Environmental Action Plan
Phase 2 and 3 Addendum

Introduction

The Environmental Action Plan (EAP) is a guide for city leaders, staff, and community members to implement sustainability visions and principles. Phase 1 of the EAP, presented to City Council and adopted on January 14, 2020, describes the goals, co-benefits, and strategies, and identifies potential tasks and responsible parties (such as a city department, private businesses, community organizations, or individuals). Phase 1 provides the groundwork for future phases of EAP development and implementation of strategies towards environmental sustainability.

Phase 2 involves understanding the appropriate metrics to track and measure as well as the current conditions. To complete this, the City will inventory available data, identify missing data sources, and determine how to gather, correct, or note important gaps. Inventories of municipal and community activities to develop baselines may be later used for measuring progress towards achieving targets.

During Phase 3, the City will consider baseline data gathered and all learned information, establish targets with statements that define a measurable reduction or increase by a specific year. Several strategies identified in Phase 1 are operational in nature and do not have an associated measurable target. These strategies will be listed in the Addendum with a note to continue operational procedures that support the goal.

Adoption of the Focus Area 4 Sustainable Transportation Addendum does not immediately establish new regulations, policies, or budgets to implement the plan. As the City considers implementation of strategies and tasks, cost-benefit analyses will be conducted as part of decision-making. Additionally, implementation of any specific strategy or task is dependent on City Council's approval and appropriation of funding. Strategies and tasks identified in Phase 1 of the EAP may be utilized, evaluated, or modified to meet the needs of the City. Upon evaluation, identified tasks in Phase 1 may no longer be feasible or appropriate. This Focus Area 4 Sustainable Transportation Addendum is a living document that will be continually updated as the City completes actions and refines them based on new information, technologies, policies, funding, and priorities. Lastly, the ability to reach targets set in this addendum will depend on project feasibility and funding availability.

Focus Area 4 - Sustainable Transportation

The City of Harrisonburg seeks to develop and maintain a safe and convenient transportation system serving all modes of travel, including driving, walking, biking, public transportation, ridesharing, and future technologies that serve the transportation needs of the community. The primary environmental benefit of sustainable transportation is the reduction of pollutants, such as greenhouse gases, which are released into the atmosphere. Public infrastructure has been developed to serve primarily gasoline and diesel

single occupancy vehicles and truck freight for many decades. In the future, new forms of transportation and technology will become more common. Concepts of multimodal, microtransit, and active transportation are increasingly being used in transportation planning.

Goal 1 - Develop an Alternative Fuel Fleet Program

Strategy 1.1 - Evaluate the Viability of an Electric City Fleet

Phase 2: Metric & Baseline

Goal 1 includes a strategy to complete municipal and community-wide greenhouse gas emissions inventories. The inventories will provide a snapshot in time of greenhouse gas emissions coming from different sources. Through our consultant, Dr. Sean McGinnis, the City of Harrisonburg, Virginia, greenhouse gas (GHG) emissions inventory was completed for the calendar years 2016 and 2019. The baseline year chosen for future comparisons was 2016. The GHG emissions inventory was completed at both the Municipal and Community levels. The metric for FA4 Goal 1 will be the percent change in greenhouse gas emissions from fleet vehicles. It is expected that an inventory will be completed annually to observe changes to emissions based on policies and activities enacted.

The scope of the Municipal inventory includes energy (electricity, natural gas, and fuel oil) for City buildings/facilities, electricity for street/traffic lights, diesel/gasoline fuels for City fleet vehicles/equipment and City Transit buses. This scope is focused on areas in which the City has some control of decisions that can affect GHG emissions.

