Transportation Master Plan
Chapter 8

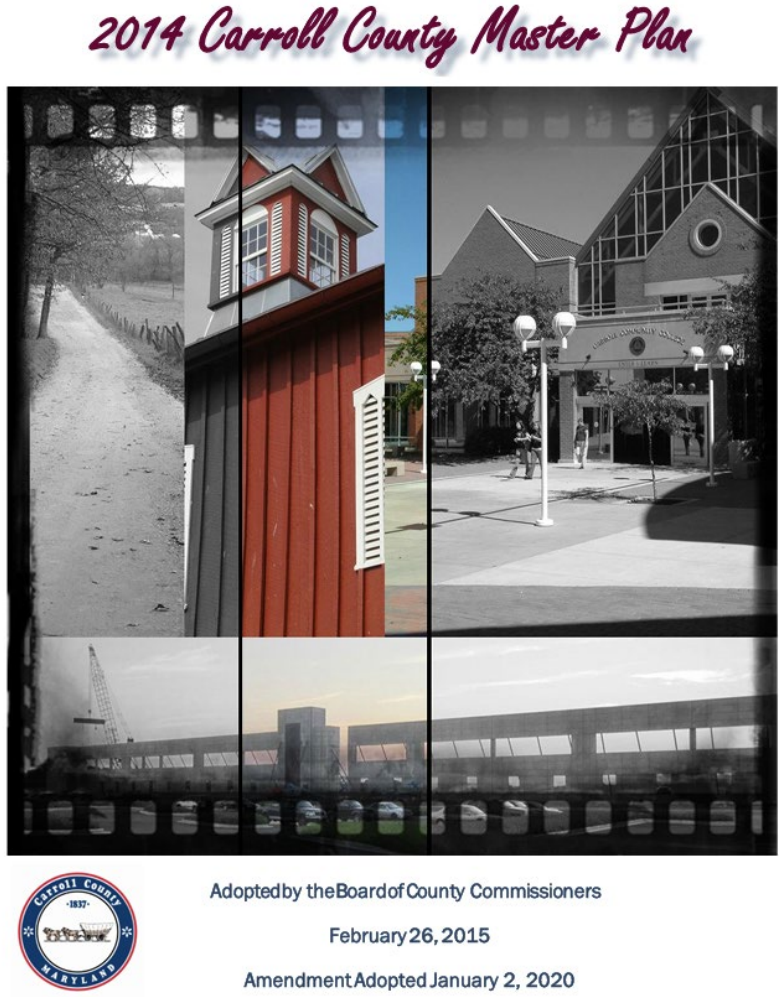
Emerging Trends

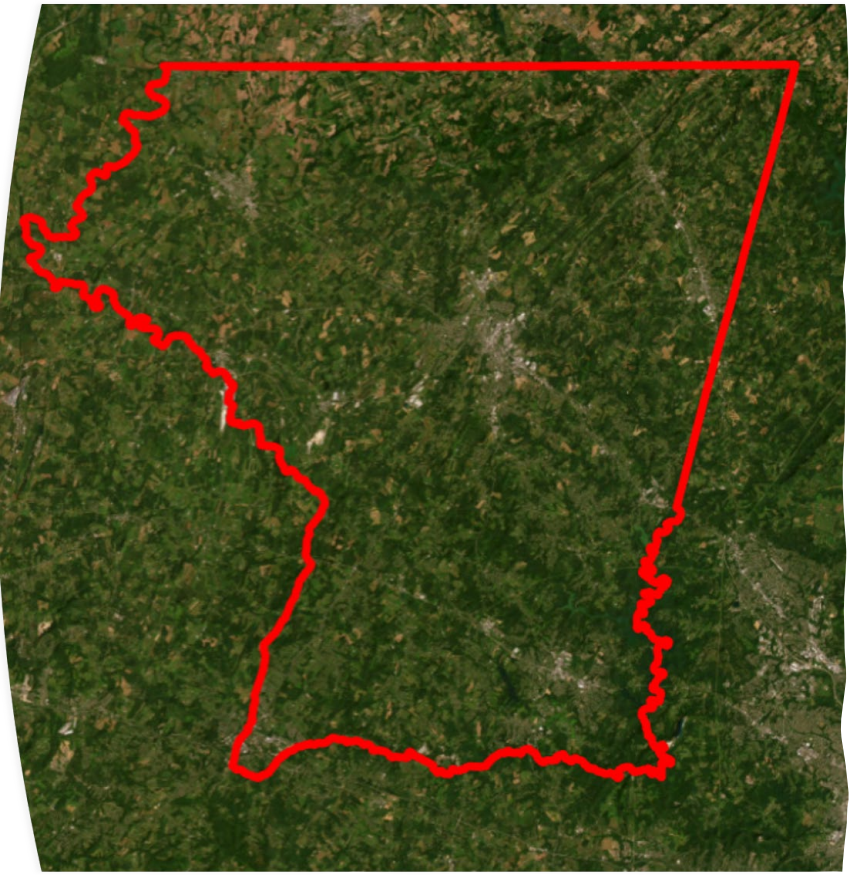
Planning and Zoning Commission
May 16, 2023

Carroll County Master Plan, as amended in 2019

Appendix A: Implementation Strategies, Chapter 7, P., that states, "Encourage the use of alternative transportation, such as bicycles, transit, and carpools, to improve air quality by reducing the number of vehicles on the road during the week" [Emphasis added].

- EV and AV technology will improve air quality from the reduction of burning oil since AVs are assumed to be EVs.



