BIRMINGHAM GREEN HEALTHY CLIMATE PLAN



DRAFT 9-19-2024

Acknowledgments

The City of Birmingham would like to acknowledge the people that have contributed their time and expertise to creating the Birmingham Green: Healthy Climate Plan. Their continued dedication to sustainability and climate action are a valuable public service and the community of collaboration that has been built over this time will serve Birmingham for many years to come.

The Birmingham Community

To all of the members of the Birmingham community that have responded to surveys, participated in events, had important conversations, and supported this idea from the very beginning.

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Welcome Letter

To the Birmingham Community,

These days, we are thinking green – Birmingham Green to be exact. In fact, the City has been thinking green since 1929 when the General Village Plan was adopted in part to study a growing population and ensure the preservation and protection of the natural beauty of Birmingham.

Fast forward nearly 100 years to 2024. The scientific consensus is clear that anthropogenic climate change is here, and that it could pose some of the greatest challenges of our time. The City Commission has taken quick and decisive action to begin a rigorous planning effort to reduce greenhouse gas emissions in the City while also building resiliency through more sustainable operations, deliberate improvements to public space, and collaboration across the board.

Recognizing that Birmingham is in an excellent position to become a leader in sustainability and climate action, we can start by building on our strengths. Birmingham has been a Tree City USA community for over 45 years. Protecting and expanding our tree canopy has always been important to our community and will continue to be a priority. Additionally, parks, trails and green space cover more than 10% of the City's total acreage alone. Included in this is a jewel, the Rouge River corridor, which provides not only recreational opportunities for people, but also a habitat for thousands of species of flora and fauna.

With that, we are proud to introduce the Birmingham Green: Healthy Climate Plan. This plan combines broad sustainability and climate action concepts into an actionable, equitable and far-reaching effort to ultimately achieve carbon neutrality in 2050. Birmingham Green challenges us to shed our dependence on fossil fuels, build resilience against extreme weather, cultivate flourishing biodiversity, and maintain our thriving urban tree canopy.

Now, more than ever, we need to work together. **Residents, businesses owners, property owners, and the like will play a crucial, leading role in reaching our ambitious goals.** We invite you to engage with this plan and use it to become our partner in creating a stronger, more sustainable and resilient Birmingham.

Sincerely,



Jana Ecker

City Manager





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EXECUTIVE SUMMARY

Vision
Plan Overview
Carbon Neutrality Goals
Summary of Key Actions



Birmingham Green: Healthy Climate Plan Vision

The Birmingham community will be a regional leader in sustainability and climate action by instituting policies and practices that enhance the natural & built environment, improve quality of life, and foster equity & resiliency towards a vibrant future.







Birmingham Green: Healthy Climate Plan Objectives

- Facilitate transition to renewable energy and decarbonization
- Integrate equity and address environmental injustices
- Restore natural areas and increase native biodiversity
- Promote nature-based solutions as standard practice
- Increase materials management and reduce waste
- Mitigate extreme weather impacts on the community
- Prioritize sustainable practices in all municipal and private projects



Plan Overview

The City of Birmingham is not alone in facing the challenges ahead to ensure a sustainable future. Michigan leads the nation in federal climate investments, strategic initiatives, and groundbreaking legislative victories that put our great state on track to achieve 100% clean energy by 2040. In 2020, the Michigan Healthy Climate Plan (MHCP) committed Michigan to 100% carbon neutrality by 2050 with interim greenhouse gas emission reductions of 52% by 2030 and 26% by 2025 as compared to 2005 levels. The MCHP was released in April 2022, after stakeholder engagement that included consultation with tribal governments.

As described earlier in this document, a number of techniques were used to engage stakeholders in the community and after extensive engagement, Birmingham too is ready to commit to carbon neutrality by 2050. Like Michigan, Birmingham is taking an all-of-government approach to sustainability and climate planning, working to incorporate sustainable priorities and climate action into existing departments and programs. This next section focuses on the objectives and actions of the plan, organized by focus topic area. These actions and focus topics are outcomes of the engagement process as well as extensive review of other plans. The objectives represent the overarching goals we seek to achieve through the key actions outlined in each section of the action plan. The action plan proposes a strategy for achieving these objectives. The action plan is separated into chapters by 'focus topics' modeled after the those used for GHGI emissions reporting, as well as the general organization of governmental responsibilities.

This plan's objectives and actions are expected to educate and empower businesses, institutions and residents to examine their own energy use, habitat, waste, recycling, and mobility habits and to consider what changes are possible within their own realm of control. While many actions focus on the role local government can play in creating a sustainable, resilient community, **the objectives and actions must be supported by both the public and private sectors**. A draft vision and objectives were developed early on to guide development of priority actions for each topic and to organize them. Each section of the action plan includes background information, data and details that helped inform the actions as well as tables to help prioritize the actions.

Carbon Neutrality Goals

Although the time horizon of the broader goals within this plan is 10 years (2035), the City continues to look forward. In adopting this plan, the City of Birmingham intends to align with the goals of neighboring communities, SEMCOG Region, and the State of Michigan and strive for carbon neutrality by 2050. In an effort to jump-start the reduction of emissions, the City aims to reduce 25% of emissions by 2035.



REDUCE CARBON EMISSIONS BY

25%

BY 2035

CARBON NEUTRAL BY

2050

How to Read Summary of Key Actions

Order of Magnitude Cost	Start-up Cost Range
Very Low ($)	$0 - 20,000
Low ($$)	$20,001 - 50,000
Medium ($$$)	$50,001 - 250,000
High ($$$$)	$250,001 - Over
Timeframe	**Time Range**
Short	0-5 years
Medium	5-10 years
Long	10+ years
Benefits	**Description**
Narrow	The benefits column blends together three core principles: social, environmental and economic sustainability. It aggregates environmental justice and equity, greenhouse gas reduction, and payback benefits and estimates a level of benefit that the City may expect when implemented.
Moderate	
Substanial	
Objectives	**Description**
Energy	Facilitate transition to renewable energy and decarbonization
Equity	Integrate equity and address environmental injustices
Biodiversity	Restore natural areas and increase native biodiversity
Nature-based Solutions	Promote nature-based solutions as standard practice
Extreme Weather Mitigation	Mitigate extreme weather impacts on the community
Sustainable Practices	Prioritize sustainable practices in all municipal and private projects
Materials Management	Increase materials management and reduce waste
Greyed-out icon	Objective does not apply to Key Action section

List of Partners/Departments	Description
Planning Department	Planning is responsible for assisting citizens and developers with all aspects of their development needs. Planning strives to enforce the rules and regulations in the City while also working with residents and other stakeholders to find creative solutions to urban problems.
Engineering Department	The Engineering Department oversees the planning, design, construction, and maintenance of public infrastructure such as roads, bridges, water supply systems, and sewage networks.
Building Department	The Building Department is responsible for the implementation and enforcement of City and State codes as they relate to the construction, remodeling, alteration, repair and demolition of buildings and structures located within the City of Birmingham.
City Management	The Office of the City Manager coordinates the activities of all City departments and is responsible for directing the administration of the City government, appointing all department heads, with the exception of the City Clerk, preparation of the annual budget and a long-range capital improvements program, and implementing the policies adopted by the City Commission.
Communications Department	The communications team provides the community with the latest information from the City of Birmingham using a wide variety of communication tools.
Finance Department	The primary responsibility of the Finance Department is to maintain the City's financial records in accordance with the City Charter, state law and generally accepted accounting principles (GAAP).
Department of Public Services (DPS)	The Department of Public Services (DPS) is comprised of Parks & Recreation (City Parks, Ice Arena & Golf Courses), Street/Sewer/Water & Fleet Maintenance
Birmingham Shopping District (BSD)	The BSD plans, promotes and supports a vibrant Downtown Birmingham experience for the community and visitors by engaging and leading a convergence of thriving businesses, property owners and residents.
Residents	People that reside within the City of Birmingham.
Property Owners	Individuals or entities that own residential or commercial property in the City of Birmingham.
Business Owners	Individuals or entities that own and/or operate a business in the City of Birmingham.

Summary of Key Actions

Water & Stormwater

Increase capacity for the infiltration or capture of an additional 500,000 gallons of stormwater per rain event by 2035

Action		Cost	Potential Partners	Timeframe	Benefits
WS-1	**Study the hydrology and topography of the City and produce recommendations toward targeting stormwater infrastructure improvements in areas that have the largest impact in reducing the negative effects of stormwater**	$$$	Planning Department Engineering Department Department of Public Services	Short	Substantial
WS-2	**Adopt a residential rain garden program**	$	Residents Planning Department Engineering Department	Short	Moderate
WS-3	**Develop a tracking system for green stormwater infrastructure**	$	Planning Department Engineering Department	Short	Narrow
WS-4	**Form new alliances and improve existing alliances with municipalities and organizations that address stormwater runoff to the Rouge River**	$	Planning Department Engineering Department Department of Public Services City Management	Medium	Narrow
WS-5	**Require green infrastructure installations in every public infrastructure and development project**	$$$	Planning Department Engineering Department Department of Public Services City Management	Medium	Moderate
WS-6	**Require, through ordinance, green stormwater infrastructure installations on commercial properties**	$$	Planning Department Property Owners Engineering Department	Medium	Moderate
WS-7	**Reduce indoor & outdoor potable water usage city-wide**	$$	Finance Department City Management Engineering Department Department of Public Services	Medium	Moderate
WS-8	**Require stormwater retention or infiltration on all new single-family construction**	$$	Building Department Engineering Department	Medium	Substantial
WS-9	**Reduce barriers to local stormwater credit programs**	$	Residents City Management Engineering Department	Short	Narrow
WS-10	**Engage with the Clinton River Watershed Council and become a designated WaterTown**	$$	Planning Department Engineering Department	Short	Moderate
WS-11	**Produce a feasibility study for strategic use of public easements to manage stormwater and create naturalized areas**	$$$$	Planning Department Engineering Department Department of Public Services Residents	Long	Substantial

Natural Resources

Increase native and naturalized areas in the City by as much as 470 acres by 2035.

Action		Cost	Action	Timeframe	Benefits
NR-1	**Protect and expand the tree canopy in each census tract of the City to at least 40%**	$$$	Residents Property Owners Planning Department Department of Public Services Businesses	Long	Substantial
NR-2	**Promote the transition of private gardens and landscapes to native species and remove any barriers to such**	$$	Residents Businesses Property Owners Planning Department City Management	Medium	Moderate
NR-3	**Study the issue of clear-cutting of lots in the City with special attention to tree removal during construction projects**	$$	Residents Property Owners Planning Department City Management	Medium	Moderate
NR-4	**Transition 100% of municipal plantings to native perennial plantings**	$$	Planning Department Department of Public Services City Management	Medium	Narrow
NR-5	**Revisit streetscape standards to include better environments for street trees and plantings**	$	Planning Department Engineering Department Department of Public Services	Medium	Moderate
NR-6	**Prioritize the health of the Rouge River corridor and follow the recommendations of the Birmingham Plan 2040 related to the Rouge River**	$$$$	Planning Department Engineering Department Department of Public Services City Management	Long	Substantial
NR-7	**Prohibit artificial turf as groundcover**	$$	Planning Department Building Department Engineering Department City Management	Short	Narrow
NR-8	**Require, through ordinance, green roofs to be installed on all new commercial and mixed-use buildings in the City**	$$	Planning Department Building Department Engineering Department	Medium	Moderate

Quality of Life

Publish citywide and community-level quality-of-life metrics on equity and sustainability by 2035.

Action		Cost	Potential Partners	Timeframe	Benefits
QL-1	**Develop the newly acquired YMCA building and St. James Park into a nexus of intergenerational recreation opportunities including a resilience hub that will serve as a warming and/or cooling center as needed and better connect residents to City services**	$$$$	Planning Department Building Department Engineering Department Department of Public Services City Management Residents	Long	Substantial
QL-2	**Permit community gardens in select parks and public open space**	$$	Residents Businesses Planning Department Department of Public Services	Medium	Narrow
QL-3	**Include educational opportunities in sustainability and climate action projects that are accessible to everyone**	$$	Communications Department City Management	Medium	Narrow
QL-4	**Install an air quality monitoring station in the City and connect to the EGLE network**	$$$	City Management	Medium	Narrow
QL-5	**Consider internal air quality monitoring systems in and around all municipal buildings**	$$	Building Department	Medium	Narrow
QL-6	**Support and expand upon the sustainable land use decisions of the Birmingham Plan 2040**	$$	Planning Department	Long	Substantial
QL-7	**Remove barriers to food production in residential zones and on residential properties**	$$	Planning Department Building Department Residents	Short	Narrow
QL-8	**Develop a green business certification program alongside the Birmingham Shopping District**	$$	Planning Department Birmingham Shopping District Businesses	Medium	Narrow
QL-9	**Maintain a regular flow of educational materials in newsletters, City publications, social media, and other outlets**	$$	Planning Department Communications Department Businesses Residents	Medium	Moderate

Buildings & Facilities

Reduce greenhouse gas emissions from buildings and facilities by 57,500 metric tons (50%) by 2035

Action		Cost	Potential Partners	Timeframe	Benefits
BF-1	**Develop a plan to incentivize or require the transition from natural gas to electric in residential renovation and construction**	$$	Planning Department Building Department City Management Residents	Long	Substantial
BF-2	**Promote state and local energy efficiency programs and encourage homes and businesses to complete home energy audits and upgrades**	$$	Planning Department City Management Residents Businesses	Short`	Moderate
BF-3	**Remove any barriers to the use of geothermal energy strategies in the City**	$	Planning Department Building Department Engineering Department City Management	Short	Narrow
BF-4	**Increase EV charging network city-wide**	$$$	Property Owners Businesses City Management Parking Department Planning Department	Medium	Moderate
BF-5	**Produce feasibility studies for solar photovoltaics on all City buildings and/or sites**	$$$	Planning Department Building Department Engineering Department City Management	Short	Moderate
BF-6	**Expand the City's historic preservation program to protect existing buildings and character**	$$	Planning Department Property Owners City Management Residents	Short	Moderate
BF-7	**Develop a process for comprehensively monitoring energy usage for all City buildings**	$$$	Planning Department Building Department City Management	Medium	Moderate
BF-8	**Study the feasibility and placement of a community solar facility**	$	Planning Department Building Department City Management Businesses Residents	Medium	Narrow
BF-9	**Promote green development in large commercial districts in Birmingham through improved Zoning Ordinance standards**	$$$	Planning Department, Engineering Department City Management	Medium	Substantial
BF-10	**Revise and expand ordinances related to solar photovoltaics and other alternative energy sources**	$$$	Planning Department Building Department Engineering Department City Management	Medium	Moderate

Waste

Reduce total landfilled solid waste by 2,390 tons (25%) by 2035.

Action		Cost	Potential Partners	Timeframe	Benefits
W-1	**Develop a City-wide food waste composting program**	$$$	Residents Businesses Property Owners Planning Department Department of Public Services	Medium	Substantial
W-2	**Study waste outside of the MSW program and work to improve data collection for commercial waste and other waste sources**	$$	City Management Planning Department Department of Public Services	Long	Narrow
W- 3	**Promote source reduction for waste to increase the practice of reducing or eliminating waste before it's created with a focus on plastics and food**	$$	Residents Businesses Planning Department Communications Department	Long	Substantial
W-4	**Create a deconstruction ordinance to encourage the reuse and repurposing of building material during construction projects**	$$	Residents Property Owners Building Department City Management	Long	Moderate
W-5	**Increase and improve quality of recyclables in curbside carts through direct education campaigns and audits**	$$	Residents Businesses Property Owners Planning Department Communications Department	Short	Moderate
W-6	**Require recycling opportunities in all new commercial and multifamily development projects**	$$	Property Owners City Management Planning Department Department of Public Services	Medium	Moderate
W-7	**Develop bi-annual recycling events for hard to recycle materials**	$$$	City Management Planning Department Department of Public Services Residents	Medium	Narrow
W-8	**Pilot a zero-waste policy for City-managed events**	$$$	Businesses Birmingham Shopping District Planning Department	Short	Narrow
W-9	**Invest in new local facilities and services for recycling food waste, electronics, textiles, hazardous materials and other specialty recycling**	$$$	Residents City Management Planning Department Department of Public Services	Medium	Moderate
W-10	**Engage with Oakland County on its Part 115 Solid Waste Management Plan**	$$	Planning Department Department of Public Services	Medium	Narrow

Transportation

Reduce greenhouse gas emissions from passenger vehicles by 10,000 metric tons (15%) by 2035

Action		Cost	Potential Partners	Timeframe	Benefits
T-1	**Continue to implement the City's multi-modal transportation goals**	$$	Residents Property Owners Planning Department City Management	Medium	Substantial
T-2	**Update the City's multi-modal plan**	$$$	Planning Department Building Department Engineering Department City Management	Long	Moderate
T-3	**Introduce bike sharing systems such as MoGo across the City**	$$	Residents Businesses Planning Department City Management	Medium	Narrow
T-4	**Advocate for a more frequent and reliable multi-modal transit service**	$$	Planning Department Department of Public Services City Management	Medium	Substantial
T-5	**Increase the budget for maintenance and creation of non-motorized transportation options in the City**	$$$$	Planning Department Building Department Department of Public Services	Medium	Substantial
T-6	**Increase the maintenance of, and amenities within, all non-motorized facilities**	$$$	Planning Department Building Department Department of Public Services	Long	Narrow
T-7	**Advocate for a Woodward Avenue road diet**	$$	Planning Department Building Department Engineering Department City Management	Short	Moderate
T-8	**Promote the use of mass transit in the City through enhanced transit stops and education**	$$$	Residents Businesses Planning Department Department of Public Services	Medium	Moderate

Municipal Operations

Institutionalize carbon reduction and climate resilience in City government by 2035

Action		Cost	Potential Partners	Timeframe	Benefits
MO-1	**Transition all administrative and light-duty municipal internal combustion engine vehicles and equipment to alternative fuel**	$$$$	Department of Public Services City Management	Medium	Substantial
MO-2	**Hire a full-time sustainability staff person and a stormwater specialist.**	$$$	Planning Department City Management	Short	Moderate
MO-3	**Create a sustainability fund for use by multiple City Departments**	$$	Finance Department City Management	Medium	Substantial
MO-4	**Establish a sustainable purchasing program and an internal administrative regulation**	$$	City Management Finance Department	Medium	Narrow
MO-5	**Decrease vehicle miles traveled during commute by municipal staff by 450,000 miles through incentive programs**	$$	City Management	Medium	Moderate
MO-6	**Adopt an anti-idling policy for all non-emergency City vehicles**	$$	Department of Public Services City Management	Short	Moderate
MO-7	**Identify and maintain a database of new and recurring grant opportunities geared towards sustainability and climate action**	$$	Planning Department Building Department Engineering Department City Management	Short	Narrow
MO-8	**Create, by ordinance, an Environmental Sustainability Committee to oversee and make recommendations on a variety of issues related to sustainability and climate action**	$$	Planning Department Building Department Engineering Department Department of Public Services City Management	Short	Moderate
MO-9	**Provide recycling opportunities in all public parks and other public spaces.**	$$$	Planning Department Department of Public Services City Management Residents Businesses	Short	Narrow
MO-10	**Phase out the use of all chemical pesticides, herbicides and fertilizers on City property and in park maintenance operations**	$$	Planning Department Department of Public Services City Management	Short	Moderate
MO-11	**Increase or require specialized training for all workers who manage natural spaces**	$$	Planning Department Building Department Engineering Department City Management Department of Public Services	Short	Narrow
MO-12	**Create and maintain an updated sustainability web page to act as a landing page for all City sustainability initiatives as well as to inform and educate residents on sustainable topics, best practices and relevant state and regional programs**	$$	Planning Department Communications Department	Short	Narrow
MO-13	**Develop a comprehensive public engagement plan as early as possible to ensure that residents, businesses and other stakeholders in the City have the education and information necessary to meaningfully engage with the implementation of this plan.**	$$$	Planning Department Communications Department	Short	Narrow



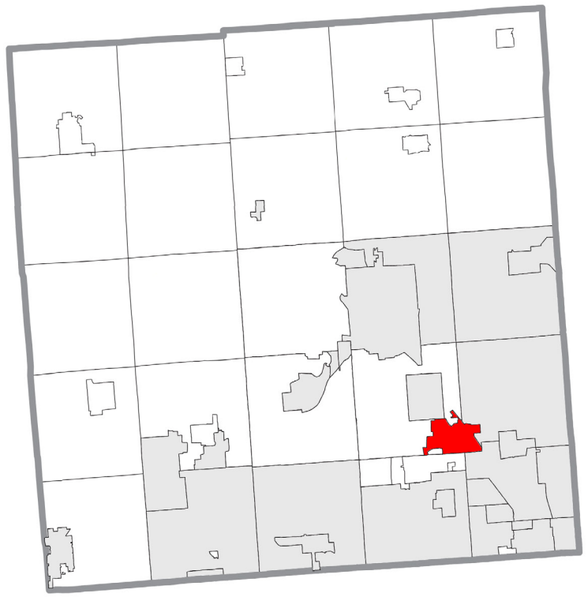
INTRODUCTION

Land Statement
Sustainability and Climate Action
Birmingham Context

Land Statement

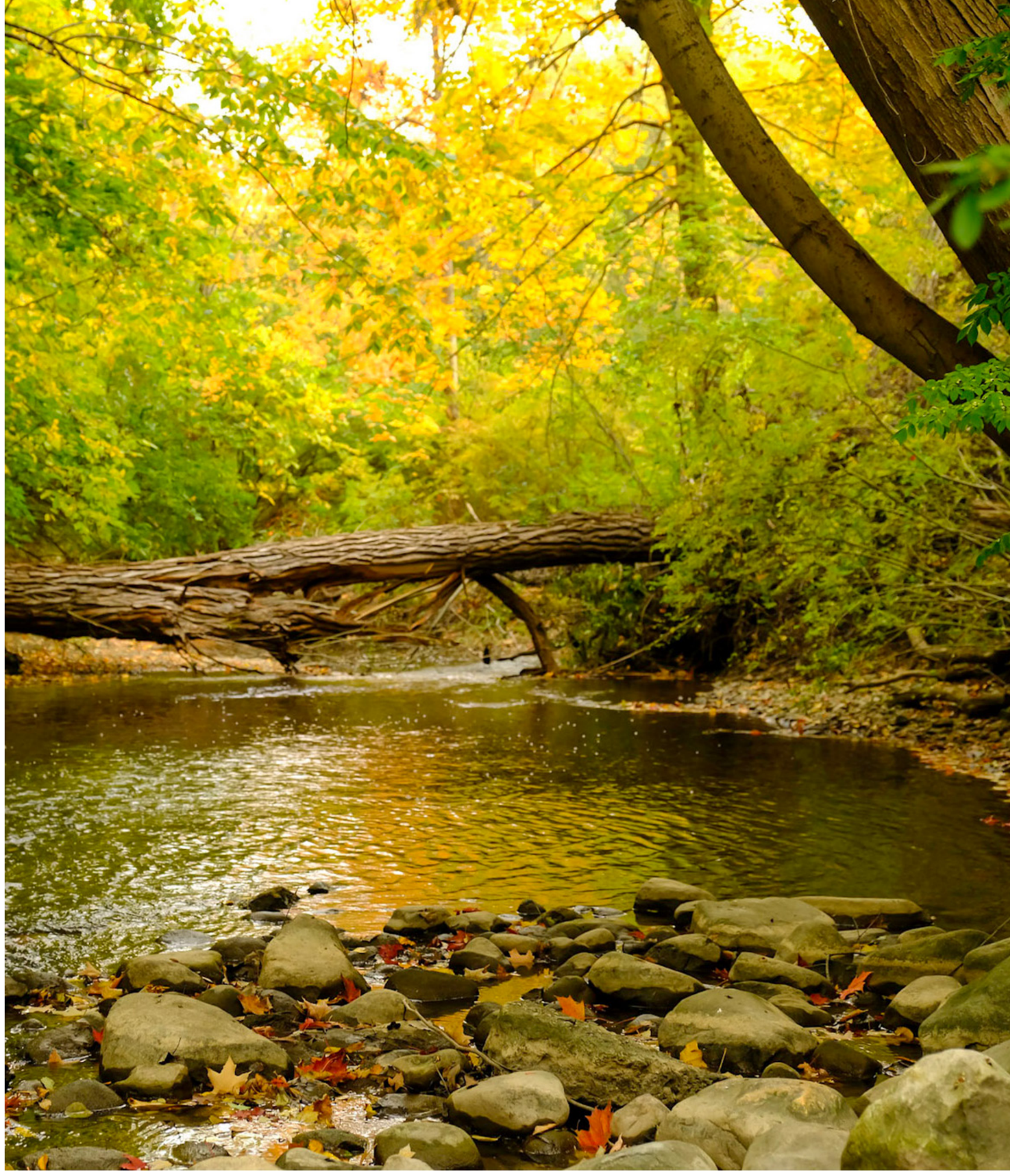
Birmingham, Michigan sits on land made by shallow seas and glacial formations, with the last glaciers receding about 14,000 years ago. Birmingham is situated on the traditional land of the Anishinaabek – Three Fires Confederacy, the Odawa (Ottawa), Ojibwe (Chippewa), and Bodewadmi (Potawatomi). We recognize that these lands have served as a site of gathering and exchange for Indigenous communities since time immemorial.

We acknowledge the resilience, strength, and ongoing presence of the Indigenous peoples who have stewarded this land throughout the generations. We also recognize the impacts of settler colonialism and the importance of understanding the history of this land. We are committed to learning more about the history and cultures of the Indigenous peoples of this area and to working towards a more just and inclusive future for all who call Birmingham, Michigan, home.





City of Birmingham situated in Oakland County



Sustainability & Climate Change

Sustainability in Birmingham refers to our ability to meet the needs of our current population without compromising the ability of future generations to meet their own needs. This concept encompasses various aspects of urban life, including environmental, economic, and social sustainability.

Environmental Sustainability: Cities need to minimize their environmental impact by reducing pollution, conserving resources, and protecting natural habitats. This involves initiatives such as promoting renewable energy, implementing green building practices, and establishing efficient public transportation systems to reduce carbon emissions.

Economic Sustainability: Sustainable cities prioritize economic development that benefits all residents while also preserving resources for future generations. This may involve supporting local businesses, fostering innovation and entrepreneurship, and investing in industries that promote sustainability, such as clean technology and green infrastructure.

Social Sustainability: Social sustainability focuses on creating inclusive and equitable communities where all residents have access to essential services, opportunities for education and employment, affordable housing, and a high quality of life. This includes promoting social cohesion, addressing issues of inequality and poverty, and ensuring that urban planning and development initiatives prioritize the needs of marginalized populations.

Another important aspect to consider is cultural sustainability. It involves preserving and celebrating the cultural heritage and diversity of a city's residents. This includes protecting historic landmarks, supporting cultural institutions and events, and promoting inter-cultural dialogue and understanding.

Achieving sustainability in all these areas requires collaboration and coordination among various stakeholders, including government agencies, businesses, non-profit organizations, and community members. It involves long-term planning, innovation, and a commitment to balancing economic growth with environmental and social responsibility for the benefit of current and future residents of the City.



Climate Change

Naturally occurring gases dispersed in the atmosphere determine the Earth's climate by trapping solar radiation. This phenomenon is known as the greenhouse effect. Evidence shows that human activities are increasing the concentration of greenhouse gases and changing the global climate. The most significant contributor is the burning of fossil fuels for transportation, electricity generation and other purposes, which introduces large amounts of carbon dioxide and other greenhouse gases into the atmosphere.

Collectively, these gases intensify the natural greenhouse effect, causing global average surface and lower atmospheric temperatures to rise, threatening the safety, quality of life, and economic prosperity of global communities. Although the natural greenhouse effect is needed to keep the earth warm, a human enhanced greenhouse effect with the rapid accumulation of GHG in the atmosphere leads to too much heat and radiation being trapped. The Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report confirms with a high level of confidence that human activities have caused an increase in carbon emissions and increase in global temperatures. Many regions are already experiencing the consequences of global climate change, and the City of Birmingham is no exception.

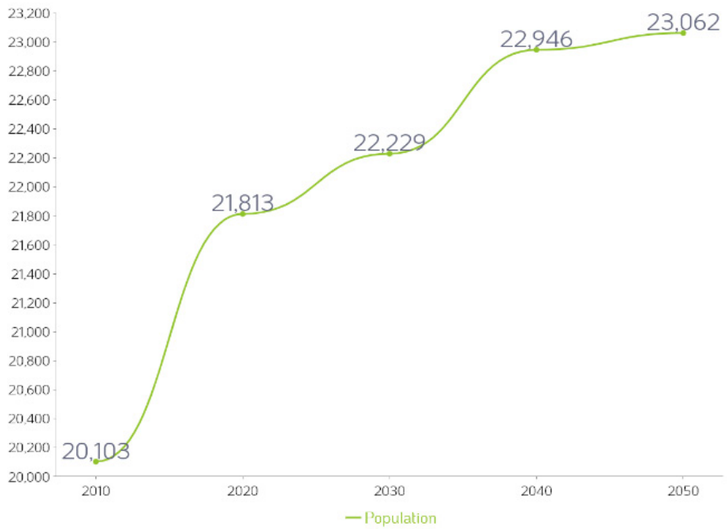


Birmingham Context

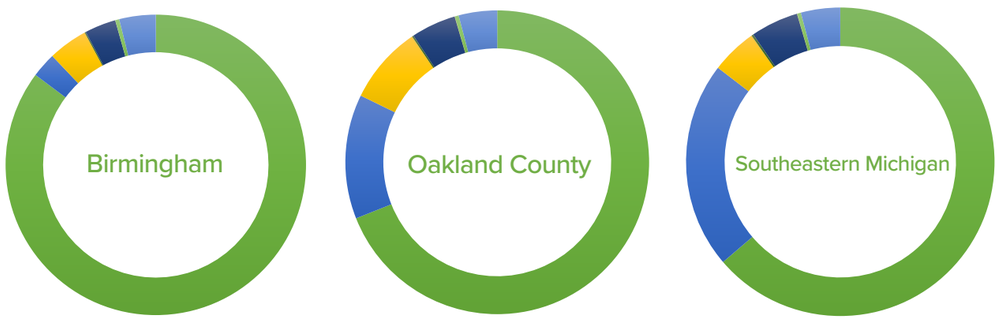
The City of Birmingham, Michigan is located in Oakland County, and is bordered by five communities: Beverly Hills, Bloomfield Hills, Bloomfield Township, Royal Oak, and Troy. Birmingham is a Engineering Department vibrant community, with a small-town feel while still being connected to all of the cultural and recreational amenities that an urban area provides. Birmingham boasts a thriving, walkable downtown, providing retail and business opportunities for both the local community and the region. Birmingham is 4.8 square miles in size and centrally located in Southeastern Michigan between the major cities of Detroit and Pontiac.

Demographics

Population Projection of Birmingham through 2050



Race (Percent)



Population & Age Demographics

21,738
2022 Birmingham Population

1,272,264 Oakland County
4,392,041 Southeastern Michigan

42.0
2022 Birmingham Median Age

41.1 Oakland County
40.1 Southeastern Michigan

Household Demographics

5,432
2010
Families

5,628
2021
Families

$151,556
2022 Birmingham
Median Household Income

$90,564 Oakland County
$71,265 Southeastern Michigan

2.91
2010
Average
Family Size

3.12
2021
Average
Family Size

9,383
2022 Birmingham Households

530.638 Oakland County
1,762,104 Southeastern Michigan

Economic Demographics

5.5%
2022 Birmingham Poverty Rate

8.1% Oakland County
13.8% Southeastern Michigan

76.3%
2021
Own their home

23.7%
2021
Rent their home



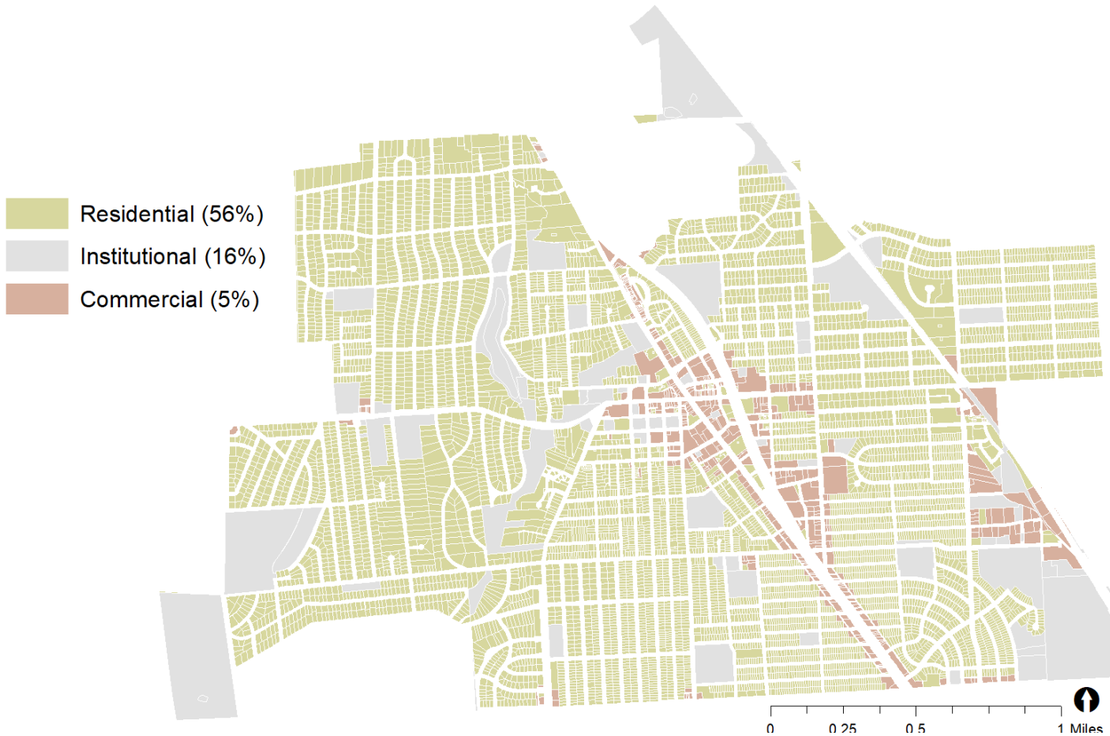
Birmingham Context

In terms of structure, Birmingham is weighted heavily towards residential. Residential land uses comprise of 56% of the land area in the City, while rights-of-way (roads, sidewalks etc.) are 23%, institutional and public land uses (schools, religious institutions, public property etc.) are 16% and commercial land uses are 5%.[1]

Birmingham Shopping District

- 1.5 million sq. ft. retail space
- 2 million sq. ft. office space
- 600 Businesses
- 7 million visitors

BSD 2023 Annual Report





Other Recent Planning Efforts

The **Birmingham Plan 2040** (“2040 Plan”) was adopted in May 2023. The 2040 Plan is a comprehensive master plan, which is a document and policy guide designed to help Birmingham conceive a vision of what we want to look like in the future. The City of Birmingham is required to adopt and maintain a comprehensive master plan pursuant to the Michigan Planning Enabling Act. The Birmingham Green: Healthy Climate Plan will exist under the umbrella of the 2040 Plan and will build upon the recommendations within the 2040 Plan while also considering its predecessors, other master plans and sub area plans within the City of Birmingham.