The scope of the Community inventory includes energy (electricity and natural gas) split among the following major sectors: Residential, Commercial, Industrial, Municipal, Water & Sewer, and James Madison University (JMU). Community inventory also includes estimated fuel use (gasoline and diesel) for vehicle travel within the City boundaries based on Virginia Department of Transportation (VDOT) traffic counts. GHG emissions from Solid Waste, Water Treatment, and Wastewater Treatment are included in the Community Inventory as well. This scope is focused on the broader Community GHG emissions, which are only indirectly affected by City policies/initiatives and controlled more directly by the activities and behavior of the community as a whole and its members individually.

Total Municipal GHG emissions from the municipal transportation sector in 2019 were 5,733 metric tons or 35% of all municipal emissions. The represents a 5% increase from the 2016 baseline level.

Goal #	Strategy #	Metric Description	2016 Baseline Data	2019 Data	% Change	2021/ Current
1 & 2	1.1 & 2.1	% change (reduction) in GHG emissions from fleet vehicles	5476	5733	5%	TBD

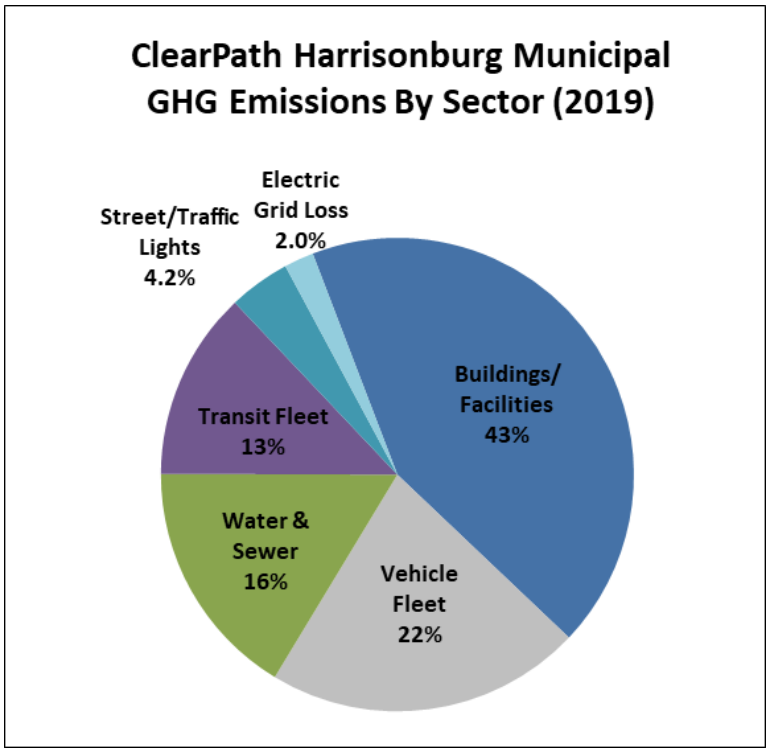


Figure 9 – Harrisonburg Municipal GHG emissions by Source (From 2019 Harrisonburg Final Emissions Inventory Summary Report)