The **Birmingham Parks and Recreation Master Plan** was adopted in December of 2023. The updated plan prioritizes sustainability as one of its core guiding principles. Sustainability is defined in the plan as “a commitment to environmentally responsible practices, ensuring that our parks and recreation facilities continue to thrive for years to come.” The City of Birmingham is required to update its Parks and Recreation plan every 5 years to maintain eligibility for state and federal grants.

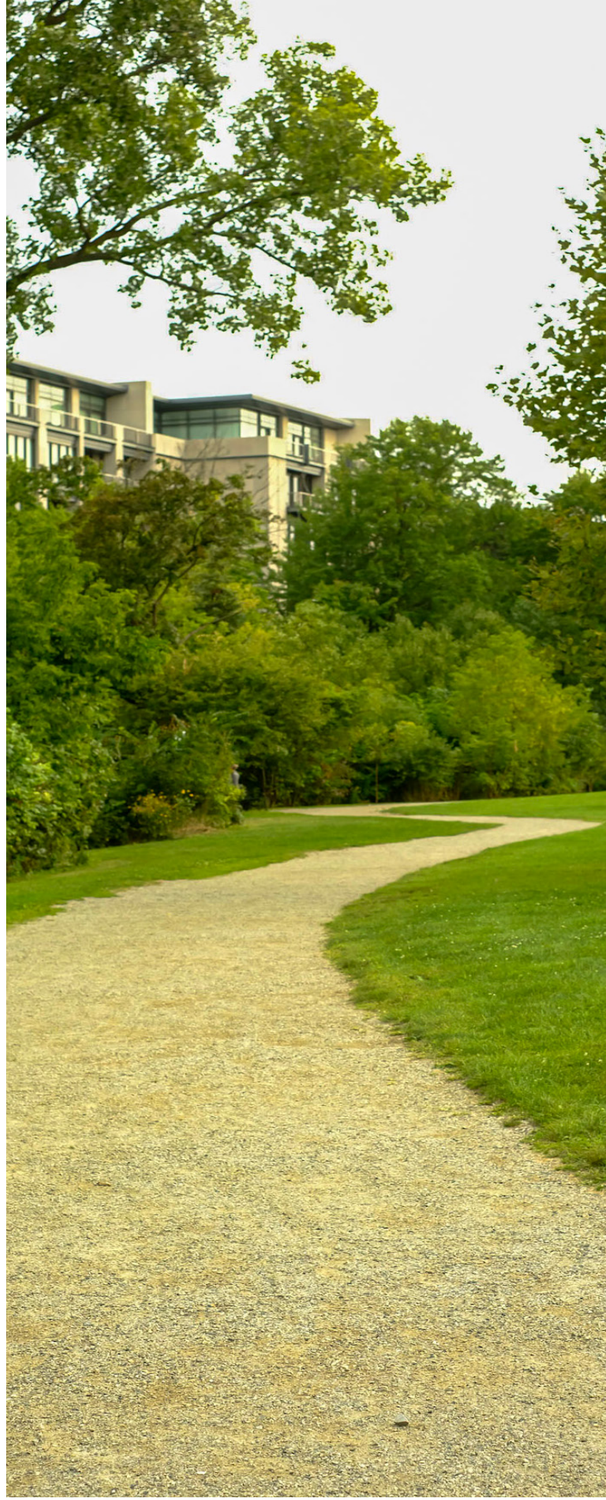
Southeast Michigan GREEN is an initiative, led by SEMCOG, to collaboratively address some of the region’s most pressing challenges—managing floods, fostering climate resilience, improving community health, protecting our natural assets—all while creating vibrant places where people want to live and where businesses will thrive. The report focuses on implementation and provides a regional framework that demonstrates the impact of local projects, positioning them for successful funding and partnership opportunities. An interactive GREEN Dashboard, an online mapping tool, accompanies the report and is a useful tool for looking at specific implementation opportunities within each locality. The GREEN Report and GREEN Dashboard will provide the basis of some site specific implementation recommendations for Birmingham’s Sustainability and Climate Action Plan.

With funding from the Inflation Reduction Act through the US EPA’s Climate Pollution Reduction Grant (CPRG), SEMCOG will develop a **Healthy Climate Plan for Southeast Michigan**. This plan is intended to connect and uplift existing State, regional and local plans, while preparing communities to be competitive for $4.6 billion in implementation grant funding for the policies and programs it identifies. The plan will cover the eight-county region of Southeast Michigan, including Wayne, Oakland, Macomb, St. Clair, Livingston, Lapeer, Washtenaw, and Monroe. As part of the CPRG, SEMCOG will develop two action plans, a priority climate action plan (PCAP) and Comprehensive Climate Action Plan (CCAP). These plans are expected to be completed by the summer of 2025.

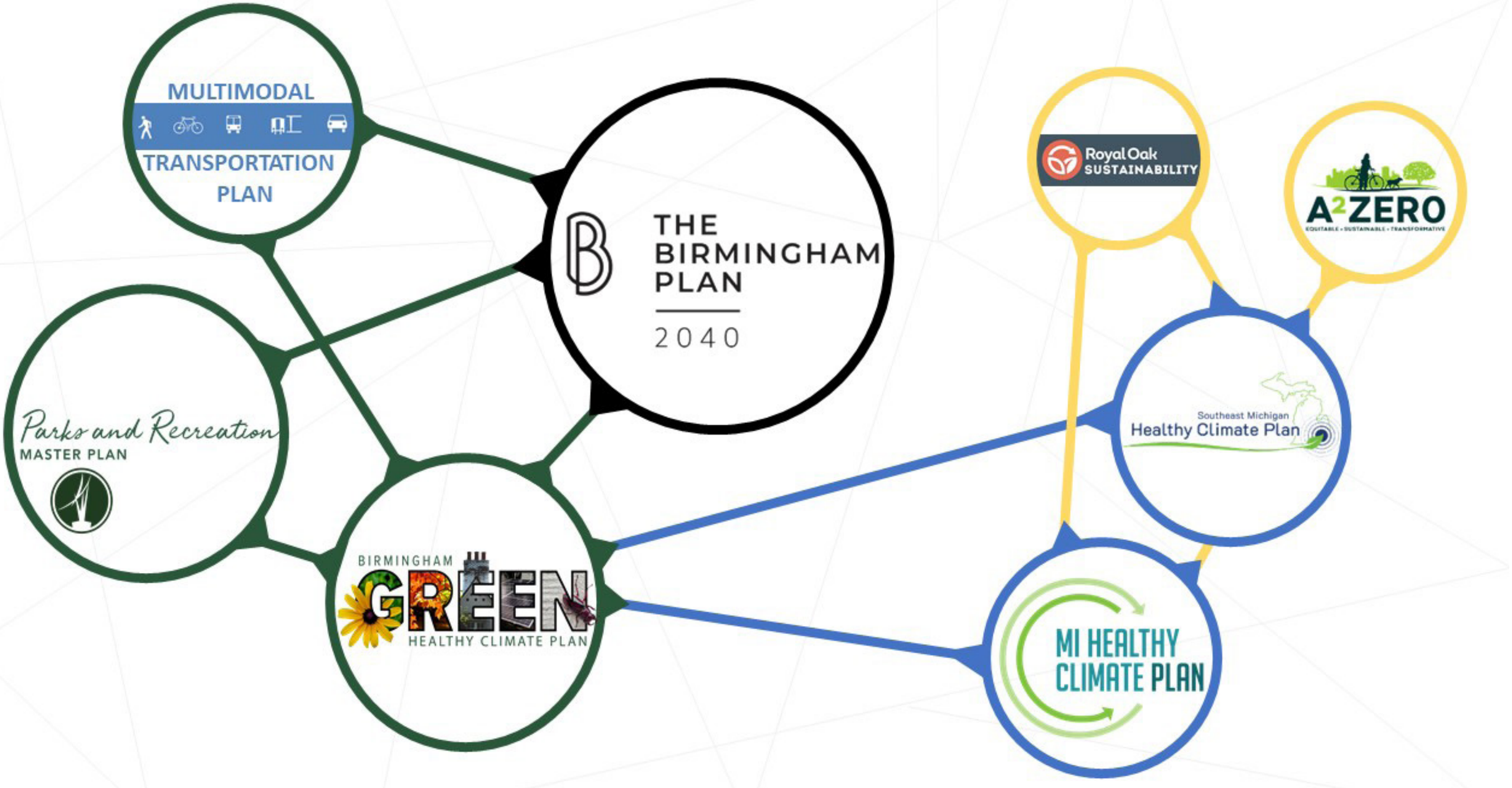
The **Michigan Healthy Climate Plan** is the state’s roadmap that charts a path to a prosperous, healthy, equitable, carbon-neutral Michigan by 2050. The plan, created by EGLE, was released in April 2022 and includes an interim target of 52% greenhouse gas (GHG) emissions reductions by 2030, from baseline 2005 levels, as part of a “Roadmap to 2030” outlining intermediate actions needed to meet Michigan’s climate goals. The objectives of the plan are to:

1. Mitigate the worst impacts of climate change
2. Spur economic development and create good-paying jobs
3. Protect and improve the health of Michiganders
4. Position Michigan as a leader in climate action
5. Safeguard our natural resources and wildlife
6. Make Michigan energy independent
7. Address environmental injustice.

The City has spent a considerable amount of time and resources implementing the 2013 **Multi-Modal Transportation Plan** (MMTP), which has provided for many miles of new and improved sidewalks, bike lanes and shared use paths, as well as other infrastructure such as bike racks and repair stations. These are all valuable additions to a multi-modal network and provide necessary last-mile infrastructure and support sustainable modes of transportation. Because the City does not operate public mass transit, the MMTP focused its recommendations on improving the environment for transit through connectivity, enhanced transit stops, and safety. The Birmingham Green: Healthy Climate Plan will support the recommendations within the current and future iterations of the City’s MMTP.



How does this plan connect?



PLAN DEVELOPMENT

Background
Public Engagement Activities
Partnerships & Leadership

Background

The City of Birmingham, Michigan has introduced environment-friendly planning schema since the General Village Plan was adopted in 1929 to address rapid urban growth and protect the then-village's natural beauty. In response to industrial pressure and development impacts of industrial uses in Detroit and Pontiac, the General Village Plan recognized the function and importance of preserving open space and natural areas such the Rouge River Valley, a regional park system, and the urban tree canopy, and suggested that zoning be immediately adopted to preserve them through single-family residential districts. Nine decades later, Birmingham has perpetuated environmental ideals through plans such as the Downtown 2016 Master Plan, Multi-Modal Transportation Plan, Parks and Recreation Master Plans, Triangle District Urban Design Plan, and the Birmingham Plan 2040, as well as its focus on mixed use, walkability, and urban design, all of which contain virtues of sustainable development and eco-friendly objectives.

The Birmingham Green: Healthy Climate Plan was developed at the direction of the Birmingham City Commission. The process started with a declaration of a climate emergency in 2023 and the creation of the Ad Hoc Environmental Sustainability Committee. The committee was tasked with drafting the plan and performing a local greenhouse gas inventory (GHGI). This decision was predated by the adoption of the City Commission's strategic goals in 2022, which elevated sustainability as one of three overall strategic goals that will guide the decision-making process at the Commission level through the year 2027.



City Commission Goals

Engaged and Connected Community - Birmingham is a community that is connected to one another and engaged in the decision making process.

- Bridge the divide that Woodward Avenue creates in the City and transform the Woodward environment
- Offer City services and amenities that enrich the lives of residents of all ages
- Encourage robust resident engagement with their government and community
- Increase Connectivity between the Rouge River trail system, downtown, and the neighborhoods

Environmental Sustainability - The City of Birmingham positions itself for a changing future by instituting policies and practices that protect the natural environment and reduce extreme weather impacts on the community.

- Create a sustainability board to review projects, investigate funding opportunities, and offer public education opportunities
- Maintain and upgrade infrastructure to prepare for future climate conditions
- Modernize City facilities for energy efficiency and sustainability

Efficient and Effective Services - Birmingham will address the needs of the community in a timely and respectful manner.

- Incorporate new technologies to improve service delivery for residents including digitization of public records and museum materials
- Build and retain an effective and professional staff who serve the community
- Create community risk reduction policies and programs that emphasize citywide increased safety and security

Public Engagement Activities

A major component of drafting the City of Birmingham Sustainability and Climate Action Plan (SCAP) was community engagement. A dedicated and comprehensive approach to community engagement provides for a plan that is collaborative, enhances communication and understanding, and fosters a sense of community and accomplishment. This section of the plan consolidates and summarizes all of the feedback we heard during the process and builds the backbone upon which this plan was created.

Public Engagement Phase 1

- **Day on the Town** – The Environmental Sustainability Committee hosted a table during the City's annual Day on the Town event, which was intended to introduce people to the Environmental Sustainability Committee (ESC) and the SCAP, as well as advertise for the community survey. Overall, several people engaged with staff and ESC members, and the City was able to disperse over 30 cards with a QR code to the survey.

- **Farmers Market** – In addition, a table was hosted at the Birmingham Farmers Market. Similar to the Day on the Town event, the focus was to get people engaged with the process, and advertise for the community survey. The heavy rainfall events in mid-August seemed to spur a robust engagement throughout the day, and as a result the City was able to inform many people about the SCAP and the survey.

- **Community Survey #1** – The City of Birmingham hosted a survey on Engage Birmingham that was designed to get a preliminary look into the feelings of the community as it relates to sustainability and climate action as a whole. In addition, the survey provided space for respondents to elaborate on any additional issues that they felt were important for the City to consider while drafting the SCAP. A complete analysis of survey responses may be found in the appendix.



Day on the Town, 2023



Farmers Market, 2023



Community Visioning Session, 2023



DPS Open House, 2022



Adams Fire Station

- **Municipal Round Tables** – As a major stakeholder in the SCAP and the goals that will be developed within it, the municipal staff was engaged through a series of round tables to get a more in-depth look into different departments and their operations/concerns. Overall, the turnout was very encouraging, and it became very clear that the municipal staff is on-board and very aware of the challenges ahead, as well as the interconnectedness of various approaches to sustainability and climate action.

- **Community Visioning Session** – The Environmental Sustainability Committee held a community visioning session in the fall of 2023. The session was split into an introduction, an activity, and a facilitated discussion with the Chief Environmental Sustainability Officer for Oakland County. Members of the community were able to provide feedback on six elements from the City Commission's Strategic Goal #2. The facilitated discussion enabled the facilitator to clarify several points of feedback and provide an opportunity for elaboration.

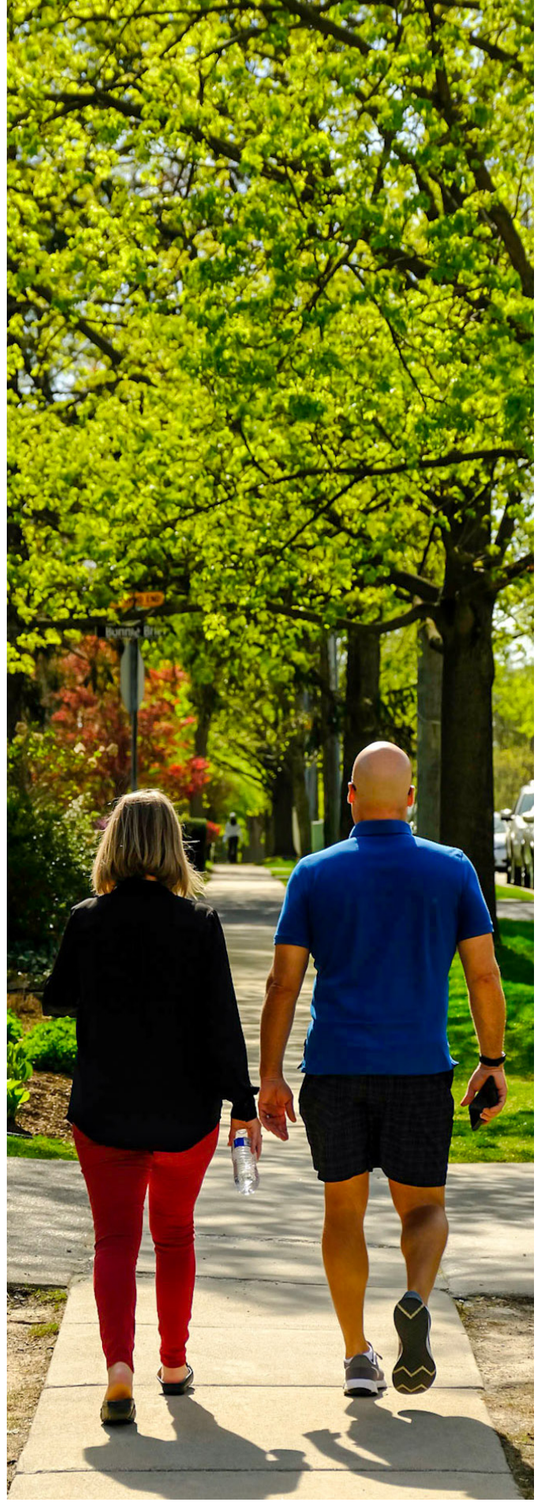
- **Newsletters & Social Media** – Since the ESC was created, the Planning Division has provided regular updates in the City's Around-Town E-Newsletters, Birmingham Beat printed newsletters, social media, and Constant Contact email services. In addition, the City has taken advantage of opportunities to speak to other media outlets such as the Birmingham-Bloomfield Eagle.

Public Engagement Phase 2

- **Community Survey #2** – The City of Birmingham hosted a second survey on Engage Birmingham that provided a deeper dive into the goals of the plan as they were developed at the time. This survey provided the opportunity for people to comment on measurable goals and how they may or may not affect different parts of the community. Nearly 150 participants completed the survey and provided critical direction for the overall goals of the plan and some ensuing actions. A complete analysis of survey responses may be found in the appendix.

- **Board and Commission Reports** – As partners in furthering the goals of the SCAP, the Environmental Sustainability Committee provided regular communications to different boards and commissions in the City to solicit feedback, but also to build bridges and ensure that the vast network of collaboration between decision makers in the City started strong and remained strong. In addition to providing reports, the Planning Department also conducted presentations at the Birmingham Shopping District, Planning Board, Historic District Commission, and Parks and Recreation Board and provided the City Commission with regular monthly progress reports.

- **Department of Public Services** – The Environmental Sustainability Committee hosted a table at the popular DPS Open House event in the spring of 2024. At this point, the SCAP was more developed, which provided an opportunity to hear about preferences related to certain goals and objectives of the SCAP, as well as any other content that visitors found interesting. This opportunity resulted in a lot of face to face interactions with a variety of different stakeholders in the City at a critical time in the drafting of the SCAP.



Public Engagement Summary

In summary, it is very clear that stakeholders feel that sustainability and climate action is important and should be a very high priority in the City of Birmingham. Overall, 82.3% of respondents felt the City of Birmingham should be a regional leader or increase community commitment to sustainability and 77.1% of respondents are very or somewhat concerned about addressing sustainability and climate action issues.

Quotes

"We have the money and education in this town to take major action. We need to work fast and think boldly about addressing climate issues."

- L.P. – Birmingham Resident

"I would like to see the city of Birmingham's commitment to sustainability and climate action extend into surrounding areas and other municipalities. Many of these changes need to be implemented on a regional and statewide level to be most effective. How can we use our resources to model sustainability and make it possible for nearby communities as well?"

- L.B. – Birmingham Resident

"We should be approaching sustainability and climate action in an order that makes sense."

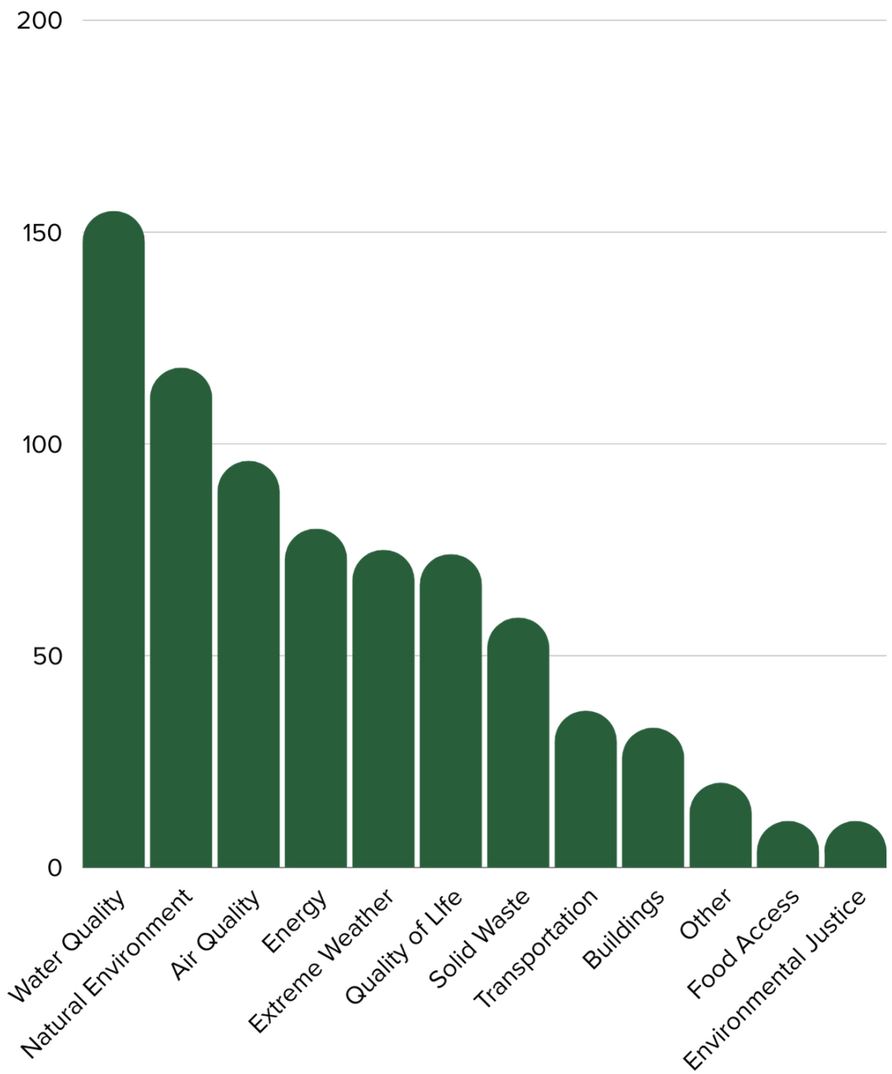
- C.M. – Birmingham Resident

"I think it is important for Birmingham to set an example as a leader on this issue. It matters to our community, to voters, and to future generations."

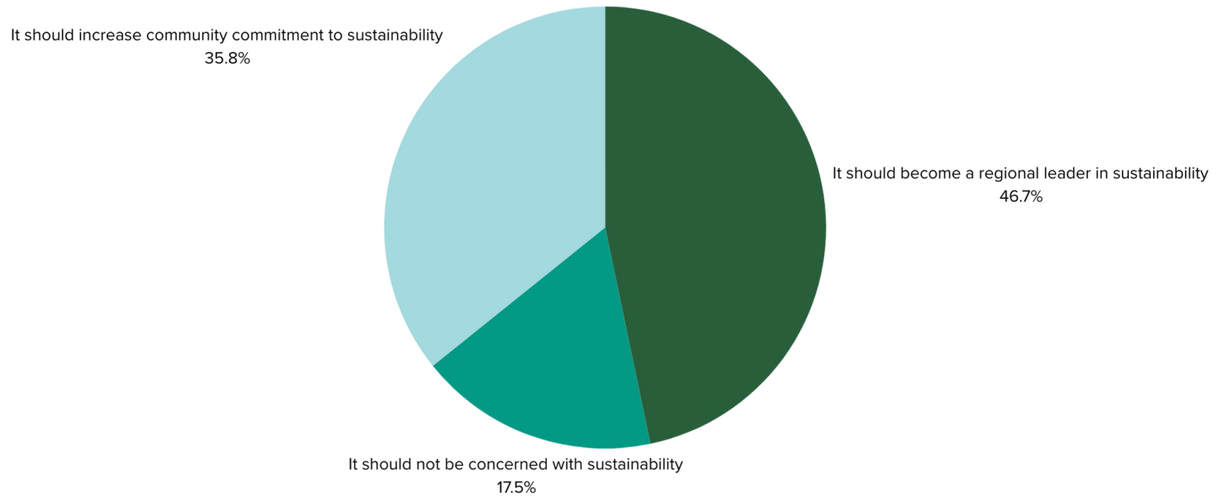
- K.D. – Birmingham Resident & Business Owner

Public Engagement Summary of Responses

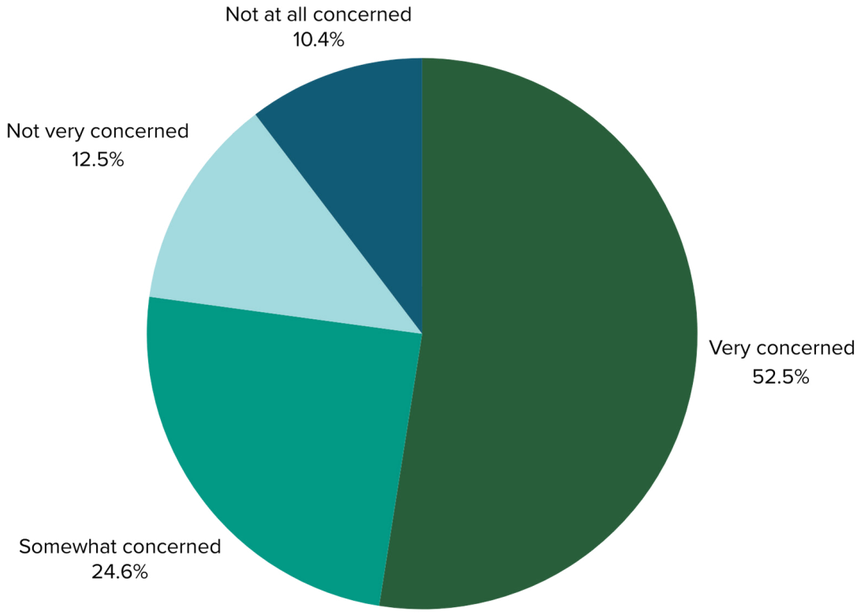
Response to community survey question asking participants to indicate their primary concerns related to sustainability and climate action in Birmingham. Respondents selected up to three answers. By far the most commonly cited concern centered on water quality, followed by the natural environment and air quality.



Responses to at what level should Birmingham be in terms of sustainable community practices?



Responses to how would you describe your overall level of concern about addressing sustainability and climate action issues?



Partnerships & Leadership

- **SEMCOG Healthy Climate Task Force** – In September 2023, Planning Director Nicholas Dupuis was appointed to the Healthy Climate Task Force to represent the City of Birmingham in the region's efforts to prepare for an influx of funding from the federal government. With funding from the Inflation Reduction Act through the US EPA's Climate Pollution Reduction Grant, SEMCOG will develop a Healthy Climate Plan for Southeast Michigan. This plan will connect and uplift existing state, regional and local plans, while preparing communities to be competitive for the $4.6 billion in implementation grant funding for the policies and programs it identifies.
- **Catalyst Leadership Circle** – The Catalyst Leadership Circle (CLC) is a peer networking group of sustainability leaders in Michigan that falls under EGLE's Catalyst Communities program. The City has been participating in the program since 2022 and has continued to be present collaborating with municipalities across Michigan. As a part of the CLC, the City has also been awarded a CLC Fellow through the program. The Fellow assisted with the creation of the City's first residential rain garden program in 2024.
- **SolSmart** – The City recently completed their first SolSmart assessment with the National League of Cities. The program is a no-cost technical assistance program that is funded by the U.S. Department of Energy Solar Energy Technologies Office. By participating in this program, the City will learn from national best practices to expand solar energy use in the City of Birmingham. After completing the program, Birmingham will be recognized with a designation of Bronze, Silver, Gold, or Platinum. Final products would potentially include Zoning Ordinance amendments and other policy changes.

SOLSMART
NATIONALLY DISTINGUISHED. **LOCALLY POWERED.**

- **EV Smart Communities** – In the fall of 2022, the City participated in the EV Smart Communities program through the Michigan Municipal League and Great Plains institute. EV Smart Communities is a recognition program designed to provide cities with a roadmap to electric vehicle (EV) readiness, including securing funding and getting projects off the ground. The path to becoming EV ready involves a portfolio of best practices and actions that include both simple steps and more complicated initiatives that makes it possible for any community to participate. After completing an initial self-assessment, the program coordinators provided the City with an analysis of EV readiness in Birmingham and developed a list of priorities for the City to pursue. The Planning Department is currently working on completing the self-directed portions of the program.
- **Michigan Green Communities** – Michigan Green Communities (MGC) is a statewide sustainability benchmarking, networking, and technical assistance program. It guides and supports communities in adapting to a changing climate, protecting infrastructure, improving the quality of life for residents and creating a more environmentally and economically sustainable future for the State of Michigan. The City has been participating in the program since 2021, and has recently earned the MGC Gold Certification level for exemplary action in multiple categories, including planning, economic development, land use, climate resilience, climate adaptation, energy efficiency, renewable energy, materials management (recycling, composting, waste diversion), water conservation and protection, clean mobility and community engagement.
- **Birmingham Green Group** – The City coordinates a regular monthly meeting of City staff to discuss sustainability issues that are new or ongoing, large or small. This group challenges each other to think green wherever possible, and fosters essential collaboration between departments in the sustainability realm.

MICHIGAN GREEN COMMUNITIES
CHALLENGE
GOLD

Alliance of Rouge Communities
OURS TO PROTECT
Working together, restoring the river

- **The Rouge River** – The City has partnered with the Friends of the Rouge for regular monitoring of the Rouge River corridor in Birmingham and will provide for opportunities for residents to get involved in activities such as spring and fall bug hunts. The City receives data on the health of the river and its ecosystems that will help protect Birmingham's most valuable natural resource. In addition, the City is active within the Alliance of Rouge Communities (ARC). The purpose of the ARC is to encourage watershed-wide cooperation and support to restore beneficial uses of the Rouge River to the area residents while meeting water quality permit requirements. Public Services Manager Charles Markus is the Vice Chair for the ARC.

- **The Clinton River** – The City has partnered with the Clinton River Watershed Council (CRWC) and became a member in 2024 to help support the work of the CRWC. Through longstanding programs like Adopt-A-Stream, StreamLeaders, Keeping-It-Clean and environmental planning, ecological, and environmental policy expertise, CRWC provides a unique set of services to communities and counties within the watershed through Local Government Memberships. Through CRWC's Local Government Membership, communities like Birmingham, and counties also become eligible for participation in CRWC's Stormwater Public Education Program, which provides the Public Education requirements for National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System (NPDES MS4) permitting.
- **RainSmart Rebates** – The Planning Department began working with the Oakland County Water Resources Commissioner in 2022 to help develop a rebate program to incentivize stormwater infiltration on private property. RainSmart Rebates is a two-year residential pilot program geared towards homeowners in the George W. Kuhn Drain Drainage District. The pilot offers homeowners up to $2,000 for implementing sustainable stormwater practices such as tree planting, rain barrel installation, or creating a rain garden on their properties. The primary goals of the program include fostering awareness about stormwater management and promoting environmental stewardship.



CLIMATE RISKS AND VULNERABILITIES

U.S. Climate Vulnerability Index
Exposure
Sensitivity and Adaptive Capacity
Key Findings



Climate Risks & Vulnerabilities

According to the U.S. Climate Vulnerability Index, understanding climate risks and vulnerabilities ("CRV's") is an imperative part of defining future adaptation strategies at any scale. Assessing CRV's in Birmingham will be a major determinant in resource allocation, action planning and advocacy. The U.S. Climate Vulnerability Index tool is designed to help understand which communities face the greatest challenges from the impacts of a changing climate while also demonstrating the drivers that are behind them that policy makers and communities can take action where it is needed most. This analysis will include identifying populations within our community that may be particularly susceptible to the hazards involved with climate change as well as a high level understanding of the physical development of the City while also attempting to address climate hazards and a community's potential approach to coping with such.

This section provides an analysis of vulnerability and risk through the lens of exposure, sensitivity and adaptive capacity.



Definitions

Vulnerability: The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

Exposure: The presence of people; livelihoods; species or ecosystems; environmental functions, services, and resources; infrastructure; or economic, social, or cultural assets in places and settings that could be adversely affected.

Hazard: The potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources. See also *Risk*.

Risk: The potential for adverse consequences for human or ecological systems, recognizing the diversity of values and objectives associated with such systems. In the context of climate change, risks can arise from potential impacts of climate change as well as human responses to climate change. Relevant adverse consequences include those on lives, livelihoods, health and well-being, economic, social and cultural assets and investments, infrastructure, services (including ecosystem services), ecosystems and species.

Climate Risks (EPA)

Acute: Acute physical risks refer to those that are event-driven, including increased severity of extreme weather events, such as cyclones, hurricanes, heat or cold waves, or floods.

Chronic: Chronic physical risks refer to longer-term shifts in climate patterns (e.g., sustained higher temperatures, sea level rise, changing precipitation patterns) that may cause sea level rise or chronic heat waves.

Adaptive Capacity: The ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities or to respond to consequences (MA, 2005).

Sensitivity: The degree to which a system or species is affected, either adversely or beneficially, by climate variability or change. The effect may be direct (e.g., a change in crop yield in response to a change in the mean, range, or variability of temperature) or indirect (e.g., damages caused by an increase in the frequency of coastal flooding due to sea level rise).