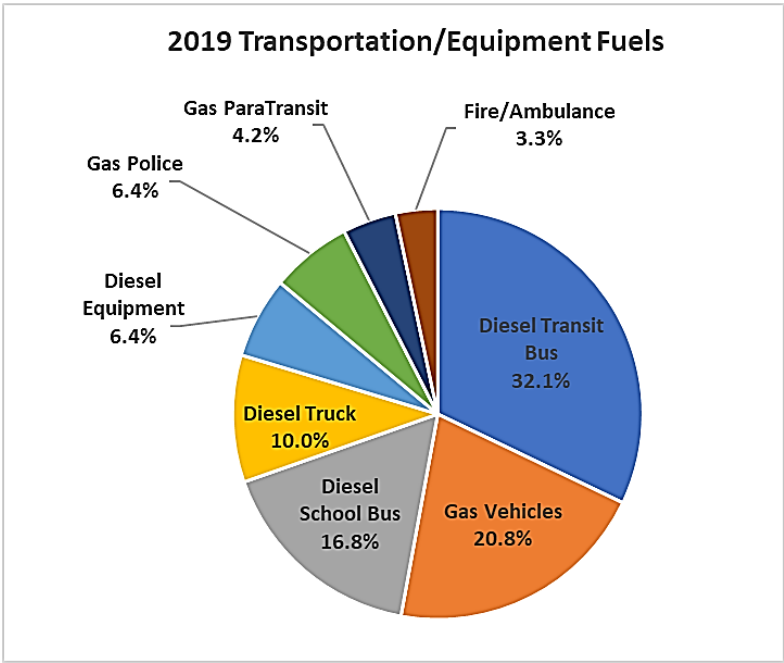


Figure 6 – Harrisonburg Vehicle/Equipment Fuel Usage (From 2019 Harrisonburg Final Emissions Inventory Summary Report)

Phase 3: Target

Targets for municipal fleet vehicles emissions were set with the knowledge that supply chain issues are a sizable hurdle in the near term. As such the targets initially start lower with increasing percentages in subsequent years. It is noted that even with a lower initial starting point that the targets listed below are not easily achievable. Reaching these targets will take considerable support.

2025 Target	2030 Target	2035 Target	2040 Target
-10%	-20%	-40%	TBD[1]

[1] **2040 target to be re-evaluated with more data and where technological development has made improvements for certain portions of the City's fleet, like emergency vehicles or snowplows, that must always be ready with minimal downtime for refueling. Additionally, changes to the electrical grid due to the Virginia Clean Economy Act, will increase the reduction potential from electric vehicles.**

Modifications to the Phase 3 targets for municipal fleet emissions are expected due to changing technology, funding opportunities, and community needs. Reaching the targets for this goal will require iterative processes to reduce greenhouse gas emissions and to protect our natural environment. As part of the iterative process, it is understood that adoption of an overall municipal greenhouse gas emissions target will supersede any greenhouse gas emission reduction targets in Focus Area 4 to allow for the City

to maximize its impacts across all Focus Areas to judiciously use funds for those actions that provide the greatest return on investment.

Goal 2 - Implement Sustainability Practices into Municipal Fleet Management

Fleet Management strives to uphold a sustainable fleet and uses sustainability practices when servicing, repairing, and replacing its vehicles and equipment. Fleet Management also applies sustainability practices whenever possible in their day-to-day operations and procedures. Performing sustainable practices means reducing the overall environmental impact from fleet operations. This is achieved by measuring, analyzing, and collecting data to save electricity, improve air quality through emission reduction, increasing fuel efficiency, and reducing fuel consumption.

Strategy 2.1 - Continue the Vehicle Maintenance and Replacement Program

Strategy 2.2 - Continue Environmentally Friendly Vehicle Maintenance

Phase 2: Metric & Baseline

Strategy 2.1 does not have a metric associated with it, but instead directs continued operational procedures. Additionally, this strategy is also partially reflected in Goal 1. Because this strategy has no metric, there is no baseline.

Goal #	Strategy #	Metric Description	2016 Baseline Data	2019 Data	% Change	2021/ Current
2	2.1 & 2.2	No metric/partially reflected in Goal 1	N/A	N/A	N/A	N/A

Phase 3: Target

Continue operational procedures that enhance and expand our vehicle maintenance and replacement program as well as procedures that minimize the release of environmental hazards.

Goal 3 - Increase Public Transit Ridership

Increasing public transit ridership through efficient and convenient routes will aid in reducing the number of cars driven throughout Harrisonburg.

Strategy 3.1 - Continue to Develop Programs to Increase HDPT Ridership (Outreach)

Phase 2: Metric & Baseline

The metric for Strategy 3.1 will be the number of and percent change in ridership counts. This information is collected daily. 2016 was selected as the baseline year for consistency with other metrics. However, it should be noted that HPDT switch to using the Avail System to track ridership counts after 2016 which changed the method and accuracy of the counts.

Goal #	Strategy #	Metric Description	2016 Baseline Data	2019 Data	% Change	2021/ Current
3	3.1	% change of riders	2,705,309	2,259,250	-16%	923,908
***Avail System implemented after 2016 changed the method and accuracy of counts. Additionally, COVID-19 impacted 2021 ridership numbers.**						

Phase 3: Target

Due to disruptions in ridership counts, not targets have been set for this strategy at this time.

Strategy 3.2 - Continue to Improve Bus Stop Connectivity (¼ Mile Improvements)

Phase 2: Metric & Baseline

The metric for Strategy 3.2 is the percent of bus stops with bench, pad and shelter, and sidewalk connection. The baseline year is currently being evaluated.

Goal #	Strategy #	Metric Description	2016 Baseline Data	2019 Data	% Change	2021/ Current
3	3.2	% of bus stops with complete set of amenities	TBD	TBD	TBD	TBD

Phase 3: Target

Since the baseline data has not been gathered yet, there is no target at this time.

Strategy 3.3 - Develop a Program to Routinely Review Bus Routes, Stop Locations, and Frequency.

It is important to closely monitor ridership usage of bus stops. This can help determine if routes are performing optimally for the greatest ridership potential. Engaging with passengers and residents is vital to determine if additional stops would increase ridership. Also, alterations of routes to remove unused stops could help improve on-time performance of routes.

Phase 2: Metric & Baseline

Strategy 3.3 does not have a metric associated with it, but instead directs continued operational procedures. Additionally, this strategy is also partially reflected in Strategy 3.2 & 3.3. Because this strategy has no metric, there is no baseline.

Goal #	Strategy #	Metric Description	2016 Baseline Data	2019 Data	% Change	2021/ Current
3	3.3	No metric/continue operational procedures	N/A	N/A	N/A	N/A

Phase 3: Target

Continue operational procedures that enhance and expand route locations and times to improve ridership.

Goal 4 - Traffic Signal Optimization and Timing Improvements

Signal timing optimization means efficient flow of traffic, less delay, fewer vehicle stops, safer driving, better accommodate different transportation modes and higher capacity of existing street network. The City has different strategies to achieve its goal of traffic signal timing optimization by invest in human resources, use of technology and seeking federal/state funds to keep the system updated.

Strategy 4.1 - Continue Improving In-House Timing Plan Update Capability

Strategy 4.2 - Continue to Optimize Signal Operations

Data collection and analysis is time consuming and costly as far as human power and data collection tools, but it is essential to have capability in-house because daily traffic management needs continuous monitoring and evaluation. The ability to collect and analyze high resolution data allows the City to optimize the street network and actively respond to traffic pattern changes. Investment in human resources, as well as technology will allow the City to provide the traffic management level of service expected by the community.

In the last decade significant changes have occurred in the Intelligent Transportation System (ITS) industry, in general, and in traffic signal optimization. New detection technology can collect turn movement counts and other performance measures, along with vehicle detection and reporting it to the Traffic Management Center. Such technology can reduce the need for human resources and data collection tools at locations where it is installed. The City already has this new technology installed in multiple locations, and benefits from the efficiencies it provides. Another emerging technology is the Adaptive Traffic Control Systems (ATCS) that continuously adjusts timing plans using detection systems where traffic patterns are less predictable and major street traffic flow is a high priority. The City's strategy at this point is to keep observing developing technology and study opportunities where they can be most effective. Optimizing signal operations, particularly on major corridors, reduces vehicle stopping time, and therefore, vehicle idling. Reducing idling reduces vehicle emissions.

Phase 2: Metric & Baseline

The metric for Strategy 4.1 is the greenhouse gas emission reductions from signal improvements. Signal optimization works by reducing idle time along travel corridors. Because travel patterns change over time, signal optimization must occur every 3-5 years to readjust timing to new traffic patterns. Overtime, as traffic patterns change, the initial reductions will become less. Thus, the baseline isn't tied to a specific year, but instead viewed as an annual practice. The reduction values are estimated in the signal optimization reports.