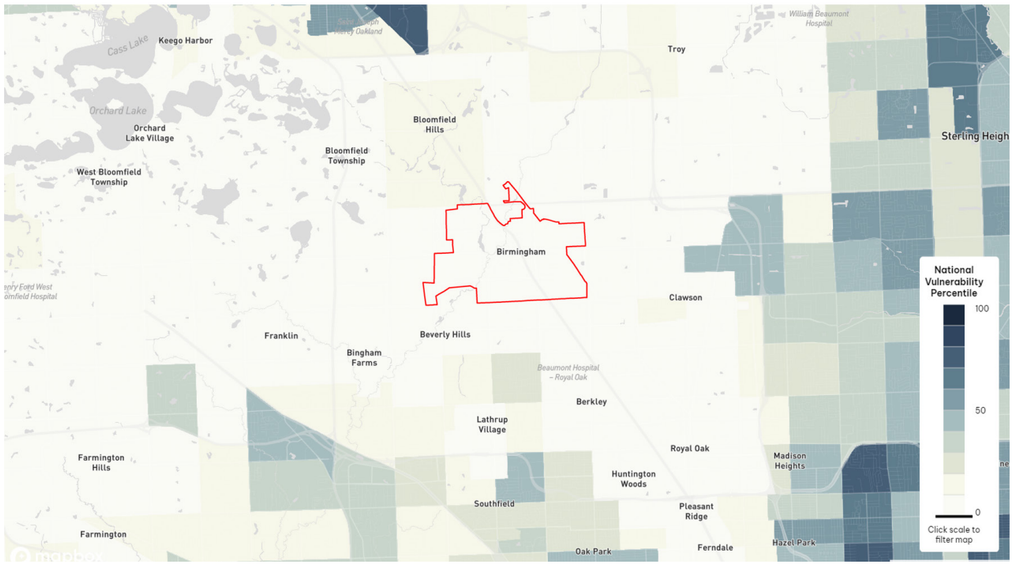
U.S. Climate Vulnerability Index

The U.S. Climate Vulnerability Index (CVI) visualizes how drivers of cumulative vulnerability disadvantage communities across the United States. Better understanding of the intersections between growing climate risks and pre-existing, long-term health, social, environmental, and economic conditions is critical to effectively building climate resilience for everyone and deploying targeted adaptation efforts.[2]

Overall, Birmingham generally ranks in the 1st and 2nd percentile for overall climate vulnerability, meaning that the majority of communities nationally are more vulnerable than Birmingham. Overall vulnerability factors together baseline vulnerabilities that reduce community resilience and climate change risks that directly or indirectly impact communities. However, Birmingham does rank in the mid-range when it comes to specific indicators such as extreme events (temperature, precipitation, storms, etc.) and the overall environment (land use, pollution sources, transportation, etc.).

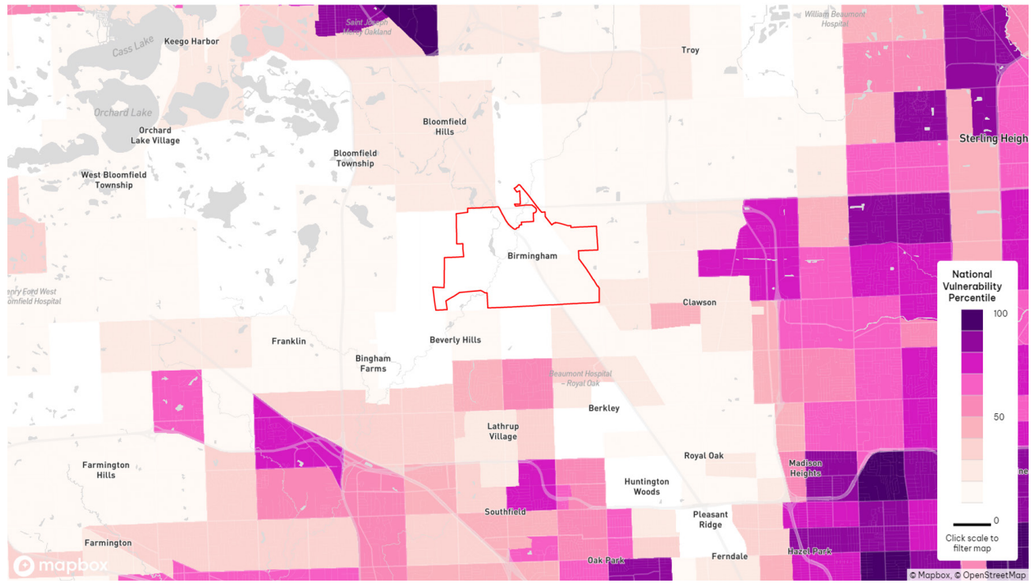
Overall Climate Vulnerability

Score combining environmental, social, economic, and infrastructure effects on neighborhood-level stability.



Community Baseline

The long-standing inequities shaping resilience to climate impacts.



Extreme Events

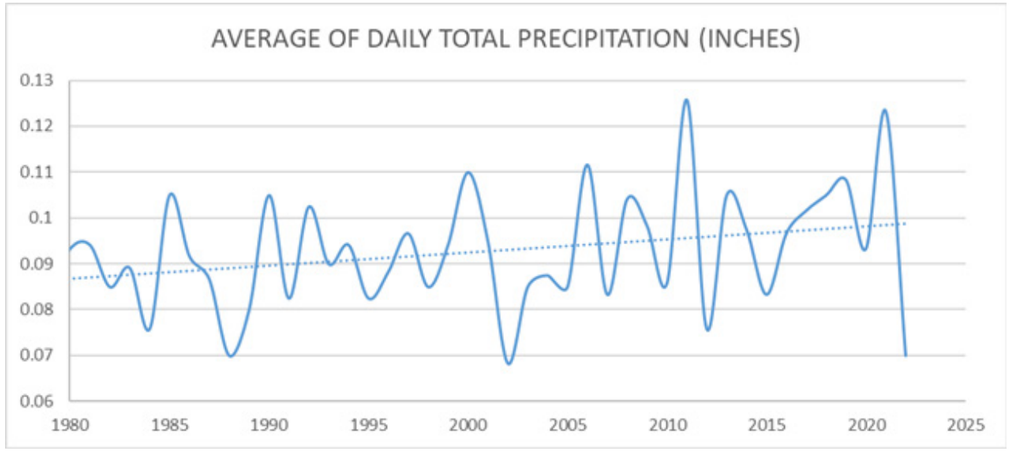
Historical and projected extreme weather event occurrences.

Exposure

The City of Birmingham is 4.8 square miles in area. Comparatively, Birmingham's area is similar to that of Orchard Lake Village, Beverly Hills, and Bloomfield Hills, but is significantly smaller than its neighbors of Royal Oak (11.8 sq. mi.), Troy (33.6 sq. mi.), and Bloomfield (25.9 sq. mi.). Overall, Birmingham is 0.52% of the total area of Oakland County (927.6 sq. mi).[3] However, Birmingham's population density is the 8th largest in Oakland County, which may leave Birmingham with a higher exposure, but also a higher payback on a per capita basis for any adaptation strategies that are adopted. Overall, Birmingham is expected to experience similar climate hazards to that of southeast Michigan such as extreme heat and increased precipitation, which based on current trends, are expected to increase all the same.

Precipitation

Similarly, changes in the frequency and intensity of rainfall are keenly felt by those affected. These unpredictable and often unyielding storm events put pressure on systems that were not designed to handle the capacity that is being demanded. This can cause significant damage to public property and infrastructure. In addition, water quality is severely afflicted in areas where combined sewer system outflows discharge into water bodies like the Rouge River.

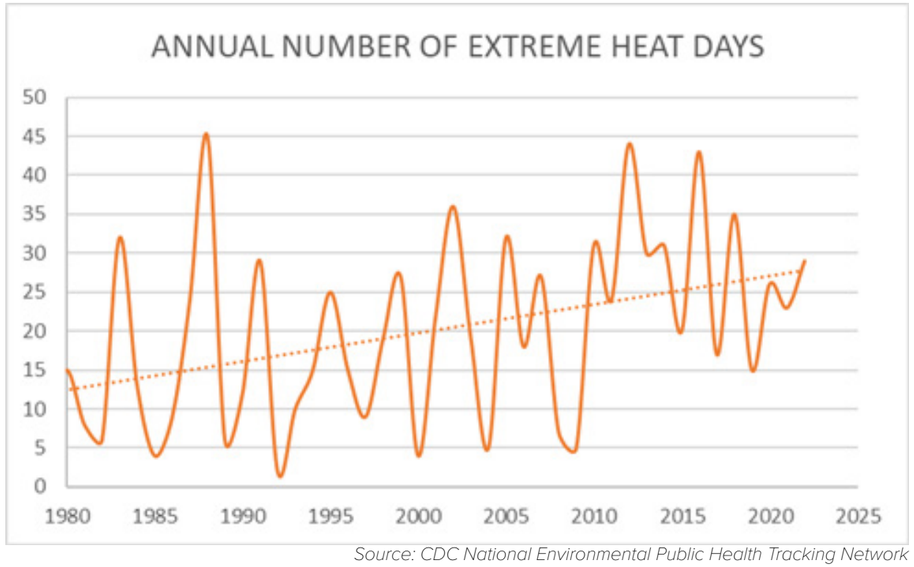


Source: CDC National Environmental Public Health Tracking Network

Extreme Heat

As one of the more perceivable effects of climate change, extreme heat hazards can present themselves in a number of ways. There is a major public health component to extreme heat, particularly with vulnerable populations such as the elderly, children, and people working outside. For people in an urban area like Birmingham, the urban heat island effect poses a greater risk from the effects of a prolonged heat wave than are people living in rural areas. In addition to health risks, extreme heat can take out power grids, decrease air quality, and damage water quality.[4] Extreme heat also plays a role in air quality. According to the National Oceanic and Atmospheric Administration, extreme heat can lead to poor air quality through ground level ozone production, increased particulate matter and the speeding up of chemical reactions in the air.[5]

Heat Island: Heat islands are urbanized areas that experience higher temperatures than outlying areas. Structures such as buildings, roads, and other infrastructure absorb and re-emit the sun's heat more than natural landscapes such as forests and water bodies. Urban areas, where these structures are highly concentrated and greenery is limited, become "islands" of higher temperatures relative to outlying areas.[6]



Source: CDC National Environmental Public Health Tracking Network

Future Projections

Although complex, the National Oceanic and Atmospheric Administration has been studying the effects of climate change and predicting weather patterns based on different variables. Their Climate Explorer tool allows users to view maps or charts that project future conditions based upon scenarios that describe specific ways the atmosphere might change. The tool can project through the year 2100. In Oakland County, the tool projects that if global emissions of heat-trapping gases continue increasing through 2100, the county could expect as much as 49 inches of rainfall a year, which is nearly 18 more inches than the observed average from 1961-1990. As far as temperature, in the same scenario where global emissions of heat-trapping gases continue increasing through 2100, the county could experience average daily temperatures of 74 degrees, which is 17 degrees higher than the 1961-1990 observed average. Should humans stop increasing global emissions of heat-trapping gases by 2040 and then dramatically reduce them through 2100, the tool predicts that total precipitation would still increase by 14.5 inches and the average daily max temp would increase 11 degrees.[7]

Sensitivity and Adaptive Capacity

As alluded to above, the effects of climate change can have different impacts on different populations. Sensitivity and adaptive capacity are often inversely correlated, meaning more sensitive populations are less likely to have the ability to adapt in the event of acute or chronic hazards. This section will analyze Birmingham's high-risk populations and other determinates of sensitivity.

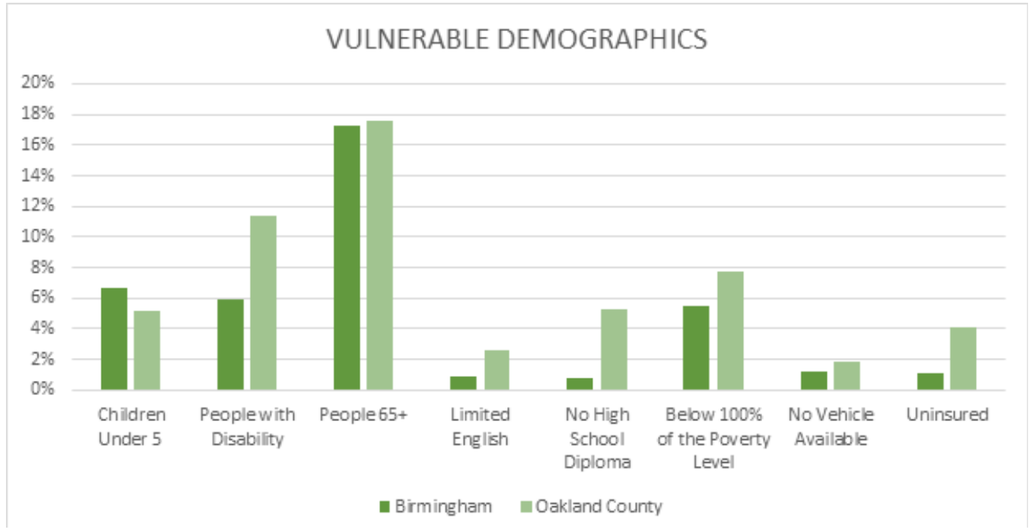
High Risk Populations

According to the U.S. Department of Health and Human Services, examples of at-risk populations may include but are not limited to children, pregnant women, older adults, people with disabilities, people from diverse cultures, people with limited English proficiency, people with limited access to transportation, people with limited access to financial resources, people experiencing homelessness, people who have chronic health conditions, and people who have pharmacological dependency.[8]

In Birmingham, we have proportionally high numbers of children and elderly persons. These populations are highest in the southeast portion of Birmingham.

Birmingham has some mechanisms to support the adaptive capacity of these populations. For example, NEXT provides services to the 50+ community such as transportation and a vast referral network to support various needs.





Source: 2022 American Community Survey (ACS): 5-Year Estimates

Community Assets

Along with people, a community's physical assets such as structures and infrastructure can also be susceptible to climate hazards. These assets can include public facilities, schools, religious institutions, roads, and other essential infrastructure that provide some level of service to a community and can contribute to its emergency preparedness. In Birmingham, its schools, public facilities and religious institutions may be considered significant assets in their locations, size, draw and influence. These assets can be strengthened and leveraged for a number of purposes from education to emergency management. When building resilience, these assets can form an essential network.

Some of the structural elements of the City of Birmingham could be considered particularly vulnerable in regards to the exposure elements noted above. In particular, the City's combined sewer system and electrical grid are of particular concern. As will be discussed in more detail in the Water and Stormwater section below, 82% of the City is serviced by a combined sewer system with diameters ranging from 6 inches to 12 inches. This infrastructure was not designed for the intensity and frequency of rainfall that is being experienced. In terms of the electrical grid, the City depends on Detroit Edison (DTE). Since 2020, DTE has experienced 39 outage events where over 20,000 customers lost power. The largest outage event saw over 866,000 customers lose power in 2023.[9] There are thousands of structures that draw on these critical infrastructure elements, including critical community assets, and these elements play a very important role in the community. In addition, older structures could play a particularly damaging role in that they may be more inefficient and require more energy to heat and cool, while also having aging sewer connections that may not meet current standards. Birmingham has 5,842 structures that were built before 1975.

Key Findings

1. Birmingham is less vulnerable to the effects of climate hazards than other areas in southeast Michigan.

2. The climate hazards that are experienced by Birmingham will continue to increase in frequency and intensity.

3. Birmingham will need to target actions toward increasing the adaptive capacities of vulnerable populations in the City.

4. Buildings will have a large role to play in adaptive capacity in Birmingham.



EMISSIONS

Greenhouse Gas Inventory Overview

Community & Local Government Operations (LGO) GHGI

Forecasts

Greenhouse Gas Emissions Inventory

Creating a roadmap for climate neutrality requires the City of Birmingham to identify priority sectors for action, while considering climate justice, inclusiveness, local job creation and other benefits of sustainable development. To complete this inventory, the City of Birmingham utilized tools and guidelines from ICLEI - Local Governments for Sustainability (ICLEI), which provides authoritative direction for greenhouse gas emissions accounting and defines climate neutrality as follows:

> The targeted reduction of greenhouse gas (GHG) emissions and GHG avoidance in government operations and across the community in all sectors to an absolute net-zero emission level at the latest by 2050. In parallel to this, it is critical to adapt to climate change and enhance climate resilience across all sectors, in all systems and processes.

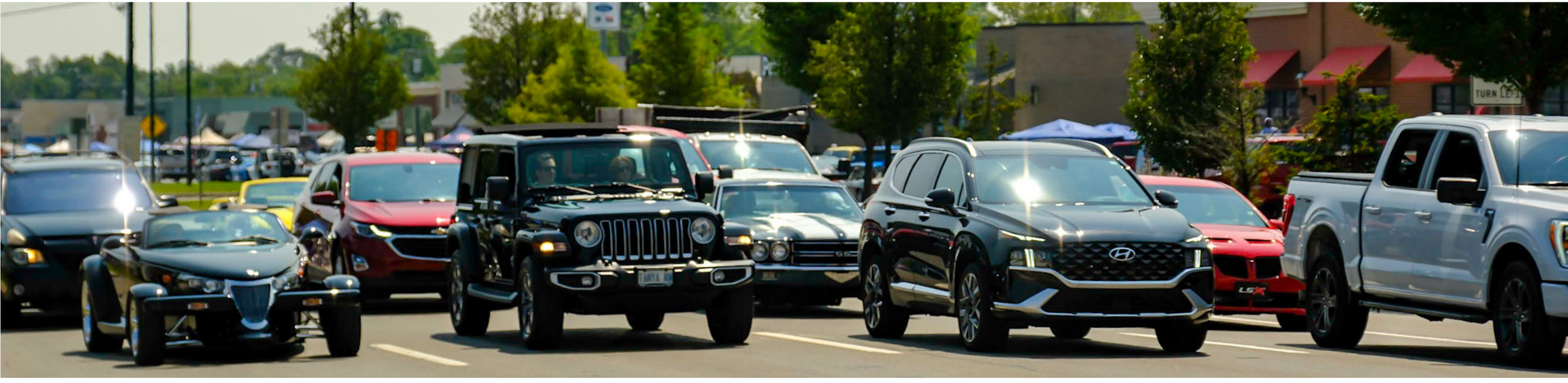
In 2023, two greenhouse gas (GHG) emissions inventories were compiled for the 2021 baseline year; one for the Birmingham community as a whole and the other for municipal operations only. Data was obtained for these inventories from the local utilities (DTE, Consumer's Energy), South Oakland County Resources Recovery Authority (SOCRRA), South Oakland Communities Water Authority (SOCWA), Oakland County Water Resources Commissioner's office (OCWRC), Great Lakes Water Authority (GLWA), Southeast Michigan Council of Governments (SEMCOG), and the City of Birmingham. The data was then entered into software developed by ICLEI – Local Governments for Sustainability. The GHG inventory produced a baseline from which to measure the City's current emissions and future emissions reduction progress.

Three greenhouse gases are included in this inventory: Carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). The standard unit for measuring GHG emissions is metric tons of carbon dioxide equivalents ($MTCO_2e$). Therefore, methane and nitrous oxide emissions are converted to $MTCO_2e$ to make comparison between emissions of the three gases possible. A full report explaining the importance, methodology and data gaps and assumptions for both GHG inventories is available on the Sustainability page of the city's website.

Key Findings

The City of Birmingham's total 2021 community-wide GHG emissions were 279,996 $MTCO_2e$ and the municipal operations (City government) GHG emissions were 4,622 $MTCO_2e$. The breakdown of Birmingham's community-wide GHG emissions for 2021 are shown in on page 62. The residential natural gas sector was the single largest contributor to community emissions (20.9%) followed by the residential electricity sector as a close second (19.6%). Residential energy, which includes both natural gas and electricity was the highest category contributor (40.5%).

As shown on page 63, emissions from municipal operations only account for 1.7% of the total community-wide emissions. It's clear for Birmingham to meet its GHG reduction goals, the community will need to participate in strategies for reducing emissions as it will require extensive effort by all of us, including households and businesses. City government will lead by example and is actively engaged in energy waste reduction initiatives within municipal operations.



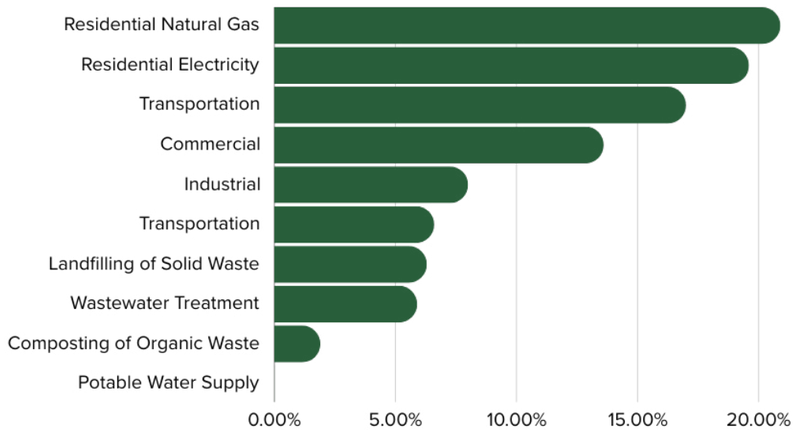
Next Steps

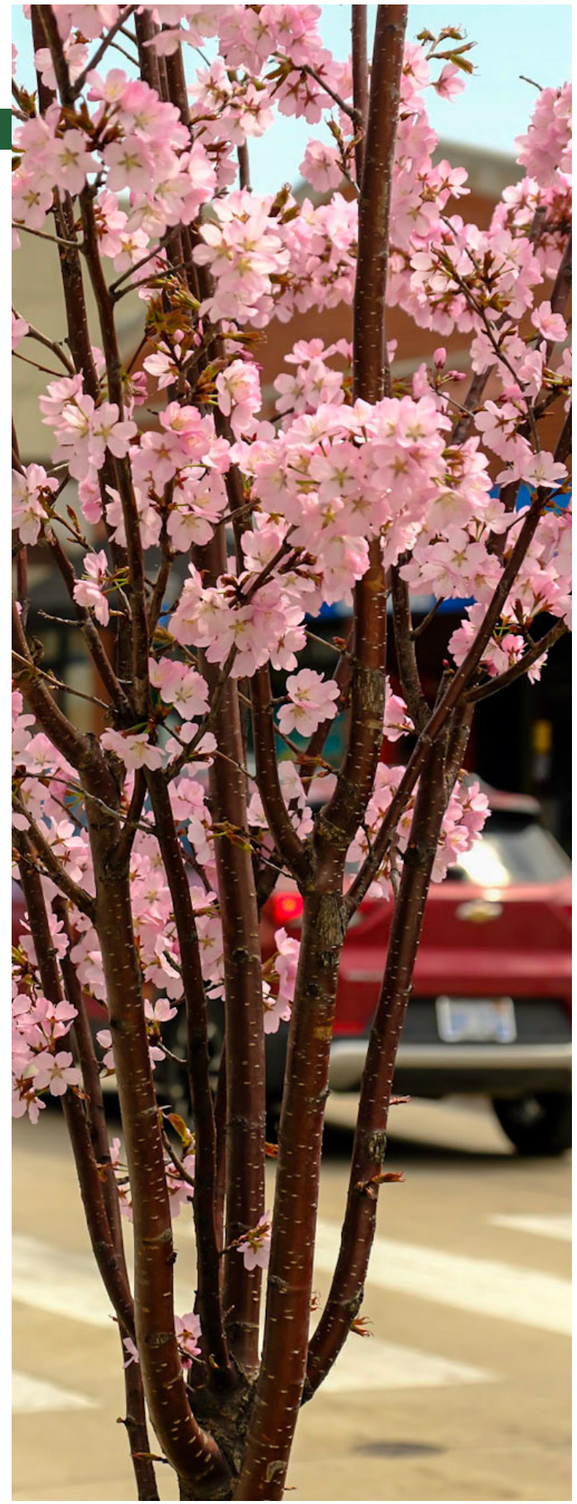
The inventory should be used to focus and prioritize actions to reduce emissions. Based on the inventory results, the following areas have the greatest potential for emissions reduction:

- Residential Energy
- Transportation & Mobile Sources
- Commercial Energy

Community-Wide Greenhouse Gas Emissions Inventory

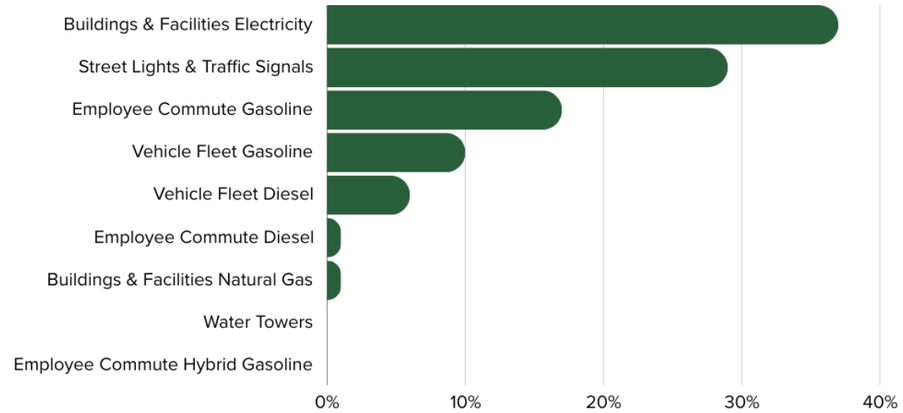
Category	Fuel or Source	Metric Tons of CO_2	Percent
Residential	Natural Gas	58,381	20.9%
Residential	Electricity	54,910	19.6%
Transportation	Gasoline	47,470	17.0%
Commercial	Electricity	38,023	13.6%
Industrial	Electricity	22,402	8.0%
Transportation	Diesel	17,685	6.6%
Landfilling of Solid Waste		16,616	6.3%
Wastewater Treatment		5,321	5.9%
Composting of Organic Waste		715	1.9%
Potable Water Supply		30	0.01%
	Total	279,996	100.0%





Local Government Operations Greenhouse Gas Emissions Inventory

Category	Fuel or Source	Metric Tons of CO_2	Percent
Buildings & Facilities	Electricity	1,712	37%
Street Lights & Traffic Signals	Electricity	1,332	29%
Employee Commute	Gasoline	771	17%
Vehicle Fleet	Gasoline	459	10%
Vehicle Fleet	Diesel	278	6%
Employee Commute	Diesel	31	1%
Buildings & Facilities	Natural Gas	28	1%
Water Towers	Electricity	7	0%
Employee Commute	Hybrid Gasoline	4	0%
	Total	4,622	100.0%



The local government operations emissions inventory points to a need to focus and prioritize actions to reduce emissions. Based on the inventory results, the following areas have the greatest potential for emissions reduction:

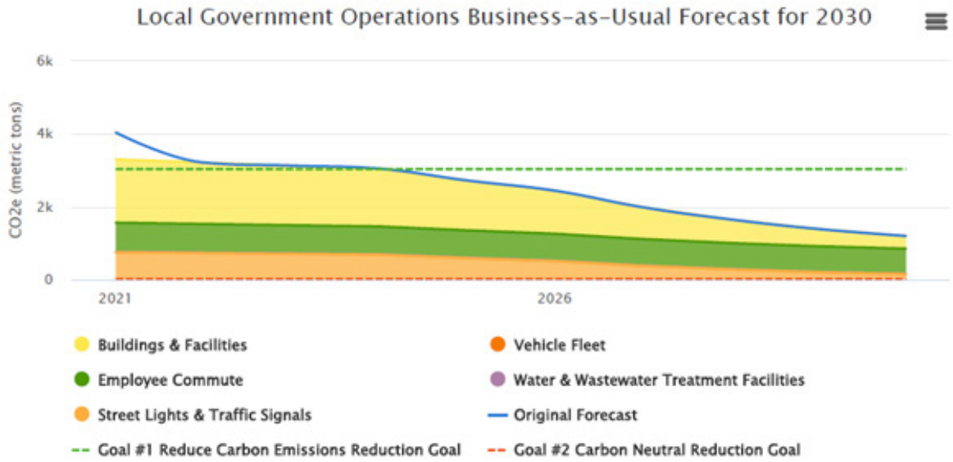
- **Buildings & Facilities**
- **Employee Commute**
- **Vehicle Fleet**

Completion of another GHG inventory in five years is recommended in order to assess progress resulting from any actions implemented.

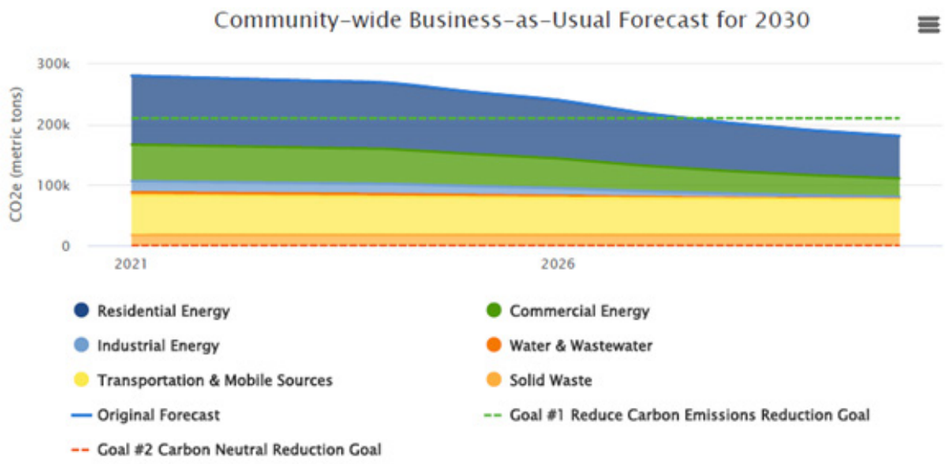


Forecasting

ICLEI's Clearpath tool also allows the City to use the inventory results to conduct a business-as-usual scenario (BAU) analyze various opportunities to reduce GHG emissions, and set projected targets for reductions. This inventory also provides the framework for future review of the city's GHG reduction goals and associated metrics for any necessary updates.



The below forecasts show estimates in Greenhouse Gas Emissions for a 'business-as-usual' (BAU) scenario. The BAU scenario takes into account population and employment growth rates for the city of Birmingham, grid emissions intensity mandates at the state level, and federal Corporate Average Fuel Economy (CAFÉ) standards under the Clean Air Act. These are considered 'business-as-usual' because they are already underway. As we develop additional sector specific goals, the tool can be used to add in specific 'Planning Scenarios' related to specific goals to estimate impacts on emissions.



ACTION PLAN

Overview & Key
Water & Stormwater
Natural Resources
Quality of Life
Buildings & Facilities
Waste
Transportation
Municipal Operations

Overview

The following section consists of seven broad topics that synthesize the concerns of Birmingham residents with the main drivers of climate change. Each section is structured with an introduction that outlines the context of the issue and justification for the goal chosen. The introduction is followed by a background that aggregates data, narratives and research to help frame the broader issue in the context of Birmingham. Finally, the conclusion section provides an action plan that outlines the specific ways that the City intends to meet the corresponding goal.

In addition, this section provides a reference on how each goal will achieve the broader vision and objectives of the plan, which may be found on pg. 7.