Goal #	Strategy #	Metric Description	Annual Reductions (lbs C02)
4	4.1 & 4.2	GHG reductions from signal improvements (East Market Street)*	4,609
4	4.1 & 4.2	GHG reductions from signal improvements (High Street)*	4,748
4	4.1 & 4.2	GHG reductions from signal improvements (Port Republic Road)*	7,675
4	4.1 & 4.2	GHG reductions from signal improvements (South Main Street)*	2,806
4	4.1 & 4.2	GHG reductions from signal improvements (Reservoir Street)*	14,897
*** Signal optimization must occur every 3-5 years to readjust timing to new traffic patterns**			

Phase 3: Target

Continue operational procedures that maintain, enhance, and expand route optimizations.

Goal 5 - Support Alternative, Active, and Low-Carbon Forms of Transportation and Improved Fuel Efficiency

Bicycling and walking are largely a function of land use, where a mix of uses, and relatively higher density, combined with the presence of bicycle and pedestrian infrastructure and lower speed limits support bicycling and walking. Land uses and the transportation network supporting them become increasingly suburban the further from downtown and from JMU one travels, and the transportation network becomes more suburban (low density, single use land uses, and high-volume roads, higher speed limits, and often inadequate bicycle and pedestrian infrastructure). Most new development lacks elements of traditional neighborhood design that supports bicycling and walking.

Strategy 5.1 - Adopt Policies and Standards that Support Alternative Modes of Transportation
Strategy 5.3 – Continue to Promote Interconnection Between All Modes of Transportation

Standards and policies will guide new development and infrastructure to promote the use of alternative modes of transportation. Interconnection of modes will allow people to take longer trips by alternative modes and make transit more accessible.

Phase 2: Metric & Baseline

Strategy 5.1 does not have a metric associated with it, but instead directs continued operational procedures. Additionally, this strategy is also partially reflected in Strategy 3.2, 3.3 and 5.2. Because this strategy has no metric, there is no baseline.

Goal #	Strategy #	Metric Description	2016 Baseline Data	2019 Data	% Change	2021/ Current
5	5.1 & 5.3	No metric/continue operational procedures	N/A	N/A	N/A	N/A

Phase 3: Target

Continue operational procedures that enhance and expand alternative modes of transportation as well as interconnectedness.

Strategy 5.2 - Continue Implementation of the Bicycle and Pedestrian Plan

The Bicycle and Pedestrian Plan promotes the development and maintenance of a network of streets and paths that are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists, and transit riders of all ages and promotes the use of education and encouragement to promote

safe walking and bicycling as a form of transportation and recreation. The plan includes recommendations for retrofitting existing development to add bicycle and pedestrian connectivity, adding safe and comfortable facilities to make biking, and walking viable alternative modes of travel. The Plan is reviewed every five years.