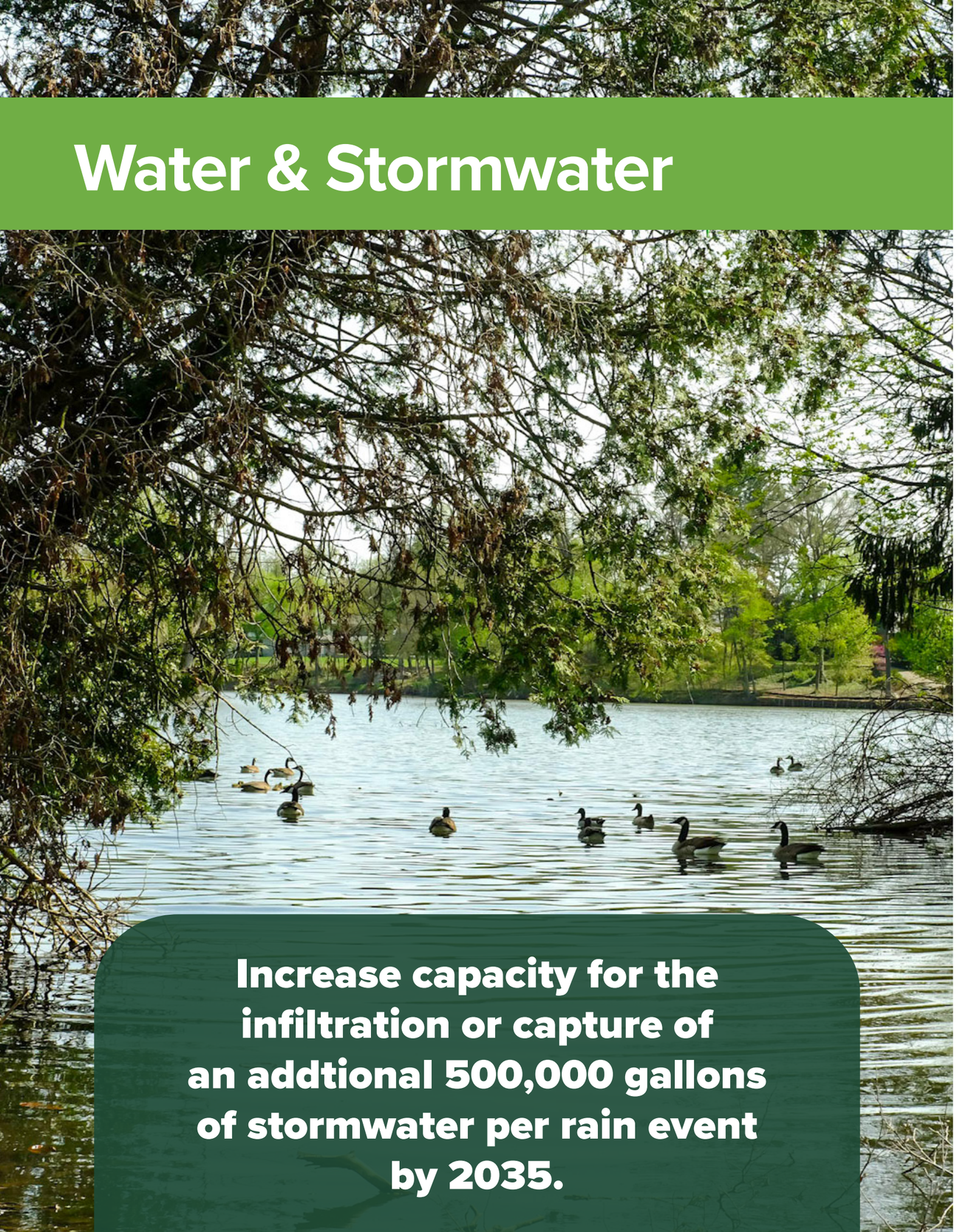
Key

Order of Magnitude Cost	Start-Up Cost Range
Very Low ($)	$0 - 20,000
Low ($$)	$20,001 - 50,000
Medium ($$$)	$50,001 - 250,000
High ($$$$)	$250,001 - Over
Timeframe	**Time Range**
Short	0-5 years
Medium	5-10 years
Long	10+ years
Benefits	**Amount of Benefit**
Narrow	The benefits column blends together three core principles: social, environmental and economic sustainability. It aggregates environmental justice and equity, greenhouse gas reduction, and payback benefits and estimates a level of benefit that the City may expect when implemented.
Moderate	
Substanial	

Objectives		Description
	Energy	Facilitate transition to renewable energy and decarbonization
	Equity	Integrate equity and address environmental injustices
	Biodiversity	Restore natural areas and increase native biodiversity
	Nature-based Solutions	Promote nature-based solutions as standard practice
	Extreme Weather Mitigation	Mitigate extreme weather impacts on the community
	Sustainable Practices	Prioritize sustainable practices in all municipal and private projects
	Materials Management	Increase materials management and reduce waste
	Greyed-out icon	Objective does not apply to Key Action section

List of Partners/Departments	Description
Planning Department	Planning is responsible for assisting citizens and developers with all aspects of their development needs. Planning strives to enforce the rules and regulations in the City while also working with residents and other stakeholders to find creative solutions to urban problems.
Engineering Department	The Engineering Department oversees the planning, design, construction, and maintenance of public infrastructure such as roads, bridges, water supply systems, and sewage networks.
Building Department	The Building Department is responsible for the implementation and enforcement of City and State codes as they relate to the construction, remodeling, alteration, repair and demolition of buildings and structures located within the City of Birmingham.
City Management	The Office of the City Manager coordinates the activities of all City departments and is responsible for directing the administration of the City government, appointing all department heads, with the exception of the City Clerk, preparation of the annual budget and a long-range capital improvements program, and implementing the policies adopted by the City Commission.
Communications Department	The communications team provides the community with the latest information from the City of Birmingham using a wide variety of communication tools.
Finance Department	The primary responsibility of the Finance Department is to maintain the City's financial records in accordance with the City Charter, state law and generally accepted accounting principles (GAAP).
Department of Public Services	The Department of Public Services (DPS) is comprised of Parks & Recreation (City Parks, Ice Arena & Golf Courses), Street/Sewer/Water & Fleet Maintenance
Birmingham Shopping District	The BSD plans, promotes, and supports a vibrant Downtown Birmingham experience for the community and visitors by engaging and leading a convergence of thriving businesses, property owners and residents.
Residents	People that reside within the City of Birmingham.
Property Owners	Individuals or entities that own residential or commercial property in the City of Birmingham.
Business Owners	Individuals or entities that own and/or operate a business in the City of Birmingham.

Water & Stormwater



Increase capacity for the infiltration or capture of an additional 500,000 gallons of stormwater per rain event by 2035.

The City splits across two watersheds – the Rouge River watershed and the Clinton River watershed. Any and all activities that involve the water system in Birmingham, including both natural hydrologic cycles and man-made infrastructure processes, affects these watersheds and the essential potable water we use every day, stormwater runoff, sewage disposal, natural environments and public health. Many of the burdens, nuisance and negative externalities of current water management and treatment activities are borne in other areas of our region. Overall, there are no less than 10 organizations, authorities or levels of government associated with water quality and treatment in Birmingham. In addition, Birmingham, much like other communities in southeast Michigan, relies on a combined sewer system that was not designed for the significant storm events that are becoming more intense and more frequent. Through the actions in this plan, the City intends to build more resilient water systems to reduce flooding and provide opportunities for everyone to have access to sufficient, safe, acceptable, physically accessible, and affordable water.

Why 500,000 Gallons?

Issues relating to water and stormwater are far and away the top concern of Birmingham residents. In order to create a goal that rose to the occasion but was also both realistic and achievable, the City analyzed the average annual precipitation within the City of Birmingham as well as significant storm events on a daily basis for the year of 2023. The average precipitation from 1986-2023 in the City is 30.22 inches. Over the course of a year (factoring in a runoff coefficient of 0.66), that equates to 1,651,658,342 gallons of precipitation entering Birmingham's sewer system annually. However, this cumulative, annual figure does not represent the volume per precipitation event. In order to understand a capacity that can make a difference, the daily data for 1 in. of precipitation and 0.5 in. of precipitation were studied for 2023. Overall, this area experienced precipitation events at 1 in. or greater 7 times, and 0.5 in. 21 times. These storm events send 55,055,278 gallons and 27,527,639 gallons, respectively, into the sewer system per event. For a 1 in. event, an additional 500,000 gallons of infiltration or capture potential could have mitigated 3,500,000 gallons of stormwater (1%). For a 0.5 in. event, 10,500,000 gallons could have been mitigated (2%). Mitigating an additional 6% of precipitation per 1 in. event and 38% of precipitation per 0.5 in. event by 2035 will go a long way to reducing the overall impact of stormwater on the City of Birmingham.

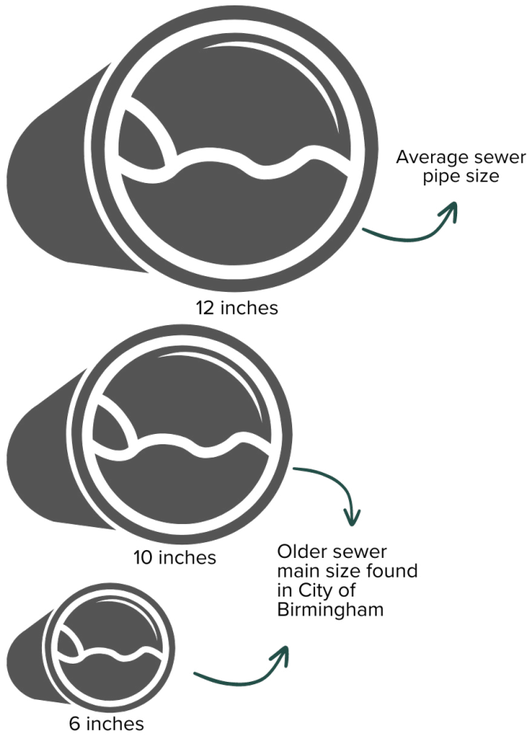
Background Material

As alluded to in previous sections, the problem of urban stormwater runoff is a compounding one. Having developed over a period of over 100 years, the City's infrastructure continues to age, and the frequency and intensity of rain events puts an overwhelming burden on a system that, in many areas of the City, was not designed for it. To get to 500,000 gallons, the Birmingham community will need to coalesce around the concept of decentralizing the responsibility for stormwater management and its related infrastructure away from government and public property alone to all property within the City. Below is an overview of four major issues related to water and stormwater in Birmingham, each crucial to understanding the overall solution.

Grey Infrastructure

The City of Birmingham owns and maintains 693,018 feet of sewer mains. Another 130,220 feet of sewer main within the City is owned and operated by the Michigan Department of Transportation, Road Commission of Oakland County, or other entities. 82% of the tributary area in the City is currently serviced by combined sewer systems in which both wastewater and stormwater flow through the same pipes. **The average diameter of sewer pipes in the City is 12 inches. However, some older sewer mains can be smaller at 10 inches, and in some places 6 inches.**

As the opportunity arises, and where feasible during road reconstruction projects, the City does separate storm and sanitary sewer lines to reduce the burden on infrastructure, but also to reduce the possibility of overwhelming combined sewer systems and discharges into waterbodies such as the Rouge River, which cause a serious hazard. According to the Environmental Protection Agency, combined sewer overflows (CSO's) are a major water pollution and public health concern and can contain bacteria, debris, and other hazardous substances that can be harmful to people, pets, and wildlife.



CSO's can also cause beach closures, shellfish bed closures, algae growth, reduced oxygen levels in waterways, and aesthetic impacts from floating debris or oil slicks.

For those areas that become separated into storm and sanitary, there still exists potential for harmful discharge. These systems do come with oversight through the states Municipal Separate Storm Sewer System (MS4) program, which itself is subject to regulation under the National Pollutant Discharge Elimination System. Birmingham maintains a permit for its MS4 areas that includes requirements for public education, illicit discharge elimination, pollution prevention, post construction stormwater runoff controls, and total maximum daily loads.

Case Study

Consider the 1,291 feet of sewer main along Westchester Way between Midvale St. and Lincoln St. The infrastructure was built in 1927 and has an average diameter of 12 inches. The maximum capacity of this stretch of sewer main is 1,014 cubic feet.

Westchester Way is a 60 ft. right-of way and runs 1,426 ft. in the same footprint. In total, the surface area of the right-of-way in this stretch alone is 85,560 square feet. Just one inch of rainfall over that surface area produces 53,336 gallons, or 7,130 cubic feet of stormwater (USGS Rainfall Calculator). Thus, one inch of rainfall could fill the entire stretch of sewer main 7 times over. For context, the National Weather Service recorded the last significant rain event on August 24, 2023 which produced an average of 1.86 inches of stormwater in Oakland County, which is nearly double that amount.



Impervious Surface

The City of Birmingham is 4.8 square miles. Although considered a suburban community, there are many areas of the City such as Downtown that have a denser urban form. Other than Birmingham's three major commercial areas, the City is comprised of predominantly single family detached housing. In fact, the land area dedicated to single family detached housing is 2.4 square miles, which is exactly half of the property area in the City. The next highest land area is rights-of-way at 1.1 square miles, followed by public property at 0.5 square miles and commercial at 0.3 square miles.

When it comes to impervious surface, there is a considerable difference between the different land areas noted above. Single family residential properties are required to have minimum open space of 40%. Open space is defined as all area of a lot except the areas occupied by a building, structure or impervious surface. Conversely, many of Birmingham's commercial areas are not required to have any open space or impervious area, save a few parking lot landscaping requirements. In terms of public space, rights of way are often unforgiving and expansive impervious areas, sometimes with greenspace on the sides or within a boulevard. The other public portions are predominantly park space.

Considering residential and commercial land areas and the differences in their relative imperviousness, there must be different approaches to stormwater for each. At a high level, if all single family properties maximized their impervious area, it would represent 1.44 square miles of impervious area, which is greater than all of the commercial and right-of-way area combined. On a standard 40 ft. by 100 ft. lot, it represents 2,880 square feet of impervious surface that has the potential to reach the city's sewer system. Using the example of a 1-inch rain event that was explored above, that translates to nearly 1,800 gallons of water. Alternatively, a significant majority of stormwater runoff on commercial property goes straight into the sewer system without the opportunity to be infiltrated by any required open space. However, there are stormwater detention requirements for commercial properties in the City, which were updated in 2024. Historically, these detention requirements have been met through underground storage as opposed to infiltration or pervious open space.

Although open space is considered pervious, not all open space is made equal in that regard. A 2010 report from the U.S. Geological Survey concluded that turf grass has a lower infiltration rate than native plants or landscapes.[10] Although it can generally be understood that the role of turf grass is not to perform significant infiltration functions, it can be inferred that turf grass can add to the urban stormwater problem, especially when considering the predominant soil composition in Birmingham, which is clay based.

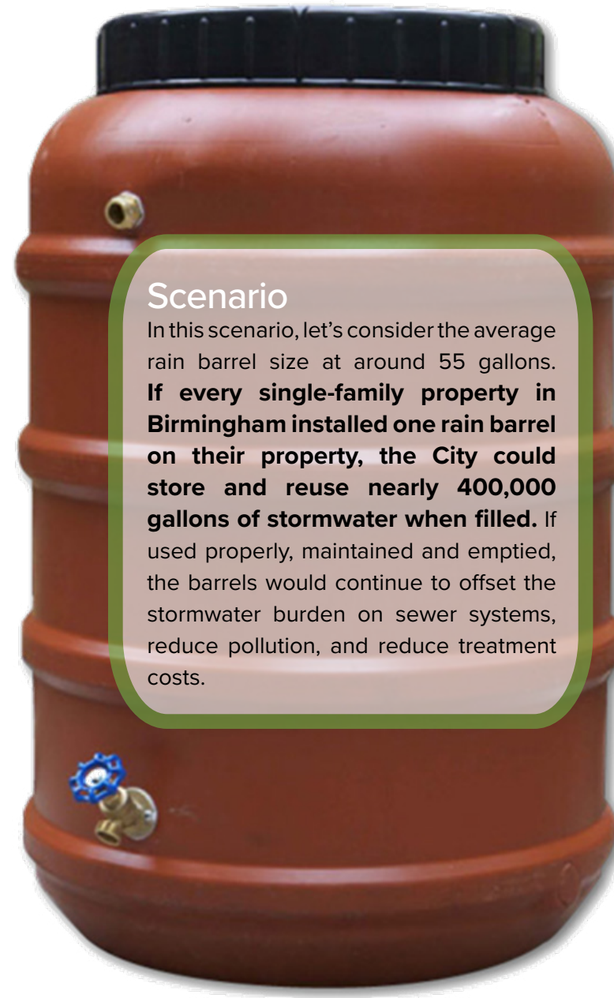
Of particular interest to the City should be addressing the public right-of-way, which consists of predominantly impervious surface (sidewalk, roads, etc.), but also often small greenspaces which are typically turf grass which as noted above do not perform at the same level as other potential options. Existing programs like Grand Rapids' Vital Streets Program can provide an easy starting point to rethinking how we approach right-of-way projects in the City to include more sustainable options where there is clearly opportunity available.

Green Infrastructure

A solution to the urban stormwater problem that has been growing in popularity over the last 10 or so years is green infrastructure. Green infrastructure reduces and treats stormwater at its source while delivering other environmental, social, and economic benefits. The 2019 United States Water Infrastructure Improvement Act defines green infrastructure as "the range of measures that use plant or soil systems, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspirate stormwater and reduce flows to sewer systems or to surface waters."[11]

Although a viable part of the solution, it is not a replacement to traditional grey infrastructure, rather a supplement to it. Green infrastructure can come in many forms, including bioswales, green roofs, tree canopy, rain barrels, or permeable pavements. Although each type provides an infrastructure service of its own, part of the benefit of green infrastructure is its flexibility and adaptability to different settings or preferences. In dense urban settings such as Downtown Birmingham, streetscape bioswales, private green roofs, or permeable pavement may be a more viable solution. Alternatively, single family properties may elect to transition some of their open space and enjoy the many benefits of a rain garden or rain barrel, or a combination of the two.

In terms of metrics, the City does not have or collect much data on green infrastructure to understand the true benefits of existing installations. According to SEMCOG's Southeast Michigan Green Dashboard, green infrastructure network components in the City of Birmingham consist of 1,195 acres of tree canopy coverage (39%), 37.4 acres of wetland, 238 acres of parks and conservation land, and 33 acres of riparian corridors.[12] The Friends of the Rouge hosts a Sustainability Mapper tool that allows residents to report different green infrastructure installations on their properties, which shows several rain garden and rain barrel installations in Birmingham. No data exists for bioswales or rain gardens that have been recently installed in the City's right-of-ways.



Scenario

In this scenario, let's consider the average rain barrel size at around 55 gallons. **If every single-family property in Birmingham installed one rain barrel on their property, the City could store and reuse nearly 400,000 gallons of stormwater when filled.** If used properly, maintained and emptied, the barrels would continue to offset the stormwater burden on sewer systems, reduce pollution, and reduce treatment costs.

Currently, Birmingham offers a Stormwater Utility Credit. These credits are offered to provide the opportunity for all property owners in Birmingham to reduce the amount of storm water that enters the sewer system from their property through green infrastructure. Credit applications require an application and are subject to renewal. Although useful, these credits have not resulted in significant changes in private property, and only one successful application for credits has been processed in 2024.

Potable Water

From 2022 to 2023, the City of Birmingham purchased 913,874 gallons of water from the Great Lakes Water Authority (GLWA), which was an increase in 10% from the previous year. For the 21,738 residents of Birmingham, clean, safe water is an essential part of a healthy and high quality life. The GLWA sources its water from Lake Huron & Great Lakes tributary, and the Detroit River to provide water to 112 communities in southeast Michigan. Current statistics indicate that the GLWA is pumping 400-500 million gallons of water per day through 816 miles of transmission mains operated and maintained by the GLWA.[14] According to the EPA, the average American family uses 300 gallons of water per day at home, 70% of which is indoors.[15]

Considering the vital importance of accessible, reliable clean water, as well as the energy, infrastructure, and capital it takes to manage clean water systems, the Birmingham community should take great strides to avoid wasting such a precious resource, along with the time and money it takes to bring it here. Solutions range from high dollar and high impact projects such as greywater recycling systems to small things like Energy Star rated appliances or regular maintenance of fixtures and plumbing to ensure that no leakages are occurring. According to the Energy & Environmental Building Alliance, greywater recycling for a family of 6 could conserve around 30,000 gallons of water a year.[16]



Scenario



Rain gardens are designed to capture and infiltrate all of the stormwater runoff from a certain area of property. Typically, rain gardens are designed to accept flow from downspouts, and thus their size is based on the roof area of a given residential building. The average footprint of buildings on a single family property in Birmingham is 2,208 square feet. To infiltrate the stormwater runoff from this area, the area of rain garden(s) would need to total roughly 450 square feet. In that 2,208 square feet, 1-inch of rainfall amounts to 1,378 gallons. According to the National Weather Service, the Detroit area received 37 inches of rain in 2023.[13] Thus, over the course of a year, **rain garden(s) collecting the runoff from the roof of the average single-family residential building in Birmingham could have infiltrated up to 51,000 gallons of water in 2023.**

Conclusion

When considering the challenges of reducing reliance and stress on grey infrastructure, reducing the impact of impervious surfaces on stormwater, and maintaining clean and safe water systems, the corresponding action plan provides solutions that range in breadth and approach while remaining tangible and realistic through the 2035 timeframe that was set for this goal. It is also important to set expectations for the stakeholders that will play a role in each solution, while also estimating implementation costs, a general timeframe, and other benefits that may come from successfully achieving this water goal. In addition, it should be understood that there must be an underlying theme of education, promotion and partnerships throughout these actions that may not be mentioned explicitly in this plan, but will be relied upon in its implementation.

Action Plan

WS-1 Study the hydrology and topography of the City and produce recommendations toward targeting stormwater infrastructure improvements in areas that have the largest impact in reducing the negative effects of stormwater.

- Description – Before the City spends significant time and resources installing stormwater infrastructure across the City, the land in and around Birmingham should be studied to understand where there are low points, problem areas, or other issues caused by topography, hydrology, or other contributors to the broader stormwater problem in the City. Ultimately, this study should produce recommendations that may be used when considering locations for new installations when funds become available.
- Stakeholders – Planning Department, Engineering Department, Department of Public Services
- Start-Up Cost – Medium
- Timeframe – Short
- Benefit – Substantial; This action will have major economic and equity benefits based on the results allowing the City to target resources where they will have the most impact.

WS-2 Adopt a residential rain garden program.

- Description – Single family property is the predominant land type in the City of Birmingham while also being one of the only land classifications with required open space, which presents a unique opportunity for residents to provide infrastructure services on private property.
- Stakeholders – Residents, Planning Department, Engineering Department
- Start-Up Cost – Very Low
- Timeframe – Short
- Benefit – Moderate; Increasing the amount of green infrastructure on private property will have economic and equity impacts.

Develop a tracking system for green stormwater infrastructure. WS-3

- Description – To better understand and quantify the effects of any green stormwater infrastructure installations, the City will need to develop a tracking system with the relevant details of the size and scope of each installation. This tracking system would focus on public installations and private installations where it is feasible to gather data such as stormwater credit applications, rain garden program applications, or commercial installations.
- Stakeholders – Planning Department, Engineering Department
- Start-Up Cost – Very Low
- Timeframe – Short; A new tracking system will not have direct benefits, but will contribute to the broader economic and equity benefits that green stormwater infrastructure presents.
- Benefit – Narrow; A new tracking system will not have direct benefits, but will contribute to the broader economic and equity benefits that green stormwater infrastructure presents.

Form new alliances and improve existing alliances with municipalities and organizations that address stormwater runoff to the Rouge River. WS-4

- Description – Birmingham is only one of 48 communities within the Rouge River watershed. The activities that take place in Birmingham follow the flow of the Rouge all the way through its delta at the Detroit River. Organizations such as the Alliance of Rouge Communities and the Friends of the Rouge provide an opportunity for Birmingham to engage and to improve the health of the entire river, including the roughly 4 miles of river that runs through Birmingham.
- Stakeholders – Planning Department, Engineering Department, Department of Public Services, City Management
- Start-Up Cost – Very Low
- Timeframe – Medium
- Benefit – Narrow; Forming these alliances will contribute to the broader health of the Rouge River and the economic, equity, and carbon reduction benefits that come with it.

WS-5 Require green infrastructure installations in every public infrastructure and public development project.

- Description – In order to be a leader in the implementation of green infrastructure practices, the City must practice what it preaches. With 1.1 square miles of public right-of way and 0.5 square miles of public property, there is ample opportunity to build green infrastructure into all construction projects that the City embarks upon, whether it be a road improvement or building.
- Stakeholders – Planning Department, Engineering Department, Department of Public Services, City Management.
- Start-Up Cost – Medium
- Timeframe – Medium
- Benefit – Moderate; Increasing green infrastructure installations on road projects, which are becoming more frequent, will have equity and economic benefits in the reduction of grey infrastructure.

WS-6 Require, through ordinance, green stormwater infrastructure installations on commercial properties.

- Description – Currently, the City's Zoning Ordinance does not require green infrastructure in any form on commercial properties. In fact, landscaping in general is only required in rare instances on commercial property. In order to contribute to the goal, the City will need to require commercial properties to install green infrastructure in the form of trees, green roofs, bioswales, rain gardens, or other forms.
- Stakeholders – Planning Department, Property Owners, Engineering Department
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Moderate; Introducing greenspace with an infrastructure function on commercial properties will have equity and economic benefits.

Reduce indoor & outdoor potable water usage City-wide. WS-7

- Description – Sufficient, safe, acceptable, physically accessible, and affordable water is an essential facet of a healthy community, and is often taken for granted. Efficient and responsible water usage will ensure that Birmingham's water system, which depends on a larger overall system, can remain resilient and affordable into the future.
- Stakeholders – Engineering Department, City Management, Finance Department, Department of Public Services
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Moderate; Based on the cost and growing scarcity of potable water, being more responsible at the tap will have an economic and equity benefit.

Require stormwater retention or infiltration on all new single-family construction. WS-8

- Description – The construction of new single-family homes in Birmingham is a common occurrence. In fact, since 2015, the City has issued an average of 100 demolition permits per year to build new single family homes. The construction of new houses affords an opportunity for the city to require the capture of stormwater to reduce the impact of decreased open space and the compaction of soils.
- Stakeholders – Building Department, Engineering Department
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Substantial; Due to the rate at which homes are being demolished and rebuilt, this action could have major equity benefits while also contributing an economic benefit.

WS-9 Reduce barriers to local stormwater credit programs.

- Description – The City's stormwater credit program is a good way to incentivize the installation of several different green infrastructure approaches. However, if the cost and complexity of the process to apply for credits outweighs the benefit for a majority of the residents in the City, it will remain underutilized and will not contribute to the City's overall goal.
- Stakeholders – Residents, Engineering Department, City Management
- Start-Up Cost – Very Low
- Timeframe – Short
- Benefit – Narrow; The stormwater credits already exist, but reducing any barriers will provide an equity benefit.

WS-10 Engage with the Clinton River Watershed Council and become a designated WaterTown.

- Description – Although the Rouge River runs directly through Birmingham, it is important not to forget that a significant portion of the City also exists within the Clinton River watershed. Thus, the importance of improving water quality and alleviating climate change impacts are just as important in this watershed as they are in the Rouge River watershed. The WaterTowns program is managed by the Clinton River Watershed Council, and aims to make improvements though promoting and implementing green infrastructure and advancing water-oriented community and recreation opportunities.
- Stakeholders – Planning Department, Engineering Department
- Start-Up Cost – Low
- Timeframe – Short
- Benefit – Moderate; Becoming a WaterTown will open the door to economic benefits and will produce equity benefits.

Produce a feasibility study for strategic use of public easements to manage stormwater and create naturalized areas. WS-11

- Description – The public rights-of-way within the City are a major opportunity for improvement due to the significant impervious area and its sheer footprint within the City in terms of land area (692 acres). In rethinking the easement areas of this land, the opportunities could include reduced flooding of streets/sidewalks, high visibility, large absorption value, and reducing direct runoff into the Rouge River. The strategy could start with a pilot, but ultimately should be constructed as a network.
- Stakeholders – Planning Department, Engineering Department, Department of Public Services, Residents
- Start-Up Cost – High
- Timeframe – Long
- Benefit – Substantial; Rethinking these significant portions of the right-of-way will have economic and equity benefits.

What can I do as a...

Individual?

- ☐ Review historical water quality reports
- ☐ Learn about Birmingham's Stormwater Credit program
- ☐ Take the 10 Minute WaterSense Challenge
- ☐ Read about the Great Lakes Water Authority
- ☐ Sign up for emails from the Friends of the Rouge
- ☐ Sign up for e-news from the Clinton River Watershed Council
- ☐ Build or adopt a rain garden
- ☐ Replace failed or worn out fixtures with low-flow fixtures
- ☐ Reduce excessive irrigation habits
- ☐ Purchase and install a rain barrel
- ☐ Save money on water bills by using outdoor irrigation systems only in dry periods and by updating your system with water saving controls
- ☐ Learn about greywater reuse
- ☐ Make sure your storm drains are clear of debris

Business Owner?

- ☐ Invest in stormwater capture
- ☐ Replace failed or worn out fixtures in commercial buildings
- ☐ Act as conduit for customers to information on water programs from City of Birmingham
- ☐ Reduce excessive irrigation habits
- ☐ Replace failed or worn out fixtures with low-flow fixtures
- ☐ Learn about greywater reuse

Natural Resources



Increase native and naturalized areas in the City by as much as 470 acres by 2035.

Increase native and naturalized areas in the City by as much as 470 acres by 2035.

When it comes to sustainability, resiliency and adaptation, the natural environment and the resources within it offer boundless opportunity. In its renewal, restoration and creation, a city such as Birmingham, through the natural environment, can sequester more carbon, cultivate and nurture critical habitats, support ecosystem services, mitigate stormwater runoff and reduce the urban heat effect (to name a few). As a dense and desirable suburb in Metro Detroit, more and more land is given over to human activities, which can exacerbate the effects of climate change. Rethinking natural environments such as the Rouge River corridor, public parks and open space, or the over 1,500 acres of private single family property could go a long way in addressing aesthetics and reinforcing function.

Why 470 Acres?

A high-level analysis of the land classification in Birmingham provides that out of the 3,072 acres in Birmingham, over half (61%) of the City could be made up of impervious surfaces. These impervious surfaces contribute to rising temperatures, stormwater runoff, and lack of biodiversity in the City. In some cases, a new 470 acres of native and naturalized area will replace impervious surface, but it could also replace under functioning pervious surfaces such as turf grass

Background Material

Birmingham's natural resources date back hundreds of years. It is important to be good stewards of these natural resources to continue to enjoy the benefits of such. When it comes to natural resources, the City's tree canopy, Rouge River corridor, and native landscapes are prevailing attributes of our beautiful and sought after City. Because of their prevalence, they are fairly well documented in master plans, policy, and other guidelines within the City. Most recently, the Birmingham Plan 2040 (2023) and the Parks and Recreation Master Plan (2023) contain many recommendations regarding natural resources that were not restated in this plan. Rather, the following is meant to fill gaps, expand upon, or support the recently established and adopted recommendations found within those plans.

Tree Canopy

According to SEMCOG's Southeast Michigan Green Dashboard, the City of Birmingham has 1,195 acres of tree canopy coverage, which is about 39% of the City as a whole. Comparatively, our neighbors Royal Oak are at 34%, Troy at 31%, Bloomfield Hills at 55%, Bloomfield Township at 48% and Beverly Hills at 53%. Overall, Oakland County is at 49%. This analysis from SEMCOG was performed using artificial intelligence from 2022 leaf-on aerial imagery data and includes public and private canopy. In terms of City collected data, the Forestry Division of the Department of Public Services regularly collects data on City-owned trees on streets and in select parks. Complete 2021 data suggests that there are almost 17,000 public trees in these areas of various heights, species and age.

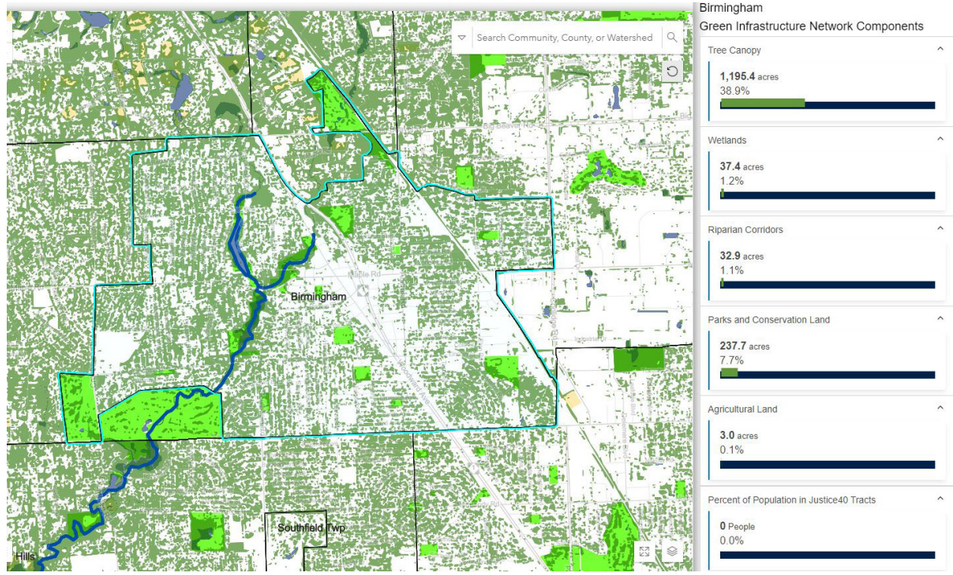
A healthy and diverse urban tree canopy is an essential part of Birmingham, and is considered a key natural resource due to its ecosystem services, carbon sequestration potential, positive impacts on human health, mitigation of stormwater runoff, and energy savings. Overall, Birmingham is doing well, but has some shortcomings along Woodward Avenue and within its large commercial districts. Regardless, Birmingham has been recognized as a Tree City USA community for 46 years, which is the third longest in Michigan and has been recognized almost as long as the program has been in existence (1976). To qualify for Tree City USA recognition, Birmingham (1) formed a tree/forestry department, (2) established a tree care ordinance, (3) maintained a community forestry program with an annual budget of at least $2 per capita and (4) consistently proclaims and observes Arbor Day.[17]

In regards to human health and carbon sequestration, the two are closely related considering the broader topic of air quality. From the perspective of greenhouse gas emission reduction, trees act as a "carbon sink" by capturing and storing carbon in their biomass. According to the Arbor Day Foundation, research suggests that a mature healthy tree will absorb more than 48 pounds of carbon dioxide annually.[18] A 2001 study estimated that the State of Michigan, through its trees, sequesters 668,000 tons of carbon per year.[19] In considering the sequestration potential of trees, it is essential to understand some of the limitations of

Birmingham Tree Canopy by Census Tract

The City of Birmingham contains seven census tracts. Analysis at the census tract level allows for a flexible and meaningful analysis of different data. In the case of tree canopy, it could allow for the City to utilize an established boundary to determine tree canopy deficiencies in different areas of the City (as opposed to arbitrary boundaries or neighborhood boundaries, which can often change).[20] The following analysis demonstrates the tree canopy coverage for each census tract in the City:

Census Tract	Area (Acres)	Tree Canopy (Acres)	Percentage
152600	638	297.9	46.7
152700	807	316.4	39.2
153200	208	53	25.5
153300	345	103.2	29.9
152900	603	183.4	30.4
153100	422	NO DATA	NO DATA
153000	211	90.2	42.7



these estimates such as species, tree density, and growth/mortality rates. Using this estimate, while acknowledging the limitations, the publicly owned and managed trees in Birmingham's streets and select parks alone could sequester more than 807,408 pounds or 404 tons of carbon per year.

Although reducing carbon dioxide in the atmosphere is a component of improving air quality, it is not the only component. In fact, the Air Quality Index identifies and collects data five major pollutants to produce its air quality data: ozone, particle pollution, carbon monoxide, nitrogen dioxide and sulfur dioxide.[21] Each of these pollutants can cause serious short term and long term health issues. Trees can remove each of these pollutants from the atmosphere as well, reducing air pollution and improving human health.

Aside from air quality, there are some other determinants of human health that trees can significantly improve. A 2020 Study, Urban Trees and Human Health: A Scoping Review, outlines several other positive human health outcomes including Ultraviolet Radiation exposure reduction and mitigating excess heat while also acknowledging measured mental health benefits, including reducing anxiety and stress.[22]

Rouge River

The Rouge River could be considered Birmingham's most precious natural resource. This is an argument that can be supported as far back as 1929 in Birmingham's General Village Plan which states that "Birmingham has within its City limits the first real landscape unit other than the flat plain that one meets in coming out of Detroit" and ultimately suggests that with its protection and enhancement could become "the most beautiful feature of the Village." According to the Friends of the Rouge, the Rouge River Watershed, in southeast Michigan, drains 467 square miles into the Detroit River. It has four major branches (Main, Upper, Middle, and Lower) with 127 river miles and numerous tributaries. In addition to the flowing water, there are more than 400 lakes, impoundments, and ponds. Within the watershed, there are over 1.35 million people in 47 municipalities. Three counties (Oakland, Washtenaw and Wayne) are part of the watershed and the land is more than 50% urbanized with less than 25% remaining undeveloped.[23] Within Birmingham exists a footprint of roughly 43 acres of water body comprised of the Rouge River, including Quarton Lake at over 13 acres.