Phase 2: Metric & Baseline

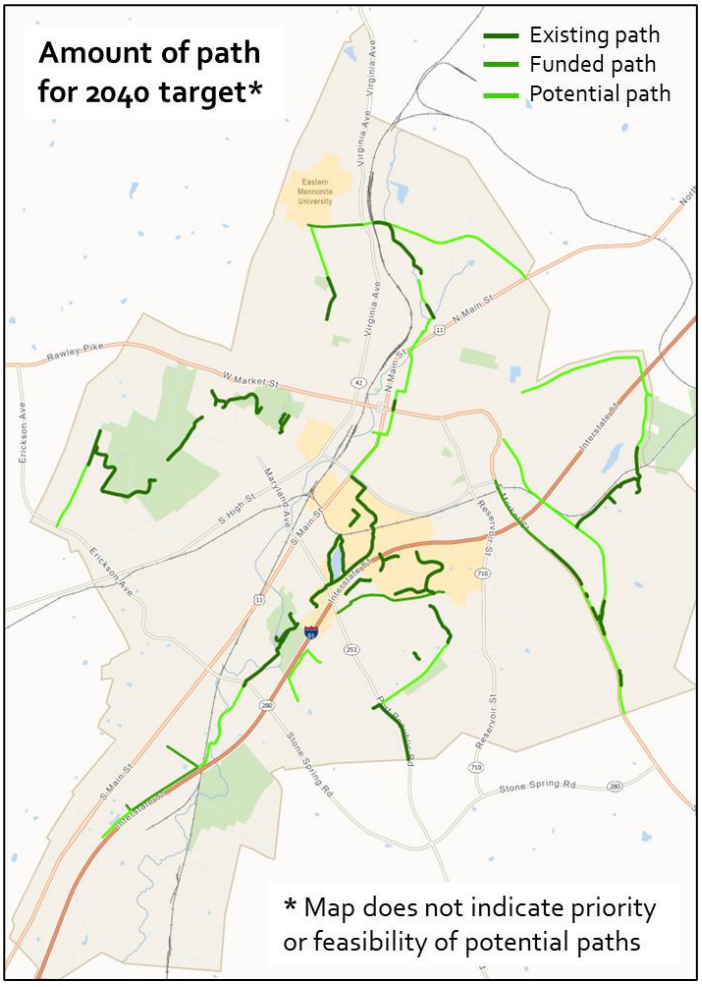
The metric for Strategy 5.2 is the total infrastructure miles associated with the Bicycle and Pedestrian Plan, such as public share use paths, public sidewalks, and public bike lanes).2016 was chosen as the baseline year for consistency. 2016 and 2019 miles were calculated based on current GIS data and subtracting known improvements that have happened in prior years. Current staff updates to the GIS data may result in different mileage for each category.

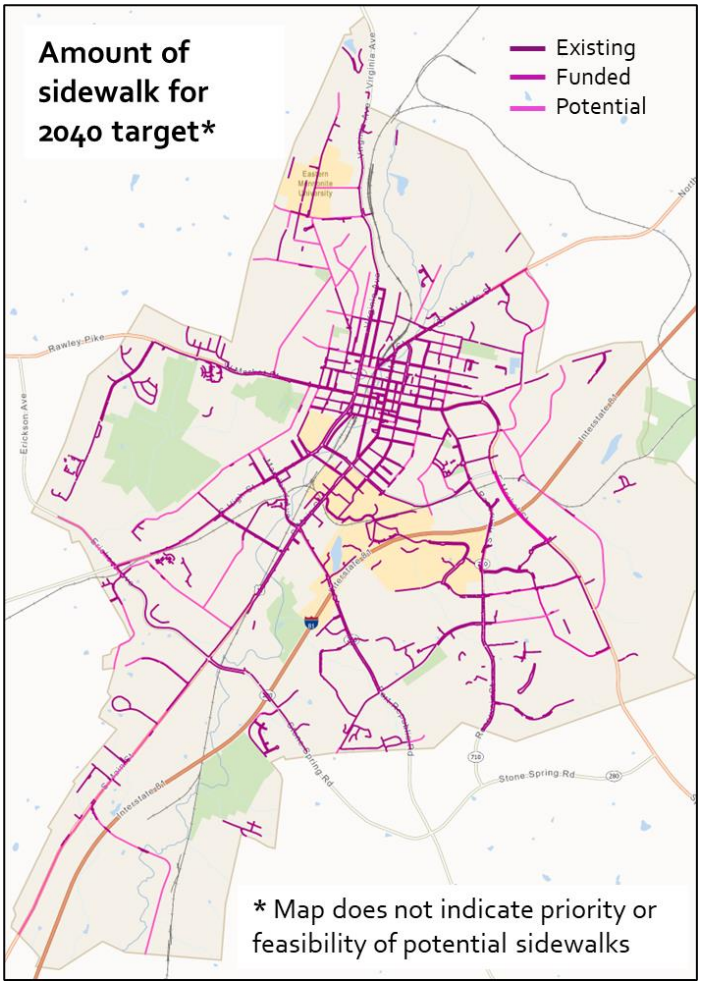
Goal #	Strategy #	Metric Description	2016 Baseline Data	2019 Data	% Change	2021/ Current
5	5.2	# of miles (Shared Use Paths)	5.9	7.6	29%	10.5
5	5.2	# of miles (Sidewalks)	83.7	86.1	3%	87.2
5	5.2	# of miles (Bike Lanes)	25	27.7	11%	28.2