According to a 1998 report from the Michigan Department of Natural Resources, the Rouge River provides habitat to nearly 60 species of fish, 49 species of amphibians and reptiles, 91 species of birds, and 18 species of mammals.[24] The relationship between the water and its flora and fauna are crucial to many ecosystem services that resonate up and down the corridor. In other words, the communities upstream and downstream from Birmingham have a stake in the health of Birmingham's section of the Rouge River just as Birmingham has a stake in the inverse. As such, the efforts to reduce the impact of stormwater on the Rouge River by improving and expanding relationships with other Rouge River communities and nonprofits as described in the Water and Stormwater section of this plan can provide a dual-benefit in the broad protection of this natural resource.

In addition to its ecosystem, the water itself is a crucial consideration when it comes to the Rouge River. For one, as noted earlier in this plan, the water flowing through Birmingham continues south to its delta at the Detroit River. The Detroit River is one of the water bodies that the GLWA pulls from to provide Birmingham with its drinking water. Birmingham does not have any glaring point source pollution issues, but certainly has its issues with non-point source pollution, which includes significant sediment deposits.

Point Source Pollution vs Nonpoint Source Pollution

Point Source Pollution

Any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged.

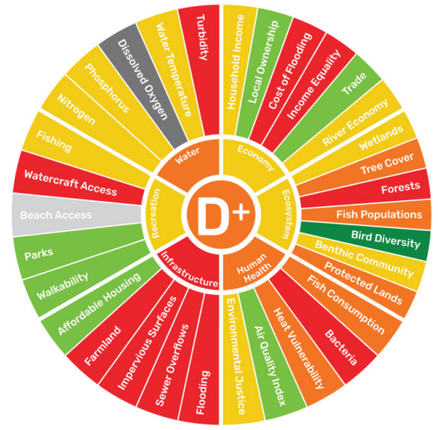
Nonpoint Source Pollution

Any source of water pollution that does not meet the legal definition of "point source" in section 502(14) of the Clean Water Act.

Generally results from land runoff, precipitation, atmospheric deposition, drainage, seepage or hydrologic modification.[25]

Recently, all of the issues described across Birmingham's plans related to the Rouge River watershed have been compiled into a report that considers six main categories: Recreation, Water, Human Health, Economy, Ecosystem, and Infrastructure. Each category and its grade is informed by 33 indicators, each associated with a category. All 33 indicators have been measured and compiled into a report card in which the Rouge River watershed earned a D+ grade. According to the report card, of the six categories, Recreation received the highest grade, a C, with good Parks (72%) and Walkability (63%) scores. Infrastructure is clearly the Rouge River's biggest challenge, receiving a failing grade overall (14%, F) and failing scores for four of the five indicators. Human Health (D) and Water Quality (D+) are both in poor condition.[26] For comparison, the Clinton River watershed received a C grade.

Rouge River Watershed Health, 2024 Report Card



Grade Scale

A	Very Good (100–80%)	B	Good (79–60%)	C	Moderate (59–40%)	D	Poor (39–20%)
F	Very Poor (19–0%)	ID	Insufficient Data	NA	Not Applicable		

Aside from pollution, which affects both water quality and the environment within the Rouge River corridor, there is also the risk of flooding. With the increase frequency and intensity of precipitation, the Rouge River bears a significant burden from urbanized areas such as Birmingham and the surrounding communities. In significant precipitation events, Birmingham infrastructure, out of necessity, sends hundreds of thousands of gallons to the Rouge River, as do communities upstream. This results in frequent and significant fluctuations of the water level in the river. Fluctuations in water level can have disastrous effects on property in the floodplain or floodway. According to the National Weather Prediction service, Birmingham had a gauge at Maple and Willits that is no longer in service. However, a record high crest was recorded in 1968 at 8.7 ft., with the next two all-time highs at 6.06 feet and 6.05 feet, both in 2020.[27]



Native Landscapes

The landscaping choices we make as a community have quantitative and meaningful effects on the natural environment. Whether starting from a blank slate or reworking existing landscaping, utilizing native plants is a huge advantage. Native plants can offer beauty and serenity all while staying low maintenance and less chemical dependent. They do not need artificial fertilizers, pesticides, or any synthetic product due to their native disposition and ability to tolerate the environment that they have been in for centuries. This not only provides a healthy place for people, it provides a healthy contributor to the climate, wildlife and our valuable water resources. Additionally, native plants are foolproof additions to rain gardens, which makes for increased functionality on top of their natural beauty.

One of the big benefits of native landscape is supporting pollinators. According to the Pollinator Partnership, birds, bats, bees, butterflies, beetles, and other small mammals that pollinate plants are responsible for bringing us one out of every three bites of food.[28] They also sustain our ecosystems and produce our natural resources by helping plants reproduce. In Birmingham, we can all take part in the conservation of these valuable pollinators. Home gardens, commercial landscaping, and public plantings that utilize native plants can and do attract pollinators, and in many cases suburbs and cities have been shown to have very diverse pollinator communities. Pollinators don't seem to be phased by city life, as long as there are plots and patches of flowers.

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A second benefit of native landscapes are their anatomies. Being native to Michigan, these plants have root systems that run deep which provide a strong base for plant & soil, access to subsurface water and the ability to filter a myriad of water-based pollutants. In addition, their stalks and leaves provide year-round food and habitat to Michigan fauna, while also contributing to better air quality. Finally, Michigan native plants have a desirable aesthetic. A native garden can be showy, vibrant, and provide interesting texture at all times of the year. This is all in contrast to the turf grass lawn, which requires more water, is often fertilized, and is often the target of pesticide or herbicide usage. Although native landscapes are a preferred alternative to turf grass, it can also be acknowledged that turf grass has its beneficial applications, predominantly recreation, which plays a major role in human physical and mental health.

Finally, a related benefit to native landscapes, which include trees, is the reduction of the urban heat island effect. The U.S. Environmental Protection Agency describes an urban heat island as 'urbanized areas that experience higher temperatures than outlying areas. Structures such as buildings, roads, and other infrastructure absorb and re-emit the sun's heat more than natural landscapes such as forests and water bodies. Urban areas, where these structures are highly concentrated and greenery is limited, become "islands" of higher temperatures relative to outlying areas.[29] Trees and vegetation are the most realistic solution to addressing this issue.

The Honeybee Problem

Sustainability and climate action are often characterized by trends. Over the last couple of decades, the honeybee has gotten a lot of attention – and for good reason. In our world today, the U.S. Department of Agriculture suggests that honeybees alone pollinate $15 billion worth of crops in the United States each year, including more than 130 types of fruits, nuts, and vegetables. Honeybees also produce honey, worth about $3.2 million in 2017 according to USDA-National Agricultural Statistics Service (NASS).[30]

However, honey bees are not native to the United States. The National Wildlife Federation describes them as a European import and more of a "livestock" than anything. While much focus has been placed on the honeybee, there is an equally important battle to be had to save native bee populations which are declining due to pesticides, disease, habitat loss and climate change.[31]

Conclusion

To appropriately address native and naturalized areas in Birmingham, we again have to consider areas of need, while also balancing it with the prevailing land uses in the City and their relative impacts. The following actions contain a mixture of soft, education/promotion type recommendations and hard, ordinance/policy recommendations. To successfully reach 470 acres of native or naturalized areas by 2035, both types of approaches will be required.



Action Plan

Protect and expand the tree canopy in each census tract of the City to at least 40%. **NR-1**

- Description – Trees, both public and private, are one of the most important natural resources in Birmingham. Although the City has a robust and long-standing commitment to a healthy tree canopy, it is essential that private property owners and the City reciprocate in their efforts and protect healthy, mature canopy trees while also taking every opportunity to plant new trees where space is available
- Stakeholders – Residents, Property Owners, Planning Department, Department of Public Services, Businesses
- Start-Up Cost – Medium
- Timeframe – Long
- Benefit – Substantial; A robust and diverse urban tree canopy will have carbon reduction, equity, and economic benefits through their sequestration potential and public health potential.

NR-2 Promote the transition of private gardens and landscapes to native species and remove any barriers to such.

- Description –The benefits of native landscapes in terms of ecosystem services, as well as aesthetics provide an opportunity to transition under-performing areas into vibrant and healthy contributions to the greater environment in Birmingham. These transitions should be sensitive to the current weed and overgrowth ordinances in the City, and clear distinctions must be made.
- Stakeholders – Residents, Property Owners, Planning Department, City Management, Businesses
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Moderate; Native landscapes will promote equity and carbon reduction and stormwater infiltration all while improving the quality of life for residents.

NR-3 Study the issue of clear-cutting of lots in the City with special attention towards tree removal during construction projects.

- Description – Both inside and outside of this project, public sentiment towards the apparent unnecessary clear-cutting of lots during new development is unfavorable. In many cases, healthy, mature urban trees provide benefits well beyond whatever construction or logistical benefits are perceived by those engaging in redevelopment. This study should produce data and recommendations to use towards a solution.
- Stakeholders – Residents, Commercial Entities, Planning Department, City Management
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Moderate; Taking measures to protect trees on private will have carbon reduction and equity benefits.

NR-4 Transition 100% of municipal plantings to native perennial plantings.

- Description –Birmingham currently manages hundreds of landscapes and planting beds across the City. Although recent efforts have transitioned many existing beds and several new beds to native plantings, the City should completely cease the planting of annuals or non-native species to reduce unnecessary maintenance needs, provide necessary habitats, and lead by example.
- Stakeholders – Planning Department, Department of Public Services, City Management
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Narrow; A focus on natives and eliminating annuals will have carbon reduction benefits and environmental benefits.

NR-5 Revisit streetscape standards to include better environments for street trees and plantings.

- Description – Street trees are often constrained by limited space and inadequate access to water. These conditions limit trees and prevent them from providing much benefit other than beautification, which leads them to often be described as “disposable.” In order to maintain a robust tree canopy, their environments should be studied and ultimately improved.
- Stakeholders – Planning Department, Engineering Department, Department of Public Services
- Start-Up Cost – Very Low
- Timeframe – Medium
- Benefit – Moderate; This action will improve the carbon sequestration potential or the urban tree canopy and provide a public health benefit.

NR-6 Prioritize the health of the Rouge River corridor and follow the recommendations of the Birmingham Plan 2040 related to the Rouge River.

- Description –As noted above, the Birmingham Plan 2040, as well as other master planning documents contain a myriad of high quality and thorough recommendations surrounding he Rouge River, its health, and its recreational opportunities. The recommendations from these plans should be reviewed and considered by a future Environmental Sustainability Board in close collaboration with other public bodies such as the Planning Board and Parks & Recreation Board.
- Stakeholders – Planning Department, Engineering Department, Department of Public Services, City Management
- Start-Up Cost – High
- Timeframe – Long
- Benefit – Substantial; Restoring and improving the health of the Rouge River will have economic, carbon reduction and equity benefits

NR-7 Prohibit artificial turf as groundcover.

- Description –– Artificial turf is becoming a more attractive option for property owners in the City due to its improved construction and sourcing of recycled materials. In addition, the installation of such is an attractive solution to the maintenance and upkeep of living turf grass. Although artificial turf can be marketed as a green and low maintenance, it is not an appropriate groundcover. Artificial turf reduces (or eliminates) critical habitats, increases the urban heat island effect, and contributes to stormwater issues.
- Stakeholders – Planning Department, Building Department, Engineering Department, City Management
- Start-Up Cost – Low
- Timeframe – Short
- Benefit – Narrow; This action will have limited carbon reduction benefits, but will also have some equity benefits in the reduction of plastic pollution and reducing the urban heat island effect.

NR-8 Require, through ordinance, green roofs to be installed on all new commercial and mixed-use buildings in the City.

- Description – Birmingham's commercial and mixed-use districts make up a considerable portion of the land area in Birmingham and have limited to no opportunity to provide greenspace on site. Although it is not currently prohibited or restricted by any code or ordinance within the City, there is currently only one green roof installation in the City. In order to reduce the urban heat island effect and provide more pollution mitigation and habitat, there exists an opportunity to require landscaping in the form of a green roof for all new commercial or mixed-use buildings in the City.
- Stakeholders – Planning Department, Building Department, Engineering Department
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Moderate; Introducing critical greenspace to commercial and mixed use districts will have carbon reduction benefits.

What can I do as a...

Individual?

- ☐ Plant a tree
- ☐ Eliminate pesticides and fertilizer
- ☐ Volunteer with the Friends of the Rouge
- ☐ Visit the Rouge trail system
- ☐ Read Southeast Michigan GREEN
- ☐ Start a native garden
- ☐ Start a native garden club in your neighborhood
- ☐ Consider a Master Rain Gardener certification
- ☐ Sign up for Birmingham's newsletters

Business Owner?

- ☐ Host garden clubs or other meetups
- ☐ Transition landscaping to native plants
- ☐ Sponsor a native garden
- ☐ Consider a green roof
- ☐ Consider SITES certification

Quality of Life



Publish comprehensive City-wide and community-level quality-of-life metrics on equity and sustainability by 2035.

Publish comprehensive Citywide and community-level quality-of-life metrics on equity and sustainability by 2035.

There are a number of different measures of quality of life. In 2023, Forbes listed Birmingham as the 9th richest city in Michigan.[32] In 2024, *Travel + Leisure* ranked Birmingham as the 6th best place to live in Michigan citing its "highly rated schools, diverse dining options, dozens of parks and playgrounds, theaters and galleries, and an eclectic mix of home styles to fit every preference."[33] However, the topic of quality of life remains difficult to define, and a definition is often prescribed based on the context in which it is used. In the context of sustainability and climate action, quality of life is directly correlated to things such as physical and mental health, equity and environmental justice, access to essential services, and social cohesion. In order to achieve a high quality of life, residents must have the ability to live healthy, safe, and fulfilling lives.

Why comprehensive quality-of-life metrics?

Over the course of this time-frame, the City will be tasked with defining and enumerating the quality of life metrics that align with the views and opinions of its residents and stakeholders. Ultimately, this plan envisions an annual publication that takes its reader through a series of metrics, feedback from residents, current census data, environmental justice indicators, weather summaries, current events and other resources that can help measure and track changes in quality of life in the City of Birmingham. This report will be a consistent and informative tool for the City government, but also its residents.

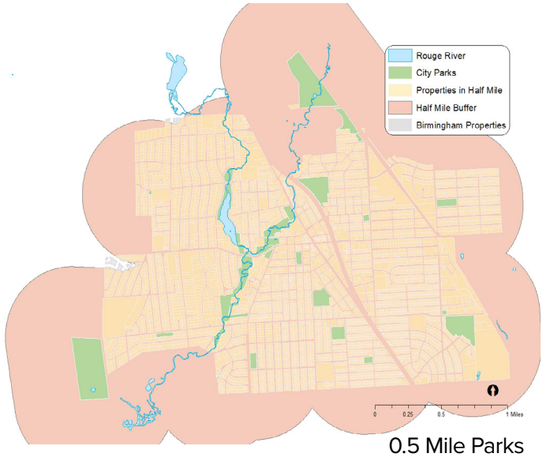
Background Material

In building a case for quality of life and its relationship to sustainability and climate action, it is helpful to understand some determinants that affect quality of life. The National Library of Medicine submits that a measure of quality of life can include personal health (physical, mental, and spiritual), relationships, education status, work environment, social status, wealth, a sense of security and safety, freedom, autonomy in decision-making, social-belonging and physical surroundings.[34] However, quality of life is inherently subjective and qualitative, and the experiences of different people do not always translate into the same value systems. No matter how one defines quality of life, it could still be argued that it is a universally desired health outcome. The following narrative explores some of these determinants and makes important connections to support the recommendations within this plan.

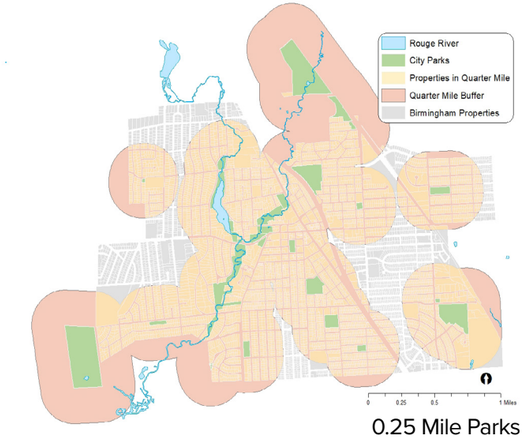
Health and Wellness

There are many public health considerations discussed in this plan including water quality, air quality, extreme weather, and high/low temperatures. One public health consideration that could be explored in more detail is access to nature and greenspace. According to the National Recreation and Park Association, public parks and recreation are leaders in improving the overall health and wellness of the nation. They are essential partners in combating some of the most complicated challenges our country faces – poor nutrition, hunger, obesity, and physical inactivity.[35] When it comes to access, research suggests a ¼ mile is a common definition of "walking distance", but also finds that there are several factors that affect a persons perception of walking distance. A 2012 article published in the American Journal of Preventative Medicine concluded that trips over ¼ mile are common and range substantially depending on purpose and population subgroups.[36]

For the purposes of this plan, a buffer analysis was performed to understand what percentage of Birmingham is within ¼ mile and ½ mile of a park. In Birmingham, 78.3% of properties are within ¼ mile of a park, and 99.8% of properties are within ½ mile of a park. Thus, Birmingham public parks could be considered a major public health asset. In addition to their proximity, there are over 250 acres of parkland in the City with a multitude of different programmatic needs and possibilities. The 2023 Parks and Recreation Master Plan contains many sustainability based recommendations that should be followed, including community gardens and low impact design features.



0.5 Mile Parks



0.25 Mile Parks

Another public health asset that would serve the Birmingham community well would be a formal resilience hub. The Urban Sustainability Directors Network describes resilience hubs as community-serving facilities augmented to support residents, coordinate communication, distribute resources, and reduce carbon pollution while enhancing quality of life. Hubs provide an opportunity to effectively work at the nexus of community resilience, emergency management, climate change mitigation, and social equity while providing opportunities for communities to become more self-determining, socially connected, and successful before, during, and after disruptions.[37] Due to the observed change in the environment, extreme weather patterns, and other negative climate change driven events, Birmingham should consider its recent purchase of the former YMCA building on E. Lincoln as an immense opportunity.

The current vision is to "create a welcoming and dynamic hub where all the members of the community can gather in an environment that promotes socialization, physical activity and lifelong learning that enhance both personal and community wellness." A vision such as this could be interpreted to have some of



the basic tenants of resiliency while also suggesting that there is a strong need in the community for a space like this. As the major tenant of this new building is anticipated to be NEXT, a community center for residents over the age of 50, there is also a tangential argument in favor of a resilience hub related to the disproportionate risks that climate change poses to the senior community.

Overall, sustainability and environmental justice are interdependent concepts. In Birmingham, there are limited environmental and socioeconomic indicators of concern. That is not to say that activities in Birmingham do not contribute negatively to such indicators elsewhere in the region, but Birmingham proper contains areas of relatively low percentiles for many environmental justice indicators. One interesting exception is the socioeconomic age indicators of "under Age 5" and "Over Age 64," which are two likely benefactors of a new community center development. Both indicators have areas in the 90-95th and 95-100th percentiles compared to the State of Michigan.[38] For these population groups that are particularly susceptible to climate change, a resilience hub could make all the difference in a world of increasing hazardous weather events and poor environments.

Education & Access

The City's efforts to build resiliency and adaptation through the many goals and recommendations of this plan will only go so far if its residents and stakeholders do not understand or are not aware of the significant issues that climate change poses. Overall, Birmingham has a highly educated community with 77.9% of persons aged 25 and over having attained a bachelor's degree or higher.[39] Having such a capable and well educated community provides an opportunity to further the education of residents about how the Birmingham government operates and what it is focusing on. More informed residents are the backbone of a high quality community. The City does currently provide a myriad of resources for its residents. On the City website, residents can find things like annual water quality reports, greenhouse gas emission inventories, master plans, and even SOCRRA's Waste Wizard tool. Moving into the future, the City should increase its efforts to host real-time data tools such as the EPA Air Now Air Quality Meter, regional or State level plans that affect Birmingham, and Birmingham authored publications or fact sheets geared towards and customized for Birmingham residents. Information and education campaigns should also be consistently pushed on social media and in newsletters with content related to sustainability and climate action. For example, the City's Planning Department has authored the Birmingham Green article series for 5 years and counting. The Birmingham Green series was developed as a means to candidly discuss environmental and sustainability topics in the context of Birmingham. These topics range from overarching sustainability themes and current events to specific green projects that are observed in the City.

Scenario

One big effort that will be undertaken in the implementation of this plan is the transitioning of turf grass to native landscapes. Chapter 118, Sec. 118-66 of the Birmingham City Code states:

"No owner of any parcel of land with the city or the agent of such owner shall permit on such parcel of land or upon any sidewalk abutting the same, or upon that portion of any street or alley adjacent to the same between the property line and the curb or traveled portion of such street or alley, any growth of weeds, grass or other rank vegetation to a greater height than eight inches on the average, or any accumulation of dead weeds, grass or brush. No such owner or agent shall permit on such land poison ivy, ragweed or any other poisonous, noxious or unhealthful growths."

Michigan native plants and native landscapes have a tendency to appear "wild" or "unkempt" in some cases. Although these landscapes would still need to be maintained, a thorough education campaign to inform residents about the goals and outcomes of a project such as this would significantly reduce concern amongst residents and ultimately reduce the amount of complaints received by the City and staff time dedicated to resolving such complaints.

Public Education Example - Greenwashing

Birmingham Around-Town E-Newsletter July 2023

As we continue our sustainability journey in Birmingham, and as we continue to ask residents, business owners, and other stakeholders to do more and more to help offset their environmental impacts, it is important to pause for a moment and raise awareness about the concept of greenwashing. Simply put, it is important to ensure that the attempts in our community to go green…are actually green. Greenwashing is the act of making false or misleading statements about the environmental benefits of a product or practice. As environmentalism goes more and more mainstream, a lucrative market has formed for sustainable products, which can be warped by marketing and clever design. There are several common strategies for greenwashing such as deceiving nature-based imagery, environmental buzzwords, misleading labels, and over emphasis on sustainability initiatives to mask other harmful activities. Take the time to scrutinize "green" products and services to ensure that they are what is desired.

In an increased effort to educate and inform its residents and stakeholders, Birmingham would also benefit from a continued commitment to accessibility of the highest standard. Accessibility standards for web design, print materials, signage, as well as physical accessibility to spaces and places that offer experiences in sustainability and climate action in Birmingham must be fair and equal to ensure that no person is left behind.

Green Culture

The Birmingham Green moniker has been a part of the sustainability and climate action conversation in Birmingham for over 6 years now. The Birmingham Green "brand" has purpose, name recognition, and personality that is heavily rooted in the community. This brand can form the backbone of a new green culture in Birmingham.

In regards to building this green culture, many of the strategies in this plan will aid in the task. Inclusivity, shared values, trust, leading by example, recognition, and communication are all key components of a strong culture. The City can leverage this culture to buttress its sustainability and climate action while also using it to build programs to support and recognize the work of people in the community.

Conclusion

There is an inherent challenge in translating quality of life into actions that are specific, measurable, achievable, and relevant to the Birmingham community. However, focusing on key components of public health, improving education & access, and building a green culture will help define success moving into the future.

Action Plan

QL-1 Develop the newly acquired YMCA building and St. James Park into a nexus of intergenerational recreation opportunities including a resilience hub that will serve as a warming and/or cooling center as needed and better connect residents to City services.

- Description – The YMCA is the first purchase of new publicly owned property that has occurred in many years. It is critical to weave sustainability and resiliency into this project early and often to create a hub for the community and its needs in a changing environment.
- Stakeholders –Planning Department, Building Department, City Management, Residents, Department of Public Services, Engineering Department
- Start-Up Cost – High
- Timeframe – Long
- Benefit – Substantial; This action has the potential for carbon reduction, but also major equity and public health benefits. In addition, there is an economic pay pack potential.

Permit community gardens in select parks and public open space. QL-2

- Description – Access to additional food from gardens that are owned and operated by the community is just one benefit of a community garden. These spaces offer residents a place to congregate, socialize, recreate, and learn. With over 230 acres of parkland in the City, surely there is enough space for another amenity in the form of community gardens.
- Stakeholders – Residents, Businesses, Department of Public Service, Planning Department
- Start-Up cost – Low
- Timeframe – Medium
- Benefit – Narrow; Access to locally grown produce has an equity and economic benefit.

Include educational opportunities in sustainability and climate action projects that are accessible to everyone. QL-3

- Description – It is expected that the journey to a sustainable and resilient future will be filled with opportunities to engage with multiple populations. To ensure that no one is left behind, all efforts by the City to educate, inform or engage with the community must be accessible to all. This includes all printed and digital content, as well as physical installations such as signage.
- Stakeholders – Communications, City Management
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Narrow; Providing opportunities for all abilities to engage with content and projects is critical to their contributions towards the plans goals.

Install one air quality monitoring station in the City and connect to the EGLE network. QL-4

- Description – Currently, the closest air quality monitoring stations to Birmingham are in Pontiac and Oak Park. As an additional public service not only to the residents of Birmingham, but also to the region would be the installation of an air quality monitoring station in Birmingham, which could provide real-time local air quality data for the City.
- Stakeholders – City Management
- Start-Up Cost – Medium
- Timeframe – Medium
- Benefit – Narrow; This action will have equity benefits and potentially economic benefits through the strategic targeting of funds toward remediation of any issues.

QL-5 Consider internal air quality monitoring systems in and around all municipal buildings.

- Description – Not only do public buildings house nearly 400 City employees on a day-to-day basis, they are also critical spaces for residents and other stakeholders in the City. In addition, several of the City's buildings are very old, leading to issues stemming from old mechanical systems, aging materials and dated design. The indoor environment in these facilities should be studied and remedied, where necessary, to be of the highest quality.
- Stakeholders – Building Department
- Start-Up Cost – Medium
- Timeframe – Medium
- Benefit – Narrow; The air quality in municipal buildings has an equity impact on employees, volunteers and visitors.

QL-6 Support and expand upon the sustainable land use decisions of the Birmingham Plan 2040.

- Description – Sustainability is greatly affected by the land use decisions of a community. The Birmingham Plan 2040 outlines future land uses and provides recommendations on increasing density in some areas, while maintaining high character single-family residential neighborhoods.
- Stakeholders – Planning Department
- Start-Up Cost – Low
- Timeframe – Long
- Benefit – Substantial; Land use decisions have a significant equity benefit, but also carbon reduction benefits.

QL-7 Remove barriers to food production in residential zones and on residential properties.

- Description –Similar to community gardens, the ability for residents to grow and cultivate their own food will have a significant public health impact on the community. Should any barriers exist to food production in residential areas of the City, they should be studied and likely removed to ensure that residents can engage in such activities without fear of citation.
- Stakeholders – Planning Department, Building Department, Residents
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Narrow; Unobstructed access to fresh local produce has a public health and equity benefit.

QL-8 Develop a green business certification program alongside the Birmingham Shopping District.

- Description – The City has a huge asset in the Birmingham Shopping District (BSD). The BSD collects significant data, supports businesses, facilitates beloved special events, and manages a significant budget. In order to get more businesses on board with the recommendations of this plan, it may help to continually recognize the good work that is happening in the business community with a recognition program that they can in turn use to market their goods and services.
- Stakeholders – Planning Department, Birmingham Shopping District, Businesses
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Narrow; Depending on the actions taken by each individual business, there are carbon reduction and equity benefits to be had.

QL-9 Maintain a regular flow of educational materials in newsletters, City publications, social media, and other outlets.

- Description – The Communications Department in the City has grown over the years to be a significant asset to the City. It is an asset not only for its social media and design prowess, but also its ability to circulate information and access broad swaths of the community. Leveraging this asset to further the City's sustainability goals will be essential to the success of this plan.
- Stakeholders – Residents, Businesses, Planning Department, Communications Department
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Moderate; Proactively putting educational materials in the hands of stakeholders in the City will increase the likelihood that they will contribute to the goals of this plan.

What can I do as a...

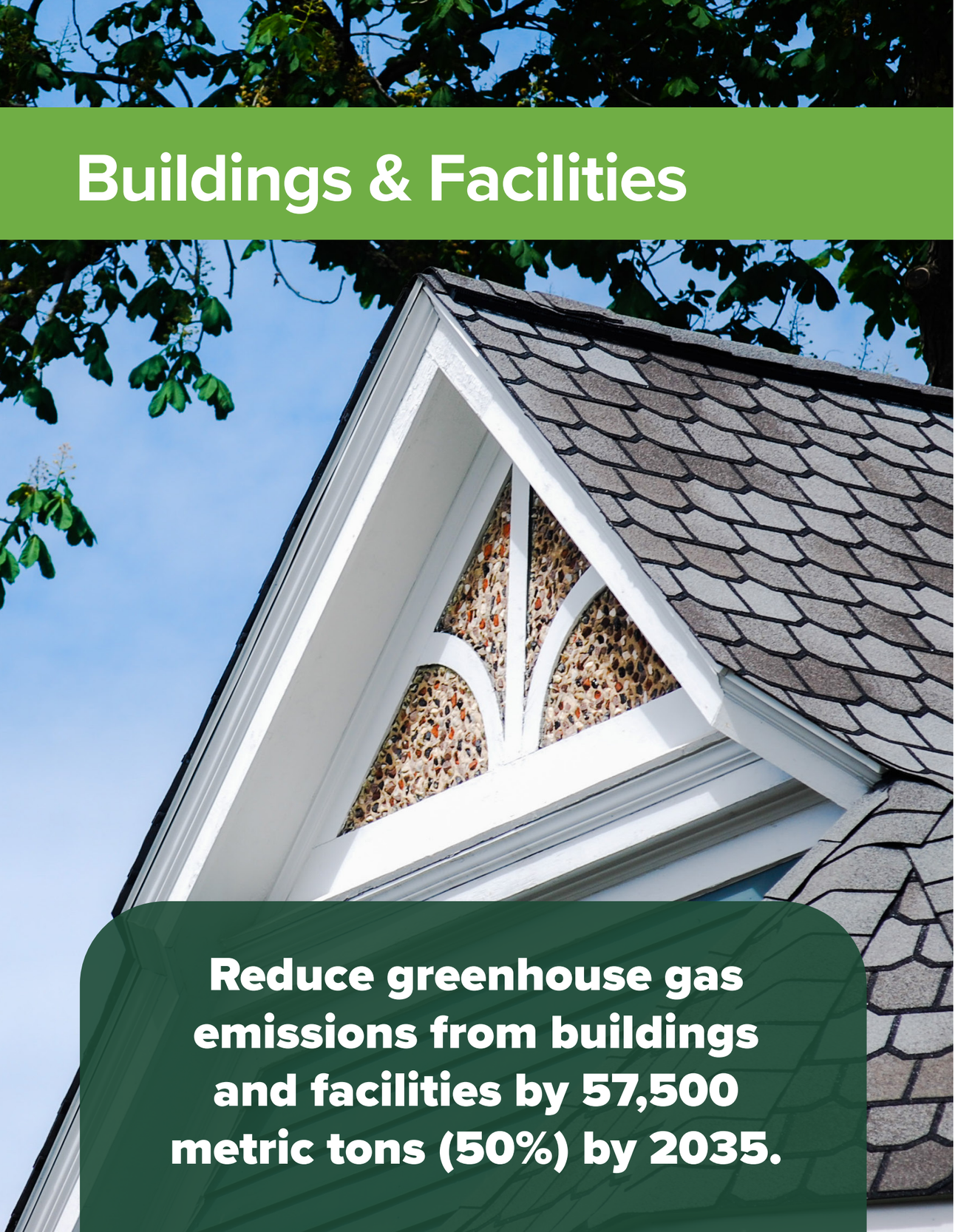
Individual?

- ☐ Engage in the development of the 400 East Lincoln Site
- ☐ Start an herb or veggie garden.
- ☐ Download the EPS's AirNow mobile app.
- ☐ Spend time outdoors to connect with nature

Business Owner?

- ☐ Review the Birmingham Shopping District website
- ☐ Update mission statements and values

Buildings & Facilities



Reduce greenhouse gas emissions from buildings and facilities by 57,500 metric tons (50%) by 2035.

Reduce greenhouse gas emissions from buildings and facilities by 57,500 metric tons (50%) by 2035

One of the largest land coverage categories in Birmingham is buildings – covering 522 acres or 17% of the land area in the city. There are over 7,981 principal buildings in the City of Birmingham across residential, commercial, industrial and civic uses. Buildings, both residential and commercial, are by far the biggest contributor of greenhouse gas emissions in the City of Birmingham. Measured in metric tons of carbon dioxide equivalent emissions ($MTCO_2E$), electricity and natural gas serving residential, commercial and industrial buildings in the city account for nearly 69% (192,159 $MTCO_2E$) of the community's overall (279,996 $MTCO_2E$). This status is mostly due to energy usage in the form of electricity and natural gas consumption produced by polluting and/or less efficient technologies, such as coal, nuclear power and natural gas. All buildings in the City of Birmingham are served by DTE (electric utility) and Consumers Energy (natural gas utility).

Why 57,500 Metric Tons (50%)?

Since GHG emissions from buildings and facilities accounts for the largest portion of carbon emissions in the City of Birmingham, we have the most work to do in this area and the most to gain by focusing on it. The State's goal is 60% reduction by 2035 (50% by 2030). Birmingham should certainly meet its goal if the State meets theirs, in large part attributable to the move away from coal and gas to renewable (wind and solar) sources of energy production by the major utility providers. Though the State is well underway to enforcing these goals through State laws; action and law-making at the State level are dependent on the political whims of both major parties. The State's priorities are apt to change quickly during and after election years and when the make-up of any of the State's three branches of government changes significantly, there is no guarantee that promises and plans of the prior administration will continue to receive follow-through. Therefore, it is important that Birmingham build on the State's efforts by taking aggressive action wherever local control has the greatest influence, towards the same or similar goals. By combining local action with State policy we have the greatest chance of exceeding interim goals and achieving the big goal of carbon neutrality by 2050.

Background Material

In 2023, the State of Michigan passed Public Act 235, which established renewable energy standards of 50% by 2030 and 60% by 2035, which applies to both utilities serving Birmingham (PA 235). This standard set by the Michigan legislature represents one of the most aggressive renewable energy strategies of any state in the nation. Although these ambitious standards will indirectly help reduce carbon emissions from Birmingham buildings and facilities (by switching the sources of the majority of energy provided to customers, to renewable sources such as wind and solar), it is imperative to focus significant attention and resources towards improving the efficiency and construction of buildings and facilities to develop resilience and reduce dependency on larger and more vulnerable systems.

Municipal Buildings

Birmingham has a long tradition of investing in civic buildings and landscapes. The City of Birmingham itself owns and maintains over 20 buildings and facilities, four of which are locally designated historic resources. Just like in the community overall, building and facility energy uses account for the majority of carbon emissions from Local Government Operations (LGO). The City's municipal buildings and facilities represent a very small portion, accounting for only 3,072 $MTCO_2E$ (including streetlights & Traffic signals) but the City should lead by example. In order to align municipal building operations with environmental goals, the City should prioritize sustainable investments in its own infrastructure to improve the efficiency and reduce emissions associated with buildings and facilities.

A particular challenge with municipal buildings in Birmingham is their age. The average age of municipal buildings in the City is 69 years with a significant amount of buildings built pre-1930. The most "modern" building in the City was built in 2007. With the aging building stock comes issues with energy consumption that may be exceedingly difficult to solve, or compound into many other issues that affect the scope of work and cost of energy improvements.

To truly understand the scale of the issue, the City needs to perform energy audits on all of its buildings. As touched on above, an audit of all municipal buildings can do a lot to move several of the recommendations in this plan. In addition to highlighting opportunities to replace outdated equipment and increase efficiency of building operation, municipal audits can also bring attention to underutilized assets or features to ensure money and emissions are not being wasted. Combining energy audits with EV, solar, geothermal and wind feasibility studies (any or all) can quickly provide a baseline understanding of what is possible for retrofitting a building with sustainability in mind and provide helpful guidance for the best 'bang for your buck' when it comes to capital improvement planning. Having energy audit data and a baseline understanding of electricity and renewable energy possibilities can also prepare the City to be competitive when applicable grant opportunities arrive.

Green Development

"Green" or sustainable development is a real estate development concept that considers the social and environmental impacts of development. Green development takes into account three sub-categories: environmental responsiveness, resource efficiency, and community and cultural sensitivity. There are many ways that Birmingham already promotes green development, such as requiring street trees, landscaping within surface parking lots and encouraging native landscaping and additional sustainability features wherever possible, but the Zoning Ordinance could go even further by requiring greater efficiency in buildings, green stormwater infrastructure, reducing parking minimums, electric vehicle charging infrastructure, etc. A full Zoning Ordinance audit and update is urgently needed to meet the needs of businesses, property owners and residents seeking to modernize their buildings. In addition, to incorporate standards related to emerging trends and technologies. A full Zoning Ordinance rewrite would also provide a good opportunity to study and incorporate recommendations from the Birmingham 2040 Plan as well as all zoning related recommendations from this plan.

When it comes to green development and buildings, there are several organizations that have become synonymous with the term "green buildings" including Leadership in Energy and Environmental Design (LEED) and the Passive House Institute US. The City should be aware of these types of organizations and may benefit from having key staff obtain green building certifications to be able to work in the space with confidence when reviewing plans and proposals.

First LEED Certified Building in Birmingham, 34802 Woodward Ave.



Residential and Commercial Buildings

The majority of the City's land area (56%) is also comprised of single-family residential neighborhoods. These residential neighborhoods in Birmingham generally consist of houses of a similar scale arranged in blocks and facing onto small, residential streets, which have street trees and sidewalks. In large part, a successful carbon emissions reduction strategy for buildings depends on individual building owners understanding the costs and benefits of emerging technologies and opting for building and appliance options that go further when it comes to energy efficiency than what is currently required. The state of Michigan is overdue on updating its energy code and is actively working to adopt a 2021 code. It is possible that some items will be outdated by the time the code is adopted as energy technology is rapidly changing and sometimes industry advances more quickly than bureaucratic processes. Three cities in Michigan; Ann Arbor, Detroit and Grand Rapids have created "2030 Districts" to join a network of private-public partnerships in urban areas across North America that work to reduce energy, water, and transportation emissions. 2030 Districts are opt-in programs that aim to create healthy buildings and neighborhoods by reducing carbon emissions and building operating expenses with goals of reaching net zero energy usage by 2050. The Birmingham 2040 Plan recommends an action to "seek to advance building sustainability in new construction, such as through the use of green building standards within the City's mixed-use districts and municipal buildings and increasing energy standards for new residential construction above those of the State energy code, ideally implementing 2030 District goals." Birmingham should investigate whether a 2030 District or something similar is right to help proactive landowners commit to owning their role in reducing the city's emissions. Programs like 2030 Districts as well as incentive zoning can help to counteract the city's lack of control over building and energy codes.

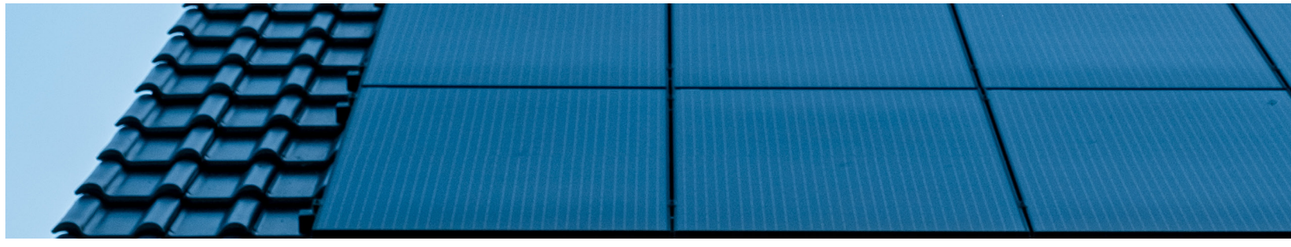
Renewable Energy

One of the goals of the MI Healthy Climate Plan is to 'make Michigan energy independent.' As of 2020, coal and natural gas were the two primary sources of GHG emissions in the power sector and provided 59% of all electricity generation in the State. Michigan's power sector contributes 30% of Michigan's total GHG emissions. Renewable energy is energy that is derived from natural sources or processes that are constantly or naturally replenished, such as wind and solar energy. It can be provided through on-site generation and storage, or off-site utility scale arrays. Currently Birmingham has zoning codes that allow for and support solar energy systems. However, to date Birmingham has issued only 17 permits for solar arrays on rooftops in the City in the last 10 years. With nearly 8,000 principal buildings in the City, our solar energy potential is much higher. Meanwhile, the State of Michigan is continuing to expand solar and increase access through various programs, and DTE has planned a portfolio of 11 million solar panels by 2040. The Great Lakes Renewable Energy Association and the Department of Energy, Great Lakes and the Environment, recently released a Michigan Solar Communities Guidebook. The guidebook covers recently updated energy laws in the State and provides practical guidance for communities. Birmingham can use this up to date guidebook to help modernize our approach to approving and permitting solar installations.

Other types of renewable energy, such as wind and geothermal are quickly increasing in popularity and viability in Michigan. Birmingham should consider whether and how these renewable technologies can be incorporated within the City. Geothermal is a form of renewable energy that utilizes the heat from the Earth to heat or cool a home or building. Soil temps are warmer than air in the winter and cooler than air in the Summer, these temperature differences can be harnessed and transferred through ground heat exchangers or ground source heat pumps to ductwork for forced air heating or in floor piping for radiant heating. Geothermal has a high upfront cost but will lead to energy savings over the life of the systems. Community Geothermal is where a series of homes are all connected to a larger piping system and can bring down the cost of the system.

One of the ways that Birmingham could increase the opportunities for renewable energy is through the SolSmart program. The SolSmart Program encourages and provides guidance to local communities to help reduce carbon emissions through solar implementation. The Federal government rolled out a free software program, SolarAPP+ to local communities to speed up the process of permitting and approvals for solar installers. Birmingham should strive for the highest possible designation through this program, which could be either Gold or Platinum.

Another topic that often comes up in relation to renewable energy is Community Solar. Community Solar refers to a solar array located within a community where many customers can subscribe to a portion of the solar array and receive a credit on their utility bill for their share of the power that's produced. The panels are located in an array off-site, not physically on the subscriber's home or business. "Community" is flexibly defined; it can be defined by location or merely a group of people who are connected via their electric utility. In this case, customers sign up to receive energy from a certain number of panels which can be purchased up front or as a 'pay as you go' subscription. Michigan does not currently have enabling legislation for community solar, so community solar programs in Michigan are developed and managed through a local electric utility. Direct participation in a community solar program is not possible until a law is enacted that supports these kinds of solar energy projects.



Electric Vehicle Charging

Electric vehicles are fast becoming an essential technology. EV usage both reduces tailpipe emissions and their impacts on people and the environment. Reduced ground-level emissions leads to better air quality at the local level. Although a City government has no control over the vehicles on its roads, Birmingham can seek to encourage EV adoption by accelerating the inclusion of vehicle charging in both private and publicly accessible locations. Since EV charging technology almost always taps into the electric systems of associated buildings, making sure that all City buildings have electrical systems up to date to handle EV charging installation is a good first step. As well as updating the Zoning Ordinance to explicitly allow electric vehicle charging as accessory to all uses in the City while creating standards to ensure that public safety and adequate streetscape aesthetics are maintained. Some cities have gone as far as to require electric vehicle charging be provided in all parking that is accessed by the public and that all new residential developments be equipped with "EV ready" electrical services.



Historic Preservation

The modern historic preservation movement in the United States started in 1966 with the passage of the National Historic Preservation Act. This Act codified many of the practices of historic preservation in the United States, establishing funding methods, encouraging local historic preservation, and establishing definitions for historic preservation relative to the legal boundaries of property ownership. In addition, the Act also established a State Historic Preservation Office (SHPO) in every state, including Michigan. SHPO's have their own preservation policies and programs and often act as an intermediary between local and national government, particularly when it comes to funding.

At present, the City boasts 82 designated historic resources and/or sites. Of the 82, 30 are commercial (37%), 12 are public/institutional (15%) and 40 are residential (49%). There are three contiguous historic districts (Central Business, Shain Park, and Bates Street Historic Districts), while the other districts are considered non-contiguous. In addition to designated historic resources/sites, the City has several neighborhoods with rich histories and many old structures.

Year Built	Number	Percentage
1974-2023	2,094	26%
1948-1973	3,046	38%
1923-1947	2,234	28%
1898-1922	443	6%
Pre-1898	96	1%
No Data	68	Less than 1%
Total	7,981	100%

Percent of Buildings built pre-1898 to 2023

Meanwhile, the City of Birmingham has received 819 demolition permits between 2015 and 2023 (797 residential and 22 commercial), which is an average of 102 demolitions per year. At that rate, the City could refresh its entire structure stock in 78 years – a single lifetime. As it happens, older homes often become easy targets for demolition due to changing home buyer preferences, design trends, family size, demographics, maintenance requirements, and other factors.

In the end, Historic Preservation and sustainability have many parallels. As stated by the National Parks Service, the repair and retrofitting of existing and historic buildings is considered by many to be the ultimate recycling project, and focusing on historic buildings has added benefits for the larger community. There are misconceptions about energy loss in historic buildings that must be clarified, and standards that must be followed, but historic preservation should play a major role in the sustainability and climate action efforts within the City. Considering embodied energy, existing buildings often have a lower carbon footprint than new construction. As is commonly said, "the greenest building is the one that's already built."

Embodied Energy

The EPA defines embodied energy as "the amount of energy consumed to produce a product, in this case building materials. This includes the energy needed to mine or harvest natural resources and raw materials, and manufacture and transport finished materials.

Conclusion

The challenge of Birmingham's community and municipal building stock is also an opportunity. All of the municipal buildings and a majority of privately owned buildings are quite old. Birmingham has a robust historic preservation program and many century-old buildings across the City add to its charm and character. The opportunity exists to preserve, adapt and reuse many older buildings to retain Birmingham's character and decrease carbon emissions associated with demolition and construction. The opportunity exists throughout Birmingham's residential and commercial buildings to update HVAC and other systems to increase efficiency through a variety of new technologies. When buildings come to the end of their useful life, or cannot be properly modernized and reused, the opportunity exists to redevelop the sites with more sustainable designs and building systems. The quicker the City of Birmingham acts to implement the following actions, the better prepared we will be to assist all building owners in increasing sustainability and reducing carbon emissions associated with buildings.

Action Plan

BF-1 Develop a plan to incentivize or require the transition from natural gas to electric in residential renovation and construction.

- Description – Natural gas is cleaner than coal or oil, emitting less carbon dioxide (CO2), but is still a fossil fuel. Additionally, natural gas emits nitrogen oxides and volatile organic compounds that contribute to ground-level ozone, indoor pollution and respiratory illnesses. For these reasons, some cities and states are considering banning or phasing out gas appliances altogether. Birmingham should develop a phased plan to consider encouraging the community to phase out natural gas in buildings.
- Stakeholders – Building Division, Planning Department, City Management, Residents, Businesses
- Implementation Cost – Low
- Timeframe – Long
- Benefit – Substantial; This action has major carbon reduction benefits. In addition, there are some environmental justice and equity considerations.

BF-2 Promote State and local energy efficiency programs and encourage homes and businesses to complete home energy audits and upgrades.

- Description – There are several different programs to help residents, businesses, and municipalities audit and increase their energy efficiency that have been born out of the Inflation Reduction Act and the Bipartisan Infrastructure Law. These programs open and close according to funding availability and program success. Staff closely monitor the availability of funding and application dates for these programs. The City can do a lot to promote when available and connect residents and businesses to applicable State and county programs.
- Stakeholders – City Management, Planning Department
- Start-Up Cost – Low
- Timeframe – Short
- Benefit – Moderate; This education based approach will have indirect carbon reduction benefits and direct equity benefits.

BF-3 Remove any barriers to the use of geothermal energy strategies in the City.

- Description – Geothermal is a form of renewable energy that utilizes the heat from the Earth to heat or cool a home or building. Soil temps are warmer than air in the winter and cooler than air in the Summer, these temperature differences can be harnessed and transferred through Ground Heat Exchangers or Ground Source Heat Pumps to ductwork for forced air heating or in floor piping for radiant heating. Similar to solar energy produced by the sun, energy, especially for HVAC is available to be harnessed from the ground. Studying current geothermal technology in depth will help to determine what Zoning Ordinance updates or permitting process changes are necessary to facilitate easy adoption of this available technology for willing property owners within the City of Birmingham.
- Stakeholders – Planning Department, Building Department, Engineering Department, City Management
- Start-Up Cost – Very Low
- Timeframe – Short
- Benefit – Narrow; Geothermal energy has a lot of potential but is still relatively new and expensive at this time, carbon reduction and payback benefits are expected to be small.

BF-4 Increase EV charging network City-wide.

- Description – Currently there are no public electric vehicle chargers in downtown Birmingham, even as the numbers of electric vehicles within downtown are visibly increasing. The City, through its surface lots and parking structures is the main provider of public parking in the parking assessment district. Many employees, including city employees, commute into the downtown. Provision of public electric vehicle charging affects people's decision to purchase and ability to utilize electric vehicles. Updating the Zoning Ordinance to require electric vehicle charging (or electrical capacity for electric charging installation) in all new installations will help to increase the electric vehicle charging network and help facilitate the adoption of EVs in the City of Birmingham.
- Stakeholders – Property Owners, Businesses, City Management, Parking, Planning Department
- Start-Up Cost -- Medium
- Timeframe -- Medium
- Benefit – Moderate; Providing more opportunities for electric vehicle charging will have a carbon reduction benefit through the reduction of fossil fuel usage.

BF-5 Produce feasibility studies for solar photovoltaics on all City buildings and/or sites.

- Description – The City should prioritize installing solar on municipal buildings as soon as possible by evaluating the feasibility for installing solar on all buildings and facilities. In many cases, a new roof may be required before installing solar is feasible on City buildings, in at least one (Fire Station 1), the building/roof is already fully equipped and prepared to run solar. For all facilities, it would be helpful to determine what additional work is needed to get the building/facility "solar ready" and how much of the building/facilities energy could be met through solar, as well as whether surplus solar is likely to be generated that can help pay back the technology faster or help power another facility. A feasibility study should also include studying solar paired with battery storage. Having this information on hand can help the City make strategic decisions when it comes to capital infrastructure investments.
- Stakeholders – Planning Department, Building, Department of Public Services, City Management
- Start-Up Cost – Medium
- Timeframe – Short
- Benefit – Moderate; City buildings and facilities have minimal emissions comparatively, but there are nonetheless carbon reduction benefits and a potential for return on investment.

Expand the City's historic preservation program to protect existing buildings and character. BF-6

- Description – Since carbon emissions are produced at every stage of a building's life (materials production, construction, demolition and landfilling of construction and demolition waste), the most sustainable building is often the one that already exists. The City should look at ways to expand the current historic preservation programs to protect existing buildings and character and to help support adaptive reuse of buildings where feasible.
- Stakeholders – Planning Department, City Management, Property Owners, Residents
- Start-Up Cost – Low
- Timeframe – Short
- Benefit – Moderate; When considering embodied carbon and the environmental and economic cost of new construction, historic preservation has a fair amount of carbon reduction and equity benefits.

Develop a process for comprehensively monitoring energy usage for all City buildings. BF-7

- Description – Many technologies now exist for real-time, monthly or annual monitoring of a building's energy usage. Monitoring energy usage can help when it comes to making capital improvement investments, by determining the most cost-efficient ways to increase energy efficiency and reduce carbon emissions. Building monitoring can also help with early identification of system issues by alerting to abnormal or increased energy use.
- Stakeholders – Building Department, City Management, Planning Department
- Start-Up Cost – Medium
- Timeframe – Medium
- Benefit – Moderate; Although emissions from city buildings is minimal, this approach will benefit carbon reduction.

BF-8 Study the feasibility and placement of a community solar facility.

- Description – Currently, there is no enabling legislation for community solar in the State of Michigan. Community solar arrays are developed and managed through a local energy utility currently. There are several entities passionately working to engage the legislature and pass enabling legislation. Birmingham should study the feasibility and placement of a community solar facility in the case the legislation allows for it.
- Stakeholders – City Management, Planning Department, Residents, Engineering Department, Businesses
- Start-Up Cost – Very Low
- Timeframe – Medium
- Benefit – Narrow; At this time, community solar facilities are not feasible in the City, but a study could provide direction that has carbon reduction, equity, and economic benefits.

BF-9 Promote green development in large commercial districts in Birmingham through improved Zoning Ordinance standards.

- Description – The current Zoning Ordinance is in need of a full audit and update to meet the current needs of businesses, property owners and residents seeking to modernize their buildings. A full Zoning Ordinance audit and rewrite would provide the opportunity to comprehensively address recommendations of the Birmingham 2040 Plan as well as sustainable development recommendations throughout this action plan.
- Stakeholders – Planning Department, Engineering Department, Department of Public Services, City Management
- Start-Up Cost – Medium
- Timeframe – Medium
- Benefit – Substantial; Regulatory approaches that enable efficient buildings will have a major carbon reduction benefit.

BF-10 Revise and expand ordinances related to solar photovoltaics and other alternative energy sources.

- Description – To meet emission reduction goals related to power, Birmingham needs to increase the adoption of solar generation. The vast majority of buildings in the City of Birmingham are privately owned and a majority of those are single family homes. Residential energy accounts for 40% of the community-wide emissions and commercial energy is 22%. Ensuring a clear and easy approval and permitting process for installing solar and other alternative sources such as geothermal will allow more residents and businesses to lower their energy consumption by harnessing naturally existing power.
- Stakeholders – Planning Department, Building Department, Engineering Department, Department of Public Services, City Management
- Start-Up Cost – Medium
- Timeframe – Medium
- Benefit – Moderate; Reducing barriers to solar adoption that exist in the zoning ordinance has a carbon reduction benefit, economic benefit, and equity benefit.

What can I do as a...

Individual?

- ☐ Install new energy efficient appliances
- ☐ Consider a heat pump instead of a gas furnace
- ☐ Elect to support renewable energy through utility billing options
- ☐ Commission a home energy audit
- ☐ Investigate incentives and rebates for energy efficiency improvements and solar
- ☐ Consider solar and/or solar+storage

Business Owner?

- ☐ Install solar on buildings
- ☐ Install new energy efficient appliances
- ☐ Consider incorporating solar/geothermal

Waste



Reduce total landfill solid waste by 2,390 tons (25%) by 2035.

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Solid waste in Birmingham represents 6% of the City's overall greenhouse gas emissions. According to the United States Environmental Protection Agency (EPA), the average person produces 5 pounds of garbage per day, or nearly 2,000 pounds per year.[40] With the average household size in Birmingham at 2.32, that is over 4,200 pounds per household per year.[41] The majority of municipal solid waste generated in the United States consists of paper & cardboard, food, and plastics. In the City of Birmingham, residential properties are offered curbside solid waste disposal services, which includes basic recycling. In addition to solid waste, the City offers its residents curbside yard waste pickup. Alternatively, all commercial and large multifamily buildings are required to contract with their own private solid waste haulers. All of this waste ends up somewhere and contributes to a growing amount of negative externalities that are not proportionally borne by those that create it.

Why 2,390 tons?

Reducing the tonnage of solid waste that enters a landfill will not only reduce greenhouse gas emissions, but will also support the circular economy, reduce pollution, and increase quality of life for those in Birmingham, but also for people living near landfills. Overall, 25% is a common reduction target of the course of 10 years. In the case of solid waste, that 25% reduction will have a huge impact on the environment, but will also prepare the City for future waste reduction targets.

Background Material

The challenge of solid waste in Birmingham needs reframing. Although Birmingham will never be without some level of solid waste, it is crucial to understand that there are many solutions to reducing waste, and there is a clear hierarchy in terms of the impact of these solutions. To be clear, the most effective way to reduce waste is to not create it in the first place. Should waste be created, the City can increase its recycling efforts and quality and also provide the means for its residents to correctly dispose of a myriad of specialty waste and hazardous materials. Not only will doing so aid in growing the burgeoning recycling economy, but it will also reduce Birmingham's impact on other communities where its solid waste is sent.

Municipal Solid Waste

Municipal solid waste (MSW) is defined by the U.S. EPA as solid phase household, commercial, and/or institutional waste.[42] In 2024, Birmingham's MSW system will dispose of around 14,000 tons of waste to its various receiving landfills or disposal centers. In total, it is about 0.65 tons (1300 pounds) per capita, which is slightly less than the national average. Birmingham offers its residents curbside waste pickup that includes recycling, ordinary refuse, bulky items, and yard waste, as well as access to Southeastern Oakland County Resource Recovery Authority (SOCRRA) drop-off facilities.

Birmingham's basic MSW is collected by a contracted waste hauler and received by SOCRRA's transfer station in Troy, where it is compacted and sent to a landfill for disposal. The closest state licensed landfills are Oakland Heights (Auburn Hills) and Eagle Valley (Lake Orion). In addition, there is a site owned and operated by SOCRRA in Rochester Hills where the City's yard waste is sent for composting.



Source Reduction & Reuse

The disposal of solid waste results in pollution, but so does the manufacturing of the products that are eventually disposed of. Logically, manufacturing also results in significant energy usage and the use of precious natural resources. Thus, the source reduction approach to waste reduction is self-explanatory in that it reduces or eliminates waste at the source while also conserving energy, saving natural resources, reducing toxicity and reducing costs. The U.S. EPA notes that source reduction includes actions such as purchasing durable, long-lasting goods and seeking products and packaging that are as free of excessive packaging and toxins as possible.

EPA Source Reduction Facts

- More than 55 million tons of MSW were source reduced in the United States in the year 2000.
- Containers and packaging represented approximately 28 percent of the amount source reduced in the year 2000.
- The total generation of MSW in 2018 was 292.4 million tons.
- From 1960 to 2018 the United States produced 9,049% more plastic - a common target of source reduction.
- In 2018, plastics only comprised 4.47% of all recycled materials.
- Paper and paperboard products made up the largest percentage of all the materials in MSW, at 23.1 percent of total generation.

Sources:
Municipal Solid Waste in The United States:2000 Facts and Figures
National Overview: Facts and Figures on Materials, Wastes and Recycling

The State of Michigan has also moved to improve its solid waste management in updating its solid waste management laws. In 2022, a sweeping update to Michigan's solid waste law, Part 115 of the Natural Resources and Environmental Protection Act, was signed and took effect in March 2023. As a part of this update, Oakland County will be required to prepare or upgrade its solid waste management plan. New plans must now establish goals and objectives for the maximum utilization of Michigan's solid waste through resource recovery, including source reduction and source separation.[43]

In Birmingham, one direct target of source reduction is recommended to be plastics. According to Our World in Data, plastic production has more than doubled in the last two decades while continuing to decline in its share of overall recycling. In addition, around 0.5% of plastic ends up in the ocean, and in the United States, nearly two pounds of plastic per capita was mismanaged in 2019.[44] This has resulted in startling consequences for humans and the environment alike. Of course, these consequences that being exacerbated by the evolution of microplastics. Because plastic can take 100 to 1,000 years or more to decompose, it spends its time fragmenting into smaller and smaller pieces which can be found in every ecosystem on the planet.[45] Microplastics are even found regularly in human bodies, and one study suggests that humans could be ingesting as much as a credit card worth of plastic every week.[46]

In addition to plastics, food waste must be a target of source reduction in Birmingham. As stated by the U.S. Department of Agriculture (USDA), "when food is discarded, all inputs used

in producing, processing, transporting, preparing, and storing discarded food are also wasted."[47] The 2021 report "From Farm to Kitchen: The Environmental Impacts of U.S. Food Waste" found that over one-third of the food produced in the United States is never eaten.[48] The primary greenhouse gas emitted from decaying food waste in landfills is methane. According to the U.S. EPA, methane spends less time in the atmosphere than carbon dioxide, but has an impact that is 28 times greater in terms of warming potential.[49] In discussing food waste, there needs to be acknowledgment of not only the environmental impacts of food waste, but also the economic and social impacts that can intersect with environmental issues. For example, the USDA puts the economic loss of food waste in 2010 at around $161 billion.[50] Meanwhile, according to Feeding America, 44 million people in the U.S. are food insecure (including 13 million children), 49 million people turned to food programs in 2022, and 100% of U.S. counties have food security issues.[51]

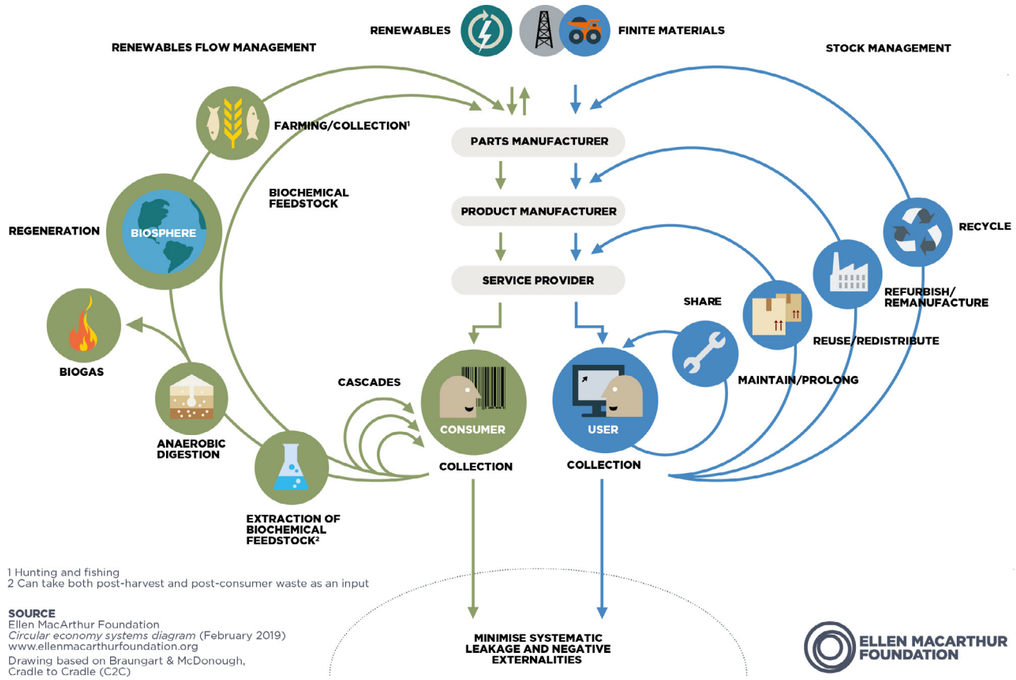


Recycling and the Circular Economy

Of the around 14,000 pounds of MSW that Birmingham will produce in 2024 through its MSW program, recycling will comprise around 16% which is higher than the average of the 12 SOCRRA communities, but 8% less than Pleasant Ridge, which has the highest recycling composition in its MSW. Recycling, although lower in the hierarchy than source reduction and reuse, can have many benefits. Recycling lowers the amount of material in landfills, conserves natural resources and energy, and fosters a robust recycling economy. Key findings from the U.S. EPA's Recycling Economic Information report demonstrated that in 2012, recycling and reuse activities in the U.S. accounted for 681,000 jobs, $37.8 billion in wages, and $5.5 billion in tax revenues.[52]

When it comes to the economy of recycling, it is often referred to as the "circular economy." The Ellen MacArthur Foundation describes the circular economy as follows:

> "The circular economy is a system where materials never become waste and nature is regenerated. In a circular economy, products and materials are kept in circulation through processes like maintenance, reuse, refurbishment, re-manufacture, recycling, and composting. The circular economy tackles climate change and other global challenges, like biodiversity loss, waste, and pollution, by decoupling economic activity from the consumption of finite resources."[53]



A big issue with recycling that affects the disposal system as well as the circular economy is recycling contamination. Recycling contamination can be summarized as non-recyclable material or unclean material that enters the recycling system. The State's Department of Environment, Great Lakes and Energy (EGLE) has engaged in a big push to reduce and eliminate recycling contamination, which would support its 45% recycling goal. From these efforts have come a bevy of education materials that should be leveraged by the City to support its residents in becoming more informed recyclers. The award winning "Know it Before You Throw It" education campaign is embodied by its mascots, the Recycling Raccoons. In addition to this resource, the Birmingham community also has access to SOCRRA's "Waste Wizard" tool in which residents can research different materials that they wish to dispose of and understand where it should be disposed of. This tool is hosted on the City's website and is continuing to improve based on the search history and database of materials.



Recycling Raccoon Squad, EGLE

Composting

When it comes to composting, there are two separate conversations to be had. The over 2,000 tons of compost that is produced annually in Birmingham through the City's MSW program is predominantly yard waste. On the other hand, the broader composting conversation includes food waste and all of its components (storage, types, etc.). The City does not provide curbside food waste compost pickup, nor is food waste composting drop off available in the City or to the City as a part of the MSW program. However, SOCRRA's Waste Wizard tool indicates that vegetable and fruit scraps may be placed in curbside yard containers for collection. Other commonly composted food waste such as coffee grounds, egg shells, grains/breads, or meats may not.

The City's yard waste composting program has benefits beyond avoiding landfills. From October 2023 to June 2024, the City has received 252 cubic yards of finished compost at an estimated value of $2,520 for use by its residents. Access to and use of this compost will help the City build healthier soil, conserve water, and improve plant growth.[54] Although the City does not provide composting services, it is possible to compost on site at home in a clean and responsible manner, or compost at home or a place of business by contracting with a private composting service.



Ferndale Compost Bins

Case Study

Since 2021, the City of Ferndale offers its residents a compostable food waste drop-off program to help reduce the amount of food waste that they send to the landfill through their MSW program. Through this program, residents can collect food waste or other compost in a container of their choice and drop it off at one of 5 collection sites within the City with 14 bins for a weekly capacity of 896-gallons.

Through the years 2022, 2023 and the first 6 months of 2024, the City of Ferndale has diverted 474,995 pounds of food from the landfill.

Specialty and Hazardous Materials

Included in the large sphere of materials management are materials that are uncommon or of a special nature. Their unique disposition often precludes them from being permitted in standard MSW programs, but Birmingham residents do have access to means to properly dispose of or recycle several common items such as hazardous waste, scrap metal, and electronics. Other common specialty or hazardous material can be disposed of or recycled in a safe manner through other means as well. In an effort to reduce the potential for specialty or hazardous waste from entering landfills through Birmingham's MSW program, additional opportunities should be provided by the City such as annual or bi-annual recycling events that address these niche materials.

Conclusion

Addressing municipal solid waste is a complex and multifaceted issue. However, Birmingham has access to select data and an abundance of resources to reduce its MSW and in turn, reduce its greenhouse gas emissions. In aligning with the waste management hierarchy, Birmingham can allocate resources appropriately and provide a healthy return on its investment. To reduce landfilled MSW by 25%, the City will need to take some short term and long term approaches, while also developing permanent policy, and in some cases permanent physical spaces to continue progress into the future.

Action Plan

W-1 Develop a city-wide food waste composting program.

- Description – In terms of tonnage, food waste is the most common form of waste. Food waste also contributes heavily to greenhouse gas emissions through its decay, and creates a myriad of economic, social and environmental issues. With several successful programs to learn from, Birmingham could reduce its food waste and not need to start from scratch. This goal would include both residents, businesses, and the municipal government, but may result in different programs for each.
- Stakeholders – Residents, Business Owners, Planning Department, Department of Public Services
- Start-Up Cost – Medium
- Timeframe – Medium
- Benefit – Substantial; Providing a composting program will have major carbon reduction benefits.

W-2 Study waste outside of the MSW program and work to improve data collection for commercial waste and other waste sources.

- Description – To get a better understanding of Birmingham's true contributions to landfills in Michigan and the possible reduction efforts, more robust data is required. Specifically, all waste that gets disposed of outside of the MSW program such as commercial waste, construction waste, multifamily waste, and other waste streams that may not be captured in current data.
- Stakeholders – Planning Department, Department of Public Services, City Management
- Start-Up Cost – Low
- Timeframe – Long
- Benefit – Narrow; This action will not impact carbon reduction directly, but will inform future action towards carbon reduction.

W-3 Promote source reduction for waste to increase the practice of reducing or eliminating waste before it's created with a focus on plastics and food.

- Description – To truly address the problem of waste, the City should focus a significant amount of energy promoting source reduction and reuse. Some of the most crucial environmental and economic impacts of waste can be solved at this level, and many local, state and national organizations are moving in the same direction.
- Stakeholders –Planning Department, Communications Department, Residents, Businesses
- Start-Up Cost – Low
- Timeframe – Long
- Benefit – Substantial; Source reduction is the most consequential action toward reducing carbon emissions. In addition, there is a significant equity benefit.