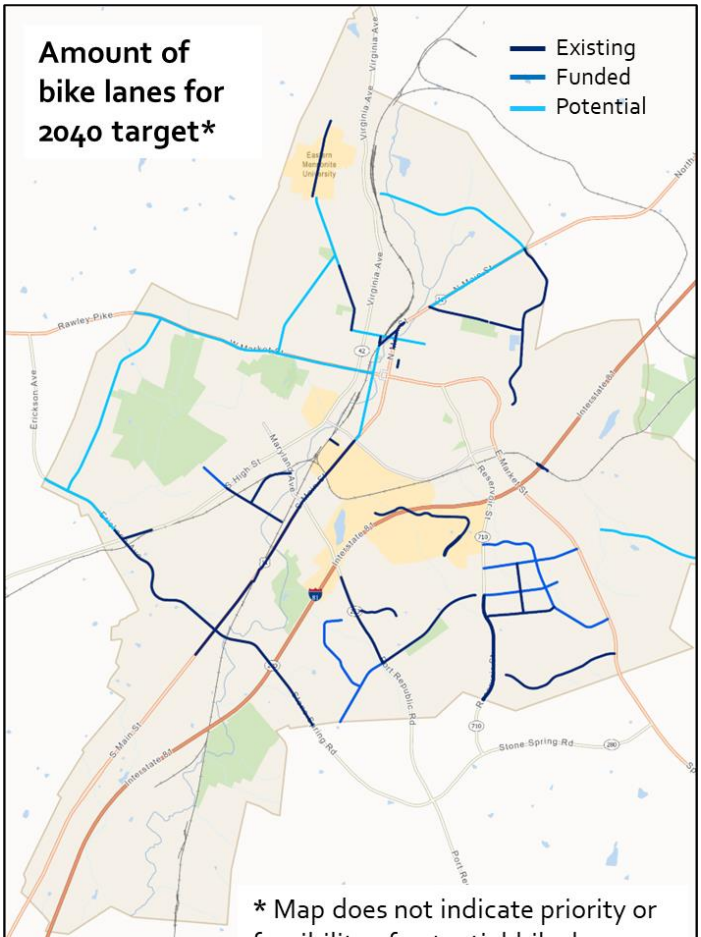
Phase 3: Target

The targets for Strategy 5.2 were derived from an estimation of existing, funded, and potential projects. Potential areas mapped are not an indication of feasibility or priority and are only mapped for estimating possible areas that could be added to the current infrastructure.

	2025 Target	2025 Target	2030 Target	2030 Target
Shared Use Paths	+120%	+171%	+239%	+307%
Sidewalks	+9%	+17%	+28%	+40%
Bike Lanes	+36%	+56%	+68%	+80%


Amount of path for 2040 target*
Existing path
Funded path
Potential path
* Map does not indicate priority or feasibility of potential paths


Amount of sidewalk for 2040 target*
Existing
Funded
Potential
* Map does not indicate priority or feasibility of potential sidewalks


Amount of bike lanes for 2040 target*
Existing
Funded
Potential
* Map does not indicate priority or

Strategy 5.4 – Support Low-Carbon Modes of Transportation and Improved Vehicle Fuel Efficiency

Improving fuel efficiency of vehicles saves community members money and reduces pollution.