W-4 Create a deconstruction ordinance to encourage the reuse and repurposing of building material during construction projects.

- Description – Construction debris, including concrete, wood, bricks, glass, metals and other materials, has the potential to measure twice the amount of MSW in terms of overall tonnage in the U.S. The City of Birmingham experiences a significant amount of development, which necessitates a study of deconstruction ordinances and how they may reduce Birmingham's overall waste.
- Stakeholders – Residents, Property Owners, Building Department, City Management
- Start-Up Cost – Low
- Timeframe – Long
- Benefit – Moderate; Salvaging and reusing construction material has carbon reduction benefits and potential economic benefits.

W-5 Increase and improve quality of recyclables in curbside carts through direct education campaigns and audits.

- Description –In order to support the disposal systems for recycling, as well as the circular economy, the City should leverage existing resources at the State and regional level to localize recycling education to reduce contamination in the MSW stream. In addition, all materials, instructions, opportunities, and other information should be easily accessible on the City's website.
- Stakeholders – Residents, Businesses, Property Owners, Planning Department, Communications Department
- Start-Up cost – Low
- Timeframe – Short
- Benefit – Moderate; Reducing recycling contamination will have an economic benefit and some equity benefits.

W-6 Require recycling opportunities in all new commercial and multifamily development projects.

- Description – Although encouraged, recycling is not required for commercial or multifamily developments in the City. There is a significant amount of square footage associated with these development types, and they are occupied by thousands of people per day – all of which produce all types of waste.
- Stakeholders – Property Owners, Planning Department, Department of Public Services, City Management
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Moderate; This action will have economic and carbon reduction benefits.

W-7 Develop bi-annual recycling events for hard to recycle materials.

- Description – Although a material drop-off station is located close by in Troy, the City would benefit from recycling events in more than one way. Recycling events will increase the recycling habits of Birmingham residents, but also provide an opportunity to reinforce the green culture that is necessary to reduce the impact of waste on the environment.
- Stakeholders – Residents, Planning Department, Department of Public Services, City Management
- Start-Up Cost – Medium
- Timeframe – Medium
- Benefit – Narrow; These type of events could have a carbon reduction benefit and an economic benefit.

W-8 Pilot a zero-waste policy for City-managed events.

- Description –Throughout this plan runs a theme of leading by example. Birmingham, the Birmingham Shopping District, and other entities put on beloved events every year including the Farmers Market, Movie Nights, Day on the Town, DPS Open House, and many more. The City should pilot a zero waste policy at a City-managed event that can easily be adopted by other entities that manage events in the City.
- Stakeholders – Businesses, Birmingham Shopping District, Planning Department
- Start-Up Cost – Medium
- Timeframe – Short
- Benefit – Narrow; Zero waste events have a carbon reduction benefit.

W-9 Invest in new local facilities and services for recycling food waste, electronics, textiles, hazardous materials and other specialty recycling.

- Description –Although residents have access to the SOCRRA facility in Troy, it would benefit the City to meet people where they are and provide local facilities across the City that accept food and specialty waste for recycling that may otherwise get thrown into the broader MSW system. The City should study all opportunities for placement, including the newly acquired YMCA site.
- Stakeholders – Residents, Planning Department, Department of Public Services, City Management
- Start-Up Cost – Medium
- Timeframe – Medium
- Benefit – Moderate; The availability of these facilities will have a carbon reduction benefit and could have economic benefits as well.

W-10 Engage with Oakland County on its Part 115 Solid Waste Management Plan.

- Description – The sweeping changes that have been dictated to county governments in regards to their solid waste management plans will change the landscape of solid waste disposal in Michigan and by association, Birmingham. To engage with Oakland County during the drafting and implementation of the plan, Birmingham would set itself up for success in implementing is own MSW goals.
- Stakeholders – Planning Department, Department of Public Services
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Narrow; This action does not a have a direct carbon reduction benefit, but the results of the plan will have downstream carbon reduction benefits.

What can I do as a...

Individual?

- ☐ Visit www.recyclingraccoons.org
- ☐ Bring your own reusable shopping bags
- ☐ Understand food product dating
- ☐ Start a backyard compost pile
- ☐ Avoid excess packaging
- ☐ Invest in a metal re-usable water bottle
- ☐ Explore SOCRRA's Waste Wizard tool
- ☐ If in an apartment, ask your building manager about recycling
- ☐ Subscribe to SOCRRA's E-Newsletter
- ☐ Make an appointment and recycle at SOCRRA's Materials Recovery Facility
- ☐ Buy less food and use what you buy

Business Owner?

- ☐ Conduct a Waste Audit
- ☐ Reduce and use sustainable packaging
- ☐ Scrutinize suppliers
- ☐ Go paperless
- ☐ Substitute hazardous cleaning products
- ☐ Purchase supplies with recycled content
- ☐ Adopt a sustainable purchasing policy
- ☐ Consider TRUE Certification
- ☐ Donate surplus food
- ☐ Provide recycling and composting facilities to customers
- ☐ Use discount food selling app



Transportation



Reduce greenhouse gas emissions from passenger vehicles by 10,000 metric tons (15%) by 2035.

Reduce greenhouse gas emissions from passenger vehicles by 10,000 metric tons (15%) by 2035.

Like most communities in southeast Michigan, Birmingham is a car-centric environment with only basic access to mass transit and other multi-modal options. Having developed along Woodward Avenue, the state's first "superhighway", it is no surprise that most of the transportation infrastructure in the City is dedicated to cars. Compounding the issue is that car trips are typically single occupancy, and the over 130 million vehicle miles traveled in Birmingham every year translate into significant greenhouse gas emissions. Additionally, emission reductions are not the only benefit of transitioning to other modes of transportation. There are major intersections and positive impacts on public safety and quality of life in a multi-modal community. The City has been able to adopt the moniker of "A Walkable City" through significant investment in sidewalks and pedestrian oriented development, but little progress has been made to improving the environment for mass transit, and has developed dedicated bicycle infrastructure on an opportunistic or reactive basis rather than a proactive one. Transitioning to electric vehicles will not be enough to solve the issue, and Birmingham is well positioned to transition more of its transportation infrastructure to other modes.

Why 10,000 tons?

According to our 2023 Greenhouse Gas Inventory (GHGI), gasoline and diesel powered emissions accounted for 23.3% of the community-wide emissions (17.0% from gasoline and 6.3% from diesel). This accounts for 65,155 metric tons of carbon dioxide emissions annually. The City aims to reduce greenhouse gas emissions from passenger vehicles by 10,000 metric tons (15%) by 2035. 69.8% of the residents of Birmingham drive alone to work according to 2022 SEMCOG data. Only 2.5 % of Birmingham residents walk, bike, use public transportation, or use other means to get to work. By increasing the quality of multi-modal transportation services, the City hopes to decrease the number of residents who drive alone to work and increase alternative methods.

Background Material

As summarized by the City's current multi-modal plan, transportation has a number of considerations to be had. There are public safety implications, economic implications, and social implications. The City of Birmingham passed a Complete Streets resolution in 2011 that sparked the movement towards increasing the City's multi-modal offerings and providing viable transportation options for its residents, employees, and visitors. Now, the City is positioned to build on its successes, including expanded infrastructure for cycling, pedestrians, and mass transit.

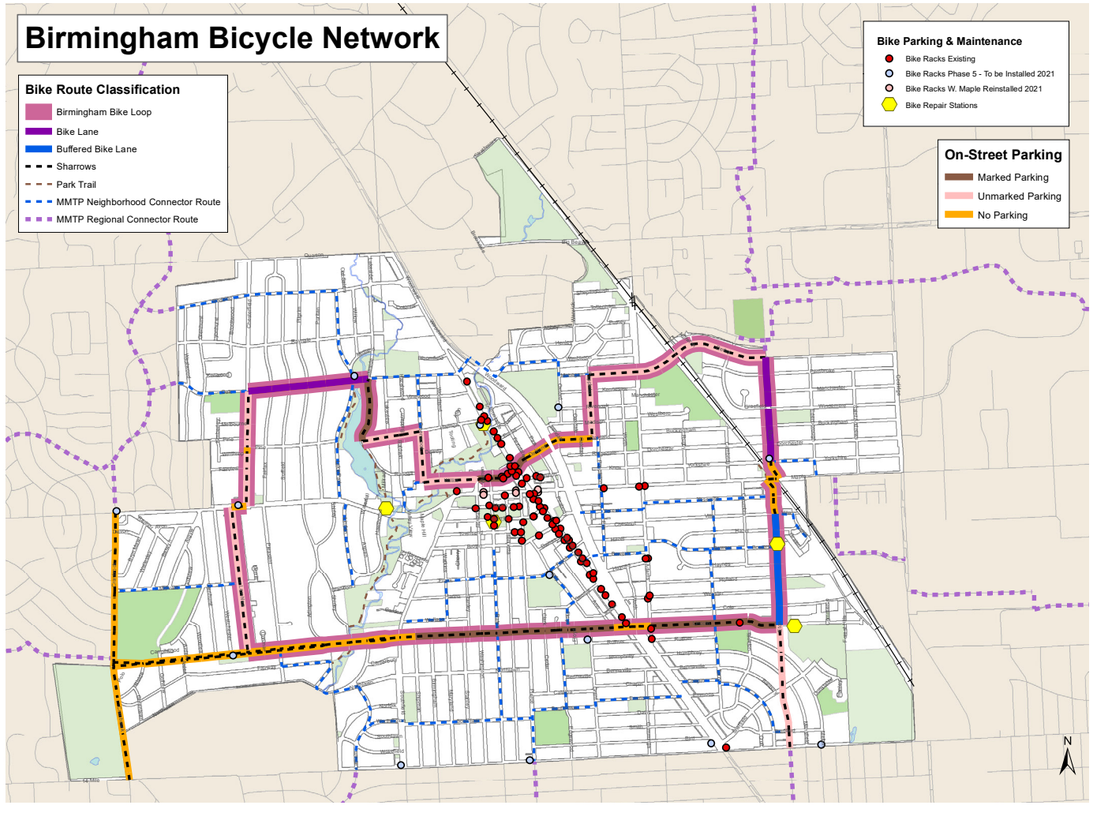
Mass Transit in Southeast Michigan

Mass transit is developed and maintained at a regional scale. However, communities within the region have plenty of opportunity to support and improve the conditions for mass transit within their own boundaries. There are several regional entities that are working on mass transit in SE Michigan. Most visible in Birmingham is the Suburban Mobility Authority for Regional Transportation (SMART). SMART services over 9 million people annually across 47 different routes and 5,300 bus stops.[55] The City of Birmingham currently has 64 SMART bus stops. Of these, 8 stops have shelters, and 14 have amenities at or near the stop such as a trash receptacle or bench. One of the objectives of the transportation section of this plan would be to promote the use of mass transit in the City through enhanced transit stops. This includes the updating of current infrastructure around the bus stops, as well as looking to invest in new infrastructure where there are gaps.



Another organization committed to mass transit in SE Michigan is the Regional Transit Authority (RTA). The RTA "envisions a region with sufficient and stable funding to support improved public transit options that will advance equity by increasing accessibility; satisfy the integrated mobility needs of Southeast Michigan communities; and promote livable, healthy, and sustainable growth."[56] The RTA engages in a number of projects, but also coordinates and oversees existing transit providers such as SMART, the Detroit People Mover, the QLINE, and MoGo. The RTA also developed and adopted the Regional Transit Master Plan that outlines trends, opportunities & accomplishments as well as adopting transit priorities for the region.

Finally, in 2022 the residents of Oakland County approved the Oakland County Public Transportation millage. This voter-approved, 10-year, 0.95 millage is dedicated to maintaining and expanding public transit services throughout Oakland County. A Transit Division within the Oakland County Economic Development Department was created and staffed with a manager and two transit planners. Although this is a relatively new department within the County, they have been active and have engaged in connecting bus services, expanding routes, and working with the Regional Transit Authority to make the county more attractive for transit. In addition, Oakland County Transit has worked with the RTA on grant funding that could help support bus



rapid transit on Woodward Avenue.

Through these regional entities, the City would benefit by advocating for more frequent and reliable multi-modal transit service in order to create a better experience for the user and community alike.

Biking

Bike lanes are an integral function of a multi-modal City. Currently, the City of Birmingham has 0.86 miles of dedicated bike lanes, 0.42 miles of buffered bike lanes, 8.6 miles of sharrows (arrows painted on the road indicating to share the road with bikes), and a 15-mile Neighborhood Connector Route. Along with increasing the amount of bike lanes in a proactive manner, another goal is to introduce a bike sharing system such as MoGo. MoGo, a non-profit bike sharing affiliate of the Downtown Detroit Partnership, currently has 75 stations in six Metro Detroit cities with over 620 bikes in operation. A bike sharing system in Birmingham would provide the opportunity for convenient and accessible transportation across the City found within the Birmingham Plan 2040 and those within this plan. By providing more opportunities for residents and visitors alike to access bike transportation, we hope to see an increase in bike usage across the community.



Multi-Modal Transportation Plan

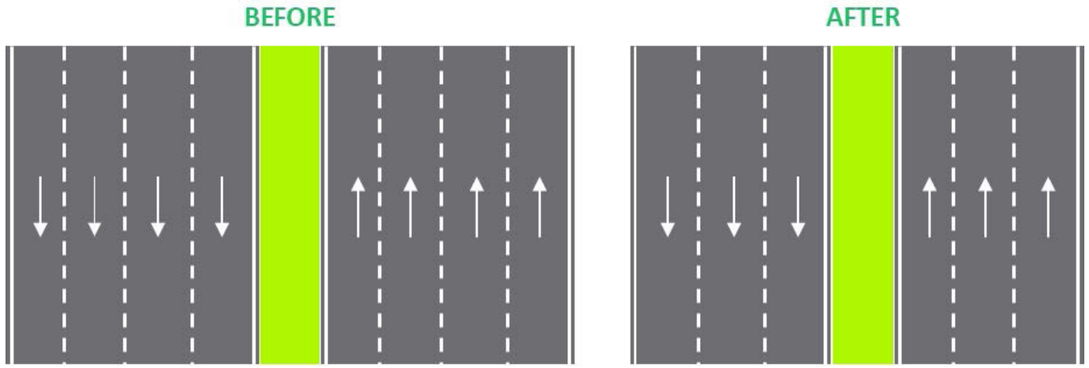
The City of Birmingham developed a Multi-Modal Transportation plan in 2013 in collaboration with The Greenway Collaborative, Inc. and Toole Design Group. With walkability being a key pillar in the community, the plan focuses on three main goals. The first is to complete the infrastructure in the City to create a balance of motorized and non-motorized methods of transportation. This includes enhancing transit amenities (e.g. benches, shelters, etc.), providing convenient and appropriate road crossings for pedestrians and bicyclists, and expanding other infrastructure as necessary.

Another goal of the plan was to increase the opportunities for social interaction within the community of Birmingham through walking, bicycling, and taking public transit. The third goal of the plan was to create a system that respects the needs of all the different users, achieved through developing accessible and adaptable infrastructure. While many aspects of this plan have been completed or have active projects, it is recommended that there be an updated Multi-Modal plan developed in alignment with the new recommendations found within the Birmingham Plan 2040 and those within this plan.

In terms of sustainability and climate action, the Multi-Modal Plan is due for an update, and a new update should take into consideration the carbon reduction goals of this plan and should focus on how to design transportation systems in Birmingham that can withstand increasing extreme weather events and changes in the climate.

Woodward Road Diet

Woodward Avenue's eight lanes of traffic spanning 200 feet creates a hazardous situation for pedestrians crossing from one side of Birmingham to the other. Concerns regarding this issue have been voiced from Birmingham residents, board members, and officials to the Michigan Department of Transportation who owns and controls Woodward Avenue. The safety concerns for Woodward Avenue have been amplified with two recent pedestrian fatalities near the intersection at Forest and Woodward. The City is coordinating with MDOT to address short term and long term safety measures for Woodward Avenue up to and including a road diet for Woodward Avenue between Quarton Road and 14 Mile. A Woodward road diet would improve conditions for multi-modal transportation.



Proposed Woodward road diet changes

Conclusion

Birmingham is a traditional car-centric community, resulting in high single-occupancy vehicle usage that results in higher greenhouse gas emissions. The City aims to increase its' pedestrian infrastructure, mass transit and proactive bicycle infrastructure through the implementation of the action items found in this plan, the Multi-Modal Plan, and the most recently adopted comprehensive master plan. Birmingham aims to reduce car emissions by 15% by 2035 and increase alternative commuting methods beyond the current 2.5%. Through increased air monitoring, realistic traffic reduction goals can be set to assist in reaching overall carbon reduction goals. By improving SMART bus stops, advocating for better transit services, and expanding bicycle infrastructure like dedicated lanes and bike-sharing systems to enhance multi-modal transportation options, Birmingham aims to become a regional leader in the increased use of multi-modal transportation.

Action Plan

T-1 Continue to implement the City's current multi-modal transportation goals.

- Description – The City's current multi-modal transportation goals focuses heavily on bicycle and pedestrian infrastructure, which are imperative for a robust multi-modal network. The City should continue to improve and expand upon its existing network.
- Stakeholders – Residents, Property Owners, Planning Department, City Management
- Start-Up cost – Low
- Timeframe – Medium
- Benefit – Substantial; The current multi-modal goals include much in terms of reducing carbon emissions through enabling multi modal opportunities, while also providing an equity benefit.

T-2 Update the City's multi-modal plan.

- Description – The City has spent a considerable amount of time and resources implementing the 2013 Multi-Modal Transportation Plan (MMTP). The MMTP is in need of an update that considers both the recommendations within the Birmingham Plan 2040, but also a focus on sustainability as outlined in this plan. A new MMTP should consider and include the City's carbon reduction goals and provide a major focus on proactive approaches to improving the conditions for walking and biking in the City, as well as mass transit. In particular, an update should focus on comprehensive cycling infrastructure recommendations with miles of bike lanes, pathways, sidewalks, neighborhood connectors/bike routes, number of mid-block crossing improvements, and number of bike parking spaces
- Stakeholders – Planning Department, Building Department, Engineering Department, City Management
- Start-Up Cost – Medium
- Timeframe – Long
- Benefit – Moderate; An updated MMTP will continue to reduce carbon emissions by enabling more multi modal travel options and improve the equity considerations of such.

T-3 Introduce bike sharing systems such as MoGo across the City.

- Description – Bike sharing systems provide a number of benefits from daily recreation to work commutes. Bike sharing facilities can be strategically placed near transit stops to offer critical last-mile options, or in other places in the City to support alternative modes of transportation.
- Stakeholders – Residents, Businesses, Planning Department, City Management
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Narrow; MoGo access in the City will fill some transportation gaps and reduce some carbon emissions as well as provide some equity benefits.

T-4 Advocate for more frequent and reliable multi-modal transit service.

- Description – With the increase on attention, funding, and personnel dedicated to mass transit in the region, Birmingham must not be left behind. By participation in meetings, stakeholder engagements, or other opportunities to provide input, Birmingham will ensure that it is prepared for any future endeavors that affect its right-of-ways and transit opportunities.
- Stakeholders – Planning Department, Department of Public Services, City Management
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Substantial; This action would have both significant carbon reduction benefits as well as equity benefits.

T-5 Increase the budget for maintenance and creation of non-motorized transportation options in the City.

- Description –The City maintains a budget for bicycle and pedestrian infrastructure, and much of the broader Capital Improvement budget is dedicated to increasing sidewalk networks, the provision of bus shelters, and other important infrastructure.
- Stakeholders – Planning Department, Engineering Department, Department of Public Services
- Start-Up Cost – High
- Timeframe – Medium
- Benefit – Substantial; More opportunity for multi-modal transportation options will reduce carbon emissions and will have equity benefits.

T-6 Increase the maintenance of, and amenities within, all non-motorized facilities.

- Description – Non-motorized amenities across the City can vary. Some amenities have seating, trash receptacles, signage, and other tools, while others don't have any amenities at all. Birmingham should adopt minimum amenity standards for its non-motorized transportation network, and seek to continually improve the conditions and amenities of such in the City.
- Stakeholders – Planning Department, Building Department, Department of Public Services
- Start-Up Cost – Medium
- Timeframe – Long
- Benefit – Narrow; This action is a supportive one in that it should support carbon reduction but does not have a direct influence.

T-7 Advocate for a Woodward Avenue road diet.

- Description – The 200 ft. superhighway that is Woodward Avenue poses safety risks and facilitates significant carbon emissions through its connection to Pontiac and Detroit. In order to connect the two sides of Birmingham, the expanse of pavement and high speeds need to be reduced, which Birmingham hopes to create through a road diet.
- Stakeholders – Planning Department, Building Department, Engineering Department, City Management
- Start-Up Cost – Low
- Timeframe – Short
- Benefit – Moderate; Reducing vehicle speeds and potentially vehicle miles traveled will have a carbon reduction benefit.

T-8 Promote the use of mass transit in the City through enhanced transit stops and education.

- Description – Transit service is only as good as its infrastructure. There have been growing investments in reliable vehicles, as well as enhanced transit stops in many areas of the region, and especially along the Woodward FAST route. In order to make transit more attractive, Birmingham should ensure that its transit stops have seating, signage, and other amenities that promote a safe and comfortable transit environment.
- Stakeholders –Planning Department, Department of Public Services, Residents, Businesses
- Start-Up Cost – Medium
- Timeframe – Medium
- Benefit – Moderate; Enhanced transit stops may support increased ridership and reduce carbon emissions. In addition, there is a significant equity benefits associated with this action.

What can I do as a...

Individual?

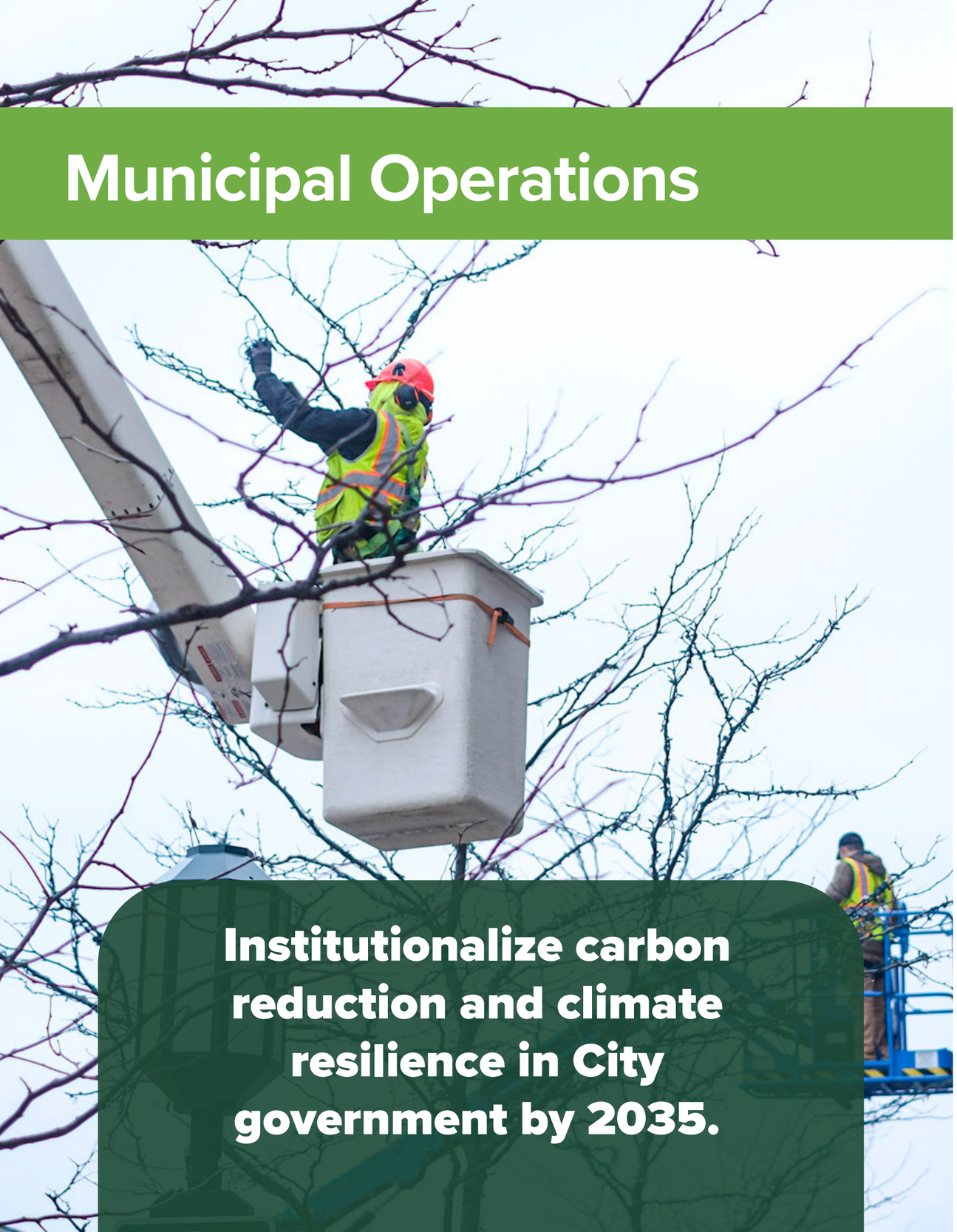
- ☐ Take the bus
- ☐ Read the Regional Transit Plan
- ☐ Engage with the Multi-Modal Transportation Board
- ☐ Participate in the annual Commuter Challenge
- ☐ Cycle to school/work/downtown
- ☐ Walk to school/work/downtown events
- ☐ Carpool

Business Owner?

- ☐ Offer incentives to workers who utilize multi-modal transportation or carpools
- ☐ Allow flexible work hours for employees to align their schedules with transit schedules



Municipal Operations



Institutionalize carbon reduction and climate resilience in City government by 2035.

Institutionalize carbon reduction and climate resilience in City Government by 2035.

Any worthwhile commitment to sustainability and carbon reduction in a community should include direct and reciprocal governmental action. The City government in Birmingham has long been committed to operational excellence and high-quality public service. Having committed itself to sustainability and climate action through dedicated strategic goals and the declaration of a climate emergency in 2023, the City acknowledged its role in the community and in the solution. The City owns and manages over 300 acres of property, nearly 20 buildings and 82 miles of right-of-way. In addition, the City employs 376 people and owns 216 vehicles. These data points alone represent a significant challenge, but also an opportunity to lead by example, build partnerships, and foster large-scale transformation across the community.

Why institutionalize carbon reduction and climate resilience?

Institutionalizing carbon reduction and climate resilience will embed these themes and ideas into the structure and system of Birmingham's local government. Once institutionalized, policy and decision making processes that include such will become second nature. This goal may be measured by its success or failure, and can be observed in its policy, budget, and implementation of projects over the next 10 years.

Background Material

The institutionalization of carbon reduction and climate resilience in Birmingham starts in City Hall. To become a regional leader in sustainability and climate action, the Birmingham City government must lead by example. In doing so, City leadership must also acknowledge that this will come at an expense both in-office and in the field, but should be considered an investment with significant future return. Overall, greenhouse gas emissions from municipal operations are minimal when compared to the broader community. While continuing to reduce emissions, the City can increase services that focus on resiliency and adaptation for its constituents, build relationships, and coordinate with local and regional entities. Ultimately, City leadership and the policy makers within will themselves set budgets and appropriate staff to accomplish these goals.

In the Office

The City of Birmingham owns and operates over 400,000 sq. ft. of enclosed and regularly occupied square footage. This includes City Hall, the Baldwin Public Library, Fire Stations 1 & 2, public service and recreation facilities, the Birmingham Museum, and golf courses. Municipal buildings, their energy consumption, and their overall performance are discussed in the Buildings and Facilities section of this plan. However, these buildings are filled with people, equipment, supplies, and policies that each require careful consideration.

Birmingham's administrative structure is led by a City Manager who receives direction and oversight from the City Commission and delegates appropriately. The City Manager directly manages 15 department heads, who in turn manage their respective departments, which all consist of full time, part-time, seasonal staff and contractors. Within this staff are a plethora of motivated and interested people who are invested in sustainability and climate action. In an effort to maintain a steady dialogue between departments,



Case Study

Historically, Birmingham provided its boards and commissions with paper packets. Over the years, the majority of them have transitioned to fully digital packets. One exception appears to be the City Commission, who quite frequently are provided with hard-copy packets to review at their bi-monthly meetings. Traditionally, a total of up to 12 full packets have been printed for the commission members and city staff. In 2023, the City Commission held 38 meetings, and the corresponding packets totaled 11,521 pages. If all 12 packets were printed for each meeting, the City Commission would have used 69,126 sheets of paper (double sided print) in one year alone. This equates to 14 boxes of 8.5 x 11 printer paper. The average cost in 2024 of a box of printer paper is around $40. Thus, the cost of paper alone in printing the meeting packets for 2023 cost somewhere in the range of $560.



an internal Green Team was created and facilitated by the City's Planning Department to have open conversations, engage in problem-solving and brainstorm a multitude of topics ranging from grant opportunities to day-to-day situations to specific projects.

In addition to the City's internal Green Team, a public body should be appointed to manage and facilitate the goals and recommendations within this plan. In 2023, the City Commission created and seated an Ad Hoc Environmental Sustainability Committee (ESC) with 9 members of varying specialized skill sets related to sustainability. The ESC was created to (1) perform the City's first greenhouse gas emissions inventory and (2) draft a sustainability and climate action plan. Thus, their tenure expires once those tasks are completed. A formal Environmental Sustainability Board would serve the City well. Adjacent to all of this, with the increased focus on sustainability and climate action in the City, at least one new position is recommended to adequately manage and guide the Green Team, Environmental Sustainability Board, other boards/commissions and City staff on the goals of this plan and all that evolves from it. Making an investment in City staff would not stop there. In order to successfully implement the City's goals, regular trainings, certifications, and other continuing education efforts should be ramped up to improve skills and increase knowledge in existing staff as well.

In terms of office supplies, equipment, and contracted services the City's purchasing guidelines do suggest that the purchasing agent "purchase materials or equipment that are sustainable when practical." In general, it is understood that many sustainable products and services have a higher up-front cost. In one stark example, in March 2024 the City recently awarded a contract for lawn maintenance services after debating contractors' proposals, which included bids for electric equipment that were three times as high as the low bid. Overall, the City maintains a budget of around $1,000,000 (+/-) for supplies, which can be more responsibly allocated towards sustainable products.

In regard to the broader municipal budget, it is generally understood that a budget should reflect the values and priorities of an organization. Having clearly stated sustainability and climate action in its strategic goals, the City would benefit from a distinct, regular and deliberate allocation of funds geared towards funding sustainability efforts within the City. This budget could be built in a few ways. Included in the growth of the budget item could be the capture of savings from transitions to sustainable practices. In one example, in June 2024 the City was charged $51,062 for 74,934 kilowatt hours by DTE for the electricity delivered to and consumed by the City's streetlights. According to the U.S. Department of Energy, LED bulbs use at least 75% less energy.[57] The City currently has 988 non-led streetlights (high pressure sodium, mercury vapor, mercury halide) and 712 LED streetlights at varying wattages. Extrapolating data from June 2023 and applying the 75% efficiency estimate, the transition to LED could eventually save the City around $84,371 annually. Thus, the eventual complete transition to LED bulbs will save considerable money. In this example, instead of recouping that savings in the General Fund, it could instead be used to fund the City's sustainability budget.



In the Field

Much of Birmingham's success in the implementation of this plan will come from the hard work being done in the field. All policy decisions made that require physical implementation on public property would need to be sensitive to the needs and capacities of the departments involved. The Department of Public Services (DPS), whether through its staff or the management of contractors, would bear the brunt of the maintenance and upkeep of improved public space. The DPS, among other things, maintains the entire vehicle fleet, manages Birmingham's 200+ acres of parkland, operates the City's recreational offerings (including two 9-hole golf courses) and oversees Birmingham's streets, sewers, and water operations. The DPS facility is located 1.25 miles away from Downtown Birmingham, and in some cases more than 2 miles away from the furthest parks. Currently, the vast majority of the City's vehicle fleet is comprised of internal combustion engine vehicles. This includes light, medium and heavy duty vehicles, some of which consume diesel fuel. Ultimately, it will be imperative to reduce vehicle miles traveled by internal combustion engine vehicles, but policies should also be put in place to reduce the idling of vehicles. The U.S. Department of Energy suggests that idling from heavy-duty and light-duty vehicles combined wastes about 6 billion gallons of fuel annually.[58] Like other products, alternative fuel vehicles and the transition to such may cost more up front. However, according to the U.S. Department of Energy, it can cost about half as much to drive an electric vehicle as an equivalent gasoline vehicle, as the price and availability of electricity is much more stable than gasoline.[59]

Aside from vehicle travel, another big factor in the transition to more sustainable operation in the field is the management of parks and open space. With goals in this plan to transition more impervious surface and turf-based groundcover to native and naturalized spaces, there will be an up-front cost associated that is more than just materials. In the case of newly planted native beds, general guidance provides that regular and consistent maintenance of these beds must occur for at least two years after planting to allow the new plants to establish themselves, outcompete weeds and receive much needed watering. If the City were to invest in rain gardens and bioswales, there is an additional maintenance aspect that must be performed to ensure that the necessary features are maintained so that it may perform its function to the fullest extent.

Case Study

The newly adopted Parks and Recreation Master Plan 2024-2028 encourages a shift in more sustainable practices throughout the City's parks and trails system to keep in line with the goals of our City Commission and 2040 Birmingham Master Plan. One of these goals is naturalizing areas in parks to eliminate maintained turf where feasible, which should in turn reduce pollutants, reduce long-term maintenance requirements and provide a more sustainable ecosystem.

In 2024, the Department of Public Services selected Manor Park Nature Reserve as a trial area because of its existing naturalized setting, minimal interference for park users and programming, and distance from residential properties. In the end, three sections totaling around 1,500 sq. ft. were fenced off and a custom blend of wildflower seeds were scattered. This project is expected to reduce weekly moving, weeding, blowing, and fertilizer/herbicide use.



Conclusion

Institutionalizing carbon reduction and climate resilience in City government by 2035 means building trust and influence in the community. To achieve a high level of trust and influence, the City must work quickly to align its long term policy goals with its day-to-day operations. In the following actions, Birmingham as an employer, service provider, and owner of land, facilities and infrastructure will begin to embed these ideas into its systems and strategies for years to come.