Phase 2: Metric & Baseline

The metric for Strategy 5.4 will be a combination of hybrid and electric vehicle use in the city and the public use charging infrastructure for electric vehicles. Hybrid and electric vehicle use can be estimated through the number of those types of cars registered in the City. To maintain consistency, 2016 was chosen as the baseline year. Municipal fleet vehicles are not a part of Strategy 5.4.

Goal #	Strategy #	Metric Description	2016 Baseline Data	2019 Data	% Change	2021/ Current
5	5.4	# of EV cars registered in the City	5	36	620%	65
5	5.4	# of hybrid cars registered in the City	288	530	84%	716
5	5.4	Public Use City EV charging stations (Level 2 Stations)	0	0	0%	0
5	5.4	Public Use City EV charging stations (DCFC Stations)	0	0	0%	0

Phase 3: Target

Since the type of vehicle a consumer purchases is an individual decision, no targets are set for this metric. It is useful to see the trends of vehicle use which makes it useful to continue to track the metric. Public electric charging stations only have one target for Level 2 chargers set for 2025. The City recently tried soliciting for EV charging stations which received no proposals. The adoption of EV chagrining infrastructure across private residences and businesses will also influence the demand for public charging infrastructure. Moreover, the DCFC chargers, which can charge a car much more quickly, are best suited to be located within a short distance of an interstate exit. Drivers stopping at these sites expect to spend 30-60 minutes at the stop. These types of chargers are more likely to be installed at locations that offer quick stops such as restaurants or stores. Lastly, many EV owners in our area have access to off street parking that allows drivers to charge at home, reducing the need for public use charging infrastructure. Thus, subsequent targets will be developed at a future time, if warranted.

	2025 Target	2025 Target	2030 Target	2030 Target
# of EV cars registered in the City	NO TARGET- PRIVATE ACTION			
# of hybrid cars registered in the City	NO TARGET- PRIVATE ACTION			
Public Use City EV charging stations (Level 2 Stations)	+10	TBD[1]	TBD[1]	TBD[1]
Public Use City EV charging stations (DCFC Stations)	0[2]	TBD[2]	TBD[2]	TBD[2]
1. The City recently tried soliciting for EV charging stations but received no proposals. The adoption of EV chagrining infrastructure across private residences and businesses will also influence the demand for public charging infrastructure. Thus, subsequent targets will be developed at a future time. **2. DCFC chargers- Best within a short distance of interstate. Private EVs more likely in these areas (hotels, restaurants, stores).**				

Goal 6 - Continue to Coordinate Land Use Planning and Regulations with Transportation Planning

Land uses affect the environment and depends on transportation and infrastructure in order to function. Land use planning relates to the physical environment where we live and work. Transportation connects us to all our activities, and it connects communities. The design of transportation facilities such as roads, driveway access points, sidewalks, and bike routes have an impact on our community's character. How we use our land impacts our transportation facilities and vice versa. Land use and transportation are mutually dependent and inseparable.

The impact of technological advances that impact transportation modes and choices should also be considered. For example, how do ridesharing (i.e., Uber, Lyft), dockless mobility devices (i.e., bicycles and scooters), GPS devices, and self-driving automobiles influence development patterns, parking requirements, etc., and how can city policies and regulations encourage more environmentally friendly choices?

Strategy 6.1 - Identify Opportunities to Promote or Require Infrastructure to Support Alternative Transportation Modes

Phase 2: Metric & Baseline

Strategy 6.1 does not have a metric associated with it, but instead directs continued operational procedures. Additionally, this strategy is also partially reflected in Strategy 5.2. Because this strategy has no metric, there is no baseline.

Goal #	Strategy #	Metric Description	2016 Baseline Data	2019 Data	% Change	2021/ Current
6	6.1	No metric/continue operational procedures	N/A	N/A	N/A	N/A

Phase 3: Target

Continue operational procedures that enhance and expand transportation infrastructure.