Action Plan

MO-1 Transition all administrative and light-duty municipal internal combustion engine vehicles and equipment to alternative fuels.

- Description – City vehicles are one of the most visible representations of the values and goals held by the City. Although electric vehicles are becoming more and more popular, they are not necessarily easy to procure due to increased demand. In addition, the technology is limited for heavy-duty vehicles. Due to this, the City should not limit itself to electricity as an alternate fuel, but should also consider other alternative fuels that may be available.
- Stakeholders –Department of Public Services, City Management
- Start-Up Cost – High
- Timeframe – Medium
- Benefit – Substantial; The removal of internal combustion engines from the municipal fleet will have a major carbon reduction benefit.

MO-2 Hire a full-time sustainability staff person and a stormwater specialist.

- Description – The proper implementation of this sustainability and climate action plan and the management and/or review of sustainability projects will require at least one dedicated, full-time staff person. In addition, this staff person would be applying for and managing grants, acting as staff liaison for a future Environmental Sustainability Board, performing future GHG emission inventories, advising City staff, and a multitude of other activities.
- Stakeholders – Planning Department, City Management
- Start-Up cost – Medium
- Timeframe – Short
- Benefit – Moderate; A dedicated staff person will serve equity benefits from the education and access they will bring, as well as economic benefits from increased grant efforts.

MO-3 Create a sustainability fund for use by multiple City Departments.

- Description – Whether embedded in each department's budget or established as a standalone fund type, regular funding is fundamental to implementing the vision and strategic goals of the City. This budget item could be constructed of a mixture of different funds, including the capture of savings from sustainability projects. This budget could and would be regularly supplemented by grant money when feasible.
- Stakeholders – City Management
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Substantial; Funding the actions in this plan will have a major economic benefit both in structure of the fund but also the natural payback potential for most sustainability work.

MO-4 Establish a sustainable purchasing program and an internal administrative regulation.

- Description – The market for green products and services is growing, and the City must address consumption to ensure that the City is acting as a role model for other businesses and organizations within the City. A sustainable purchasing program could include requirements for the purchase of recycled materials, natural cleaning supplies, refurbished or used products, or other low-impact products/services.
- Stakeholders –Finance Department, City Management
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Narrow; This action will have carbon reduction benefits through source reduction and recycling.

MO-5 Decrease vehicle miles traveled during commute by municipal staff by 450,000 miles through incentive programs.

- Description – The average commute one-way for city staff to their place of work is 15 miles. There are many commutes that are in excess of 40 miles one-way, and one commute greater than 50 miles one-way. As the region continues to build its mass transportation systems, the City must address the vehicle miles traveled by its staff.
- Stakeholders – City Management
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit – Moderate; The 25% reduction in vehicle miles traveled by municipal staff will have carbon reduction benefits

MO-6 Adopt an anti-idling policy for all non-emergency City vehicles.

- Description – It can be argued that the idling of modern vehicles is done solely for the comfort of its occupant. Other than comfort, it serves no real mechanical or functional purpose. Although comfort is a consideration, especially for DPS staff that works outside, the waste of fuel and eventual contribution to greenhouse gas emissions should be of greater concern.
- Stakeholders –Department of Public Services, City Management
- Start-Up Cost – Very Low
- Timeframe – Short
- Benefit – Moderate; Significantly reducing idling will reduce the consumption of fossil fuels and reduce carbon emissions.

MO-7 Identify and maintain a database of new and recurring grant opportunities geared towards sustainability and climate action.

- Description – Although the $4.6 billion in available grant funding from the Inflation Reduction Act of 2023 has dominated the minds and time of many in recent months, there are a significant amount of regularly occurring grants related to sustainability and climate action. Historically, the City has been hugely successful in obtaining grant funding for projects of many shapes and sizes.
- Stakeholders – Planning Department, Building Department, Engineering Department, City Management.
- Start-Up Cost – Low
- Timeframe – Short
- Benefit – Narrow; Grant funding is spotty and takes time to manage, but could fill funding gaps and increase the likelihood of meeting some of the actions in this plan.

MO-8 Create, by ordinance, an Environmental Sustainability Committee to oversee and make recommendations on a variety of issues related to sustainability and climate action.

- Description – A formal, public board dedicated to the management of this plan and any other ancillary duties that stem from this plan will be essential in ensuring that the public has ample opportunity to participate in the public process. This body could meet regularly on a monthly basis, with opportunities to set special meetings whenever necessary.
- Stakeholders – Planning Department, City Management.
- Implementation Cost – Low
- Timeframe – Short
- Benefit – Moderate; The benefit of a formal committee will be long term and will focus on equity and public engagement benefits will focus on equity and public engagement benefits.

MO-9 Provide recycling opportunities in all public parks and other public spaces.

- Description – One of the most important steps a government can take to increase sustainability and climate action efforts is to provide access and the means to properly dispose of waste. Ensuring that there are equal opportunities to recycle and possibly compost in public spaces will provide such access.
- Stakeholders – Planning Department, Department of Public Services, City Management, Residents, Businesses
- Start-Up Cost – Medium
- Timeframe – Short
- Benefit – Narrow; At a minimum, increased opportunity will reduce carbon emissions and can contribute to the circular economy.

MO-10 Phase out the use of all chemical pesticides, herbicides and fertilizers on City property and in park maintenance operations

- Description – Birmingham maintains a high standard of quality control and aesthetics in its public spaces, which sometimes require the elimination of weeds, invasive species, or other undesirable vegetation and pests. Although chemical fertilizers, pesticides and herbicides perform at a high level, their consequences outweigh the benefits. Chemical exposures include toxicity, carcinogenicity, dermatological, gastrointestinal, neurological, respiratory, reproductive, and endocrine effects.
- Stakeholders – Planning Department, Department of Public Services, City Management.
- Start-Up Cost – Low
- Timeframe – Medium
- Benefit –Moderate; Reducing chemical applications of various types will have equity and health benefits for the user, but also environmental benefits.

MO-11 Increase or require specialized training for all workers who manage natural spaces.

- Description – The Department of Public Services has over 50 positions dedicated to the maintenance of public space. Because many of the improvements in this plan require regular and unique maintenance, it would be beneficial to provide maintenance staff with specialized training.
- Stakeholders – Planning Department, Building Department, Engineering Department, City Management, Department of Public Services
- Start-Up Cost – Low
- Timeframe – Short
- Benefit – Narrow; Training staff will allow them to contribute to a number of different economic, environmental and social benefits across the board.

MO-12 Create a sustainability web page to act as a landing page for all city sustainability initiatives as well as to inform and educate residents on sustainable topics, best practices and relevant State and regional programs.

- Description – The City website is a valuable repository of current and historical events, plans, policy, and other information that is essential to an open and transparent government. For those interested in sustainability and climate action, the City should create a separate page for sustainability that includes essentials such as plans, GHG inventories, news, and other important information.
- Stakeholders – Planning Department, Communications Department.
- Start-Up Cost – Low
- Timeframe – Short
- Benefit – Narrow; Access and education will have equity benefit and improve the ability for persons to participate in the plan.

MO-13 Develop a comprehensive public engagement plan as early as possible to ensure that residents, businesses and other stakeholders in the City have the education and information necessary to meaningfully engage with the implementation of this plan.

- Description – As described throughout this plan, residents and business owners are essential to the successful implementation of this plan. In order to get the most out of these major stakeholder groups, the City must create a deliberate, consistent, and education based approach to engagement that should include a number of different avenues beyond the traditional municipal approaches. New approaches could include the Birmingham Schools, community organizations, and in-person events.
- Stakeholders – Planning Department, Communications Department.
- Start-Up Cost – Medium
- Timeframe – Short
- Benefit – Narrow; Engaging stakeholders early will provide an important equity component and enable them to contribute to the goals immediately.

What can I do as a...

Individual?

- ☐ Review Birmingham's Annual Budget
- ☐ Attend City meetings
- ☐ Advocate for sustainable operations
- ☐ Review Birmingham's Communication Resources

Business Owner?

- ☐ Attend City meetings
- ☐ Participate in City events

CONCLUSION

Implementation, Monitoring, & Reporting

Funding Opportunities

First Steps

Conclusion

Planning for sustainability and climate action is a responsibility of all levels of government. Increasingly federal and state governments have become more serious about innovation and funding solutions for our planet's ongoing climate emergency. The City of Birmingham has long been sensitive to the environment. However, many important sustainability efforts within the City still take place at an individual or departmental level. An on-going and enhanced commitment to furthering sustainable goals and coordination across City departments allows us to capitalize on valuable opportunities to share resources and exchange ideas with neighboring communities in our region.

To make plain the underlying theme present throughout this entire plan, **the City will not reach its goals without its residents, business owners, institutions, and other stakeholders meaningfully and earnestly participating in this process.** Becoming regional leaders means enabling people to make changes as an individual, but also as a part of the community to be able to thrive in a changing future.

With full leadership buy-in from the City Commission and support from City Management and City Departments, Birmingham is ready to take the next steps towards formalizing a commitment to sustainability and reducing the effects of climate change in Birmingham. In adopting this plan, the City will elevate its charge and become the regional leaders we know ourselves to be. In this effort, we will become innovators, collaborators, supporters and ultimately, stewards of the next generation.

Alone we can do so little; together we can do so much.

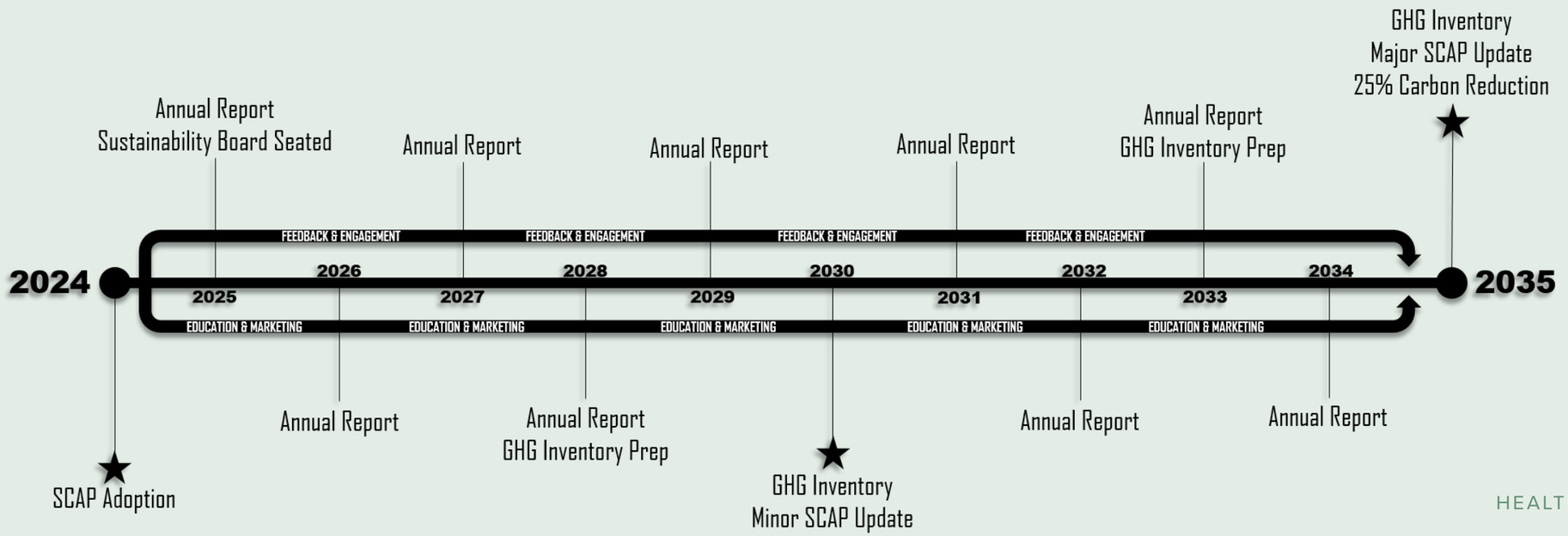
Implementation, Monitoring, and Reporting

To ensure the successful implementation of the Birmingham Green: Healthy Climate Plan, the City will need to build into is policy and procedure a series of checkpoints and feedback loops that can provide consistency, but also the flexibility to react to changes in the environment or politics. In addition, due to the multidisciplinary, "all hands on deck" nature of this plan, these feedback loops should include more than the future Environmental Sustainability Board and the City Commission. All adjacent boards/commissions, City departments, and City stakeholders as well as local neighbors, Oakland County, SEMCOG, and even the State of Michigan should be included in the process. This will ensure that the City's actions are up to date and consistent while also receiving crucial information from all who have a role in the implementation of this plan.

It is expected that the City's Planning Department will continue to facilitate and monitor the implementation of this plan. It is recommended that Birmingham's internal Green Team be the touch-point between departments at least monthly, and that their meetings be structured so that considerable time is dedicated to this plan and ensuring tasks are clearly assigned which will establish accountability. The activity in this group will be reported out to the future Environmental Sustainability Committee.

As alluded to earlier in this document, the implementation of this plan would also benefit from a robust marketing/information strategy that is aimed at bringing these conversations to where people are and making conscious sustainability and climate action decision a part of everyday life. The City's robust communication tools may be leveraged consistently, and new channels may be created.

Finally, similar to reports from the Planning Board, Historic District Commission, Design Review Board, and other bodies, annual reports will be furnished to the City Commission and made public outlining progress towards the goals of this plan. This report will contain data, project highlights, success stories, and any other pertinent information.



Funding Opportunities

There are several existing or potential funding sources available for sustainability, resilience, carbon reduction and other climate action efforts. **In addition to the City's General Fund, other potential sources of funding for sustainability include: a dedicated millage, user fees, revenue bonds, donation and grants.**

Grant Funding

In addition to the funding sources mentioned above, grant funding can be an important funding resource. Securing grant funding for sustainability initiatives is a pivotal component in leveraging budget dollars to enhance sustainability and resiliency of the city's buildings, facilities, infrastructure and open space. There are a variety of Local, State, and National grants that can help achieve the city's goals for sustainable operation of programs, services, infrastructure and capital projects. The following is a non-exhaustive list of potential grant resources for the city to explore. The IIJA & IRA Funding Tracker developed and managed by the University of Michigan Graham Sustainability Institute provides the most up to date information on available funding, application deadlines, eligible uses, etc. for most of the below grants:

- Charging and Fueling Infrastructure Grants (Community Charging + Corridor Charging): Community grants to install electric vehicle charging and alternative fuel in location son public roads, schools, parks, and in publicly accessible parking facilities. Corridor charging will deploy electric vehicle charging and hydrogen/ propane/natural gas fueling infrastructure along designated alternative fuel corridors and communities.
- Clean Heavy-Duty Vehicles: To offset the costs of replacing heavy-duty Class 6 and 7 commercial vehicles with zero-emission vehicles; deploying infrastructure needed to charge, fuel, or maintain these zero-emission vehicles; and developing and training the necessary workforce.
- Communities Taking Charge Accelerator: Strategic investments at the local level that address key barriers to expanding access to electrified mobility options for individuals without home charging; accelerating the transition to electrified micro, light, and medium duty fleets; and maturing the implementation of managed charging systems to mitigate impacts and optimize usage of the grid.
- Culvert Removal, Replacement, & Restoration: Provides funding for projects that replace, remove or repair culverts that would improve or restore fish passage for certain fish, with a priority given those species who are endangered or at risk of becoming endangered, or projects that address fresh-water runoff that impact certain marine life.
- Flood Mitigation Assistance: The Flood Mitigation Assistance program makes federal funds available to states, U.S. Territories, federally recognized Tribal governments, and local communities to reduce or eliminate the risk of repetitive flood damage to buildings and structures.
- Funding to Address Air Pollution: Clean Air Act: To provide general funding for EPA's Clean Air Act research, development, planning, and grants program.
- National Fish Passage Program: Activities proposed under this award may include project planning and feasibility studies, engineering and design, permitting, on-the-ground fish passage restoration, near-term implementation monitoring, project outreach, and capacity to manage these project-related activities
- Natural Gas Distribution Infrastructure Safety and Modernization Grants: Grant funds will be made available to municipalities or community owned utilities (not including for-profit entities) to repair, rehabilitate, or replace natural gas distribution pipeline systems or portions thereof or to acquire equipment to reduce incidents and fatalities, and to avoid economic loss.
- Pilot Program for Transit Oriented Development: The Pilot Program for Transit Oriented Development Planning is a discretionary grant program that helps support Federal Transit Administration's mission of improving public transportation for America's communities by providing funding to local communities to integrate land use and transportation planning with a new fixed guide way or core capacity transit capital investment.
- Reconnecting Communities Pilot (RCP) Program: Advance community-centered transportation connection projects. Planning grants fund the study of removing retrofitting, or mitigating an existing facility to restore community connectivity; public engagement; and other transportation planning activities. Capital Construction Grants fund a project to remove, retrofit, mitigate, or to replace an existing eligible facility with a new facility that reconnects communities.





First Steps

The following actions are considered crucial to the first 5 years of the implementation of this plan and ultimately the reduction of greenhouse gas emissions to the levels required to reach the City's carbon neutrality goals, as well as build the resilience of the City. These actions are considered prerequisites to many others in the plan, and will provide a much bigger impact with early adoption. The progress on these actions will serve as an interim 2030 milestone that will be crucial to setting expectations and realistic goals:

Year 1-2	**MO-8**	Create, by ordinance, an Environmental Sustainability Committee to oversee and make recommendations on a variety of issues related to sustainability and climate action.
	MO-2	Hire a full-time sustainability staff person and a stormwater specialist.
	MO-13	Develop a comprehensive public engagement plan as early as possible to ensure that residents, businesses and other stakeholders in the City have the education and information necessary to meaningfully engage with the implementation of this plan.
	WS-1	Study the hydrology and topography of the City and produce recommendations toward targeting stormwater infrastructure improvements in areas that have the largest impact in reducing the negative effects of stormwater.
	WS-2	Adopt a residential rain garden program.
	BF-2	Promote state and local energy efficiency programs and encourage homes and businesses to complete home energy audits and upgrades.
	MO-3	Create a sustainability fund for use by multiple City Departments.
	WS-3	Develop a tracking system for green stormwater infrastructure.
Year 2-3	**T-2**	Update the City's multi-modal plan.
	WS-8	Require stormwater retention or infiltration on all new single-family construction.
	W-2	Study waste outside of the MSW program and work to improve data collection for commercial waste and other waste sources.
	W-1	Develop a city-wide food waste composting program.
	BF-1	Develop a plan to incentivize or require the transition from natural gas to electric in residential renovation and construction.
Year 3-5	**NR-1**	Protect and expand the tree canopy in each census tract of the City to at least 40%.
	BF-2	Revise and expand ordinances related to solar photovoltaics and other alternative energy sources.
	QL-4	Install an air quality monitoring station in the City and connect to the EGLE network.

APPENDIX

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Key Sustainability-Adjacent Recommendations from other Master Plans

The Birmingham Plan 2040 (2023)

- Update the zoning code
  - » Encourage renovations to expand existing houses rather than the construction of new houses.
  - » Review and update site, building, and design codes to prevent increased rainwater runoff and other negative impacts from new house construction.
  - » Address neighborhood lighting standards, including exterior residential lighting intensity and color temperature. See the International Dark Sky Association recommended standards.
  - » Advance building sustainability in new construction, especially within the City's mixed-use districts and for municipal buildings.
- Adopt a policy to proactively establish new historic districts as well as landmarks.
- Establish a Sustainability Board to oversee the recommendations of this plan section and other future sustainability initiatives.
- Create a Woodward Safety and Beautification Plan.
  - » Study lane reduction and re-striping options for Woodward.
  - » Pursue a speed reduction on Woodward through legislative means.
  - » Plant a full and consistent tree canopy along the Woodward median throughout Birmingham, beginning with the northern and southern entries.
- Create a Mixed-use Districts Parking Plan
  - » Study bike parking and electric vehicle charging stations in garages.
- Expand the 2018 Parks and Recreation Master Plan or create a new plan beyond the 2022 horizon.
  - » Develop Worth Park to provide needed open space for Torry.
  - » Develop the contemplated linear park and trail along the Rail District.
  - » Purchase part of the Adams Square parking lot for park space, or ensure that redevelopment would require that future park space be provided near Adams and Bowers.
- Create a streetscape improvement plan for the Triangle District and Rail District.
- Update the Multi-modal Plan
  - » Address increased pedestrian activity anticipated in mixed-use districts that will grow in residential population.
  - » Support increased pedestrian activity on both sides of North Old Woodward and provide streetscape amenities.
  - » Complete gaps in sidewalks, add accessible corner ramps where not already specified, and replace street trees which are displaced by the process.
  - » Ensure bicycle facilities are protected on all streets posted at or above 35mph.
  - » Study bicycle accommodation alternatives along Lincoln.
  - » Include mobility routes based upon bicycle boulevard practices
  - » Implement additional transportation mode best practices for new mobility technology and modes such as micro EVs, golf carts, and micro-mobility.
  - » Improve the conditions at bus stops along more major roads.
  - » Add Electric Vehicle charging stations throughout the city at garages, public parking lots, and on-street in Mixed-use Districts.
  - » Increase connectivity for pedestrians, bikes, and cars for the area south of Hazel Street including future rail crossings.
  - » Provide access to the Troy Transit Center and consider the development of surrounding properties.
- Create a Green Infrastructure Plan to address stormwater run-off and areas experiencing regular flooding.
- Create a Sustainability Action Plan
  - » Reduce environmental impacts of municipal operations.
  - » Incentivize green building, renewable energy, and green landscaping.
  - » Expand recycling and composting.
  - » Implement green stormwater practices in streets and parks.
  - » Support Rouge River Natural Area improvements.
  - » Implement other sustainability focused recommendations of this plan.
  - » Create a Hazard Mitigation Plan addressing the City's future climate.
  - » Increase inter-governmental cooperation around sustainability initiatives.
  - » Study the best path towards encouraging or requiring businesses reduce plastic and Styrofoam use.
- Develop a plan to improve and maintain the Rouge River natural area.
  - » Inventory and analyze the Rouge corridor's wildlife, ecology, natural systems, and pollution sources.
  - » Stabilize riverbanks, remove invasive species, reintroduce native ground covers, wildflowers, under-story, and canopy tree species.
  - » Mitigate potential pollution or chemical sources, including the existing Springdale snow storage dumping area.
  - » Work with area organizations and agencies to oversee, build support, and raise funding for the park's enhancements.
  - » Work with other area and regional organizations and communities to improve the quality of the Rouge River watershed.
- Develop and implement a trails and access master plan to improve the Rouge River trails and trail heads.
  - » Install pedestrian linkages to the park's surrounding neighborhoods and commercial districts, including to Quarton Road.
  - » Secure easements to expand the park area and improve its walkability, for complete ecological restoration, and universal accessibility.
  - » Coordinate with Bloomfield and Beverly Hills to expand trail connections.
  - » Install an environmentally sensitive, hard-surfaced pathway for pedestrians and cyclists along the Rouge River.
  - » Expand the extent of the trail system, crossing the river at more locations to access large portions of the natural area currently cut off.
  - » Install bridges, ramps, and other enhancements to enable access by all ages and abilities.
- Create a Tree Canopy Improvement Plan

  - » Establish comprehensive policies for trees in streets and open spaces.
  - » Create 5-, 10-, and 15- year goals to expand tree canopy cover.
  - » Study the condition of neighborhood tree canopies in parks and private spaces and potential improvements.
  - » Require that trees removed due to construction be replaced, as well as mandatory contributions to fund new off-site trees.
  - » Prevent existing, healthy trees from being removed due to new construction.
  - » Survey areas with constrained root area and establish a plan to add additional soil volume.
- Study a public circulator to provide viable means of accessing mixed-use districts and other significant destinations without a car.

Parks & Recreation Master Plan (2023)

- Deploy recycling receptacles adjacent to waste receptacles at all parks.
- Install bicycle racks in remaining parks, prioritizing remaining Community and Neighborhood parks that do not yet have them.
- Explore the possibility of bike share locations at strategic parks to enhance connectivity.
- Organize garden club volunteers to help adopt parks, certain parts of parks, natural green areas, or gardens.
- Develop an interpretive sculpture/signage/experience program in parks to expand educational opportunities about environmental protection.
- Develop (and publicize) an approved list of native plant species appropriate for park and recreation applications. Long-term, commit to utilizing native plantings whenever feasible for park design and landscape features.
- Develop Design Guidelines for future capital and park improvements that encourage low maintenance alternatives.
- Seek opportunities for green stormwater infrastructure in all future park designs.
- Install a community garden pilot project.
- Complete Rouge River Trail Corridor improvements as conceptually described in the “Trail Concept Improvement Plan”.
- Implement a pilot “Pesticide Free Park” program at a City Park.
- Dedicate informal green spaces as public parks, sign/advertise them appropriately and add amenities such as benches/ places to rest, accessible paths, and pollinator gardens/ low maintenance landscape areas.
- Dedicate informal green spaces as public parks.

Multi-Modal Transportation (2013)

- Set up a system for interdepartmental coordination between engineering, planning and public safety for all transportation projects.
- Require a minimum number of bicycle parking spaces at each commercial or multifamily development.
- For multi-family dwellings require a number of the bicycle parking spaces to be covered.
- Incentives should be provided to commercial and multi-family dwellings for providing covered and/or secured bicycle parking (e.g. reduction of vehicular parking and/or density bonus could be offered).
- Require bicycle parking facilities to be credited toward provision of motor vehicle parking. For example, each ten required bicycle parking spaces, or fraction thereof, may be substituted for one code required motor vehicle parking space.
- Require hoops on every block with retail in a downtown/commercial zone.
- Provide secured and covered in downtown parking public garages as demand dictates. The cost for such should be offset by a monthly user fee. See specific area recommendations for more details.
- A walking and biking map of Birmingham should be created that includes the following:
  - » A bike map should include the entire street network and community destinations as a base. Some maps are prescriptive in that they color code routes based on bicycle level of service or highlight recommended routes. Others are informational providing data on traffic volumes and existing facilities to let cyclists make choices based on their own skill sets. The maps should include information on bicycle laws and safety recommendations as well as trail etiquette.
  - » A walking map should include destinations, including both publicly owned structures such as museums and libraries as well as private enterprises that are open to the public. The map may also include suggested walking routes, local walking events and safety information.
- Track the miles of built facilities in the multi-modal network. The miles of built facilities should be documented on a yearly basis to track the development of the multi-modal network. The miles of bike lanes, pathways, sidewalks, neighborhood connectors/bike routes, number of mid-block crossing improvements and number of bike parking spaces should be tracked.
- There is potential to add bike lanes on a number of the primary roads in the near future as part of CIP projects and by simply re-striping the roadway.
- On S. Eton Road between W. Maple Road and W. Lincoln Street there is potential to add buffered bike lanes to the west side of the road by removing on-street parking from that side of the street. Due to the proximity of the Rail District, parking would remain on the east side of the street.
- There is potential to enhance the bicycle and pedestrian environment along Woodward Avenue. Bike lanes could be added to the service drive with a curbed buffer area between the bike lane and Woodward Avenue.
- Neighborhood Connector Routes should be developed over time. Initial improvements include wayfinding signage and crossing improvements where the route intersects a major roadway. Traffic calming is added only if it is necessary. Environmental and aesthetic improvements are implemented based on community input and available budgets.
- Provide Active Transportation Hubs at key locations around town such as Booth Park, Millrace Park, City Hall and in the Rail District.
- Two tree extensions are proposed on Lincoln Street to help calm traffic between Southfield Road and Woodward Avenue.
- At a minimum, all bus stops should provide a concrete pad so wheelchair users can safely access the bus stop.
- In areas with a high number of people boarding or exiting buses, provide additional amenities such as shelter, lighting, benches, route maps and schedules.

Survey Results

SCAP Recycling Survey

SCAP Survey #1

SCAP Survey #2



GLOSSARY

Glossary

Adaptation Planning: The process of evaluating vulnerabilities and prioritizing approaches to manage or minimize the impacts of climate change within an area.

Accessible: A site, facility, work environment, service, or program that is easy to approach, enter, operate, participate in, and/or use safely and with dignity by a person with a disability. (District of Columbia Office of Disability Rights n.d.), APA Planning Accessible Communities

Age-friendly: A local response to help to identify and address barriers to the well-being and participation of older people and encourage active aging by optimizing opportunities for health, participation and security.

Anthropogenic: Originating in human activity, resulting from the influence of human beings on nature.

Biodiversity: Refers to all the different kinds of living organisms within a given area, including plants, animals, fungi and other living things.

Building life cycle: Refers to the view of a building over the course of its entire life, viewing it not just as an operational building, but taking into account the design, construction, operation, demolition and waste treatment.

Carbon Neutrality: Refers to having a net-zero carbon footprint, reaching a balance between the emission of carbon into the atmosphere, and the removal of the climate pollutant through carbon sinks or other offsets.

Carbon-free energy: A source that does not emit greenhouse gas, and excludes hydrogen, solid waste, biofuel, and biomass from that definition , as well as gasification, pyrolysis, and use of carbon-capture and storage technologies (as defined by MI House bill 4759).

Climate Action: A range of efforts to combat climate change and its impacts including actions to reduce greenhouse gas emissions, prepare for and adapt to climate change, transition to low-carbon and renewable energy sources, and promote sustainable practices.

Climate Change: The long-term changes in the average weather patterns that have come to define Earth's local, regional, and global climates.

Climate Resilience: The capacity of a community, business, or natural environment to prevent, withstand, respond to, and recover from climate impacts and disruptions.

Combined Sewer System (CSS): A system of pipes, tunnels, pump stations, etc. to transport sewage and urban stormwater runoff together to a sewage treatment plant or disposal site.

Complete Streets: Roadways that make it safer and easier for users of all ages, abilities, and modes to get around. These streets typically have design elements that include bus lanes, sidewalks, accessible signaling, curb extensions, and street trees or other vegetation.

"Curb Cut Effect": Recognizes that curb cuts (i.e., curb ramps) benefit a variety of users, from a parent pushing a stroller to a traveler with a suitcase to a person using a wheelchair or crutches. (Sheridan 2021)

Decarbonization: Reduction or elimination of carbon dioxide emissions from a process such as manufacturing or the production of energy.

Ecosystem Services: Benefits to humans provided by the natural environment and healthy ecosystems (SEMCOG).

Embodied Energy: The amount of energy consumed to produce a product, in this case building materials. This includes the energy needed to mine or harvest natural resources and raw materials, and manufacture and transport finished materials.

Environmental Sustainability: Environmental sustainability refers to fostering practices that reduce pollution, waste, and damages to the natural surroundings. The objective of having a healthy environment is for resources to exist for future generations.

Equity: In this report, equity refers to the distribution of resources to reduce inequalities, increase fairness and to level the playing field.

EV: Electric Vehicles are vehicles that derive all or part of their power from electricity.

Green Roof: Or rooftop garden; a vegetative layer grown on a rooftop. Green roofs provide shade and remove heat from the air through evapotranspiration, reducing temperatures of the roof surface and surrounding air.

Green Stormwater Infrastructure (GSI): A method of storing stormwater using the natural environment, i.e., bioswales, rain gardens, green roofs, etc. rather than "gray infrastructure" such as sewer pipes and basins.

Greenhouse gas (GHG) emissions: Greenhouse gases (GHGs), such as carbon dioxide, methane, nitrous oxide, and fluorinated gases, trap heat in the atmosphere and contribute to global warming. GHG emissions and removals associated with human activities can be tracked across sectors, including transportation, industry, electricity, agriculture, and land use.

Heat Island: 'Urban heat islands' occur when cities replace natural land cover with dense concentrations of pavement, buildings, and other surfaces that absorb and retain heat. This effect increases energy costs (e.g., for air conditioning, air pollution levels and heat related illness and mortality.

Just transition: A framework developed by the trade union movement to encompass a range of social interventions needed to secure workers' rights and livelihoods when economies are shifting to sustainable production, primarily combating climate change and protecting biodiversity.

LED: Light-emitting diode, which is an energy-efficient mainstream lighting technology.

LID: Low impact development are systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration, or use of stormwater in order to protect water quality and associated aquatic habitat.

"Light Imprint" Technique: One of the Great Ideas of New Urbanism. A philosophy of stormwater management that avoids expensive drainage systems and excessive pavement to let the water filter directly into the soil. The approach cost-effectively handles water and makes a more comfortable place.

Materials Management: The process of planning and controlling material flows. It includes planning and procuring materials, supplier evaluation and selection, purchasing, expenditure, shipping, receipt processes for materials, warehousing and inventory, and materials distribution.

Mitigation: The act of reducing the severity, seriousness, or painfulness of something.

Municipal Fleet: Includes a city government's public works vehicles, administrative vehicles, public safety and emergency services vehicles, and if applicable, public transportation vehicles.

Native Plants: Plants that have been growing in the United States prior to European settlement.

Nature-based Solutions: Projects that restore, protect and/or manage natural systems and/or mimic natural processes to address hazards like flooding, erosion, drought, and heat islands in ways that are cost-effective, low maintenance, and multi-beneficial for public health, safety, and well-being.

*Green Stormwater Infrastructure Strategies are an example of Nature-based Solutions.

Renewable Energy: Energy that comes from unlimited, naturally replenished resources, such as the sun, tides, and wind. Renewable energy can be used for electricity generation, space and water heating and cooling, and transportation.

Sustainability: Refers to the ability to meet the needs of our current population without compromising the ability of future generations to meet their own needs. This concept encompasses various aspects of urban life, including environmental, economic, and social sustainability.

SCAP: Sustainability and Climate Action Plan.

Tree Canopy: In an urban setting, this refers to the area of a city that is shaded by trees. This shade offers benefits, like by lowering temperatures in the summer, and also provides habitat for wildlife.

"Urban Heat Island Effect": Increased temperatures from buildings and roads having replaced vegetation (according to nonprofit Climate Central). Miami suffers from "urban heat island effect" (msn.com)

Vulnerability Assessment: Seeks to identify areas most likely to experience negative impacts of climate change and help prioritize adaptation strategies for the community (according to 'Resilient Macomb' plan).Key areas of focus for the assessment include extreme heat exposure, flooding, critical facilities, social services, and food availability.

Watershed: A land area that channels rainfall and snow-melt to creeks, streams, and rivers, and eventually to outflow points such as reservoirs, bays, and the ocean.

Zero Waste: Materials of economic value, whether for reuse, resale or recycling, that won't be thrown away or end up in the landfill.

2030 Districts: A global network of districts committed to making meaningful changes within cities that address climate change.