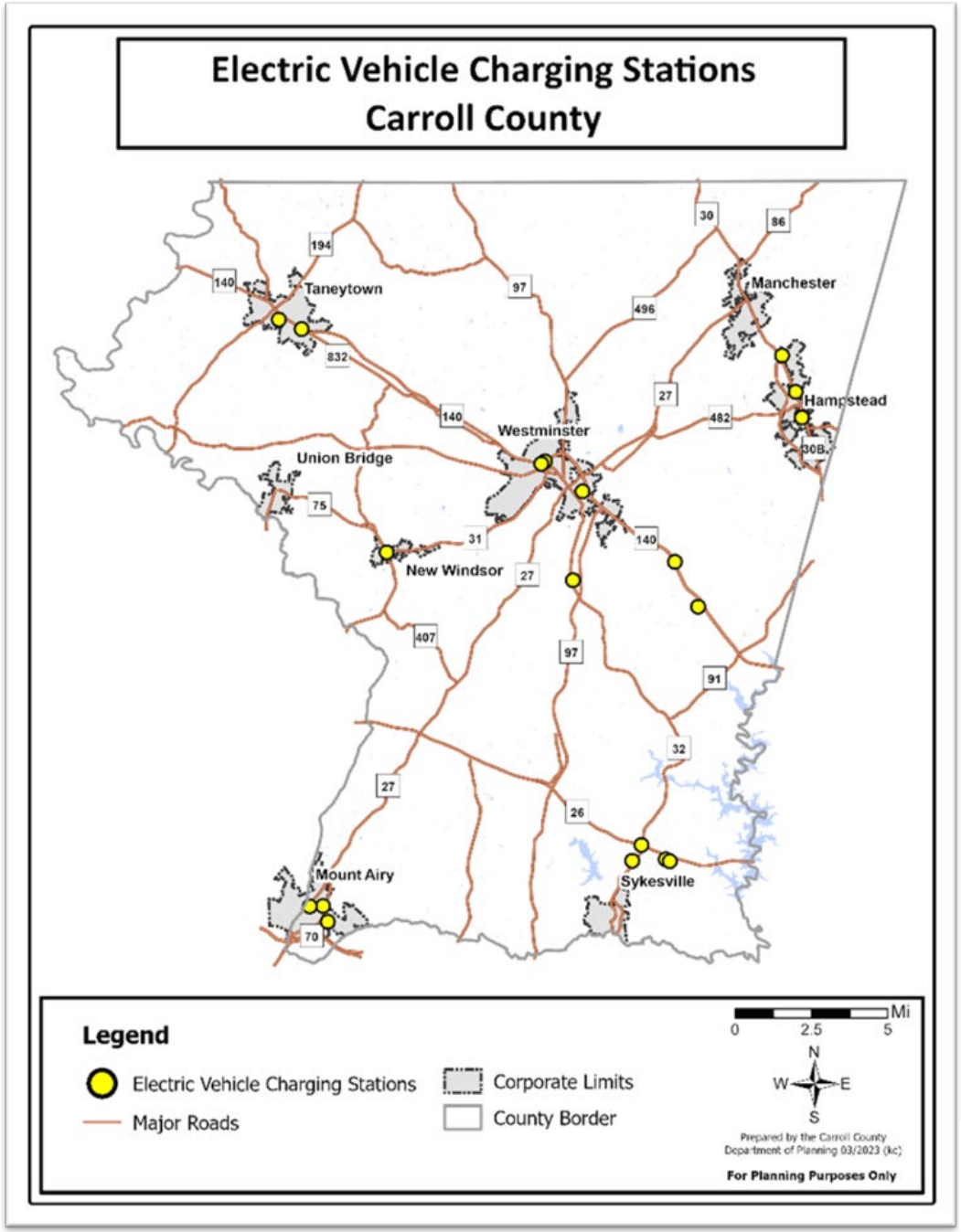


Electric Vehicles

- Global market transitioning from internal combustion engine (ICE) to vehicles powered by electric motors.
  - Sustainability:
    - Transportation accounted for the largest portion (27%) of total U.S. Greenhouse Gas (GHG) emissions in 2020.
    - 12 to 30 percent of energy generated in ICE vehicles are used to power the vehicle.
    - 77+ percent of energy generated in EVs are used to power the vehicle.
  - Federal and state incentives:
    - In 2021 and 2022, federal legislation allocated up to $9.2 billion in EV incentives.

Adapting Carroll County to EV's

- Providing an adequate supply of EV charging infrastructure for county residents and visitors.
  - 19 EV charging stations in Carroll County.
  - Hampstead/Manchester gasoline stations (seven) vs. EV charging stations (three).
    - Two of the three EV charging stations are located on public property (NC Library and town park).
  - Essential to economic development and equity.



Maryland State Law

- In 2023, the Maryland General Assembly voted to require all new single-family dwellings and townhomes to be EV equipped by requiring a dedicated circuit for charging, so it will be easier and cheaper for residents to adapt.

- The Governor announced a plan **ending the sale of ICE vehicles by 2035**.

Image source: https://msa.maryland.gov/msa/mdstatehouse/html/home.html

EV's Charging Infrastructure

- **Level One** – Uses a standard 120-volt power outlet and usually takes eight to 12 hours to fully charge an EV. This is most typical for home charging without any special charging equipment.
- **Level Two** – Uses a 240-volt power outlet that will typically charge an EV in four to eight hours. This is most typical for home charging that uses special charging equipment.
- **Level Three** – Uses 480-volt power outlet that can fully charge an EV in about 30 minutes.

Image Source: https://pluginsites.org/bge-fast-charger-in-westminster-md/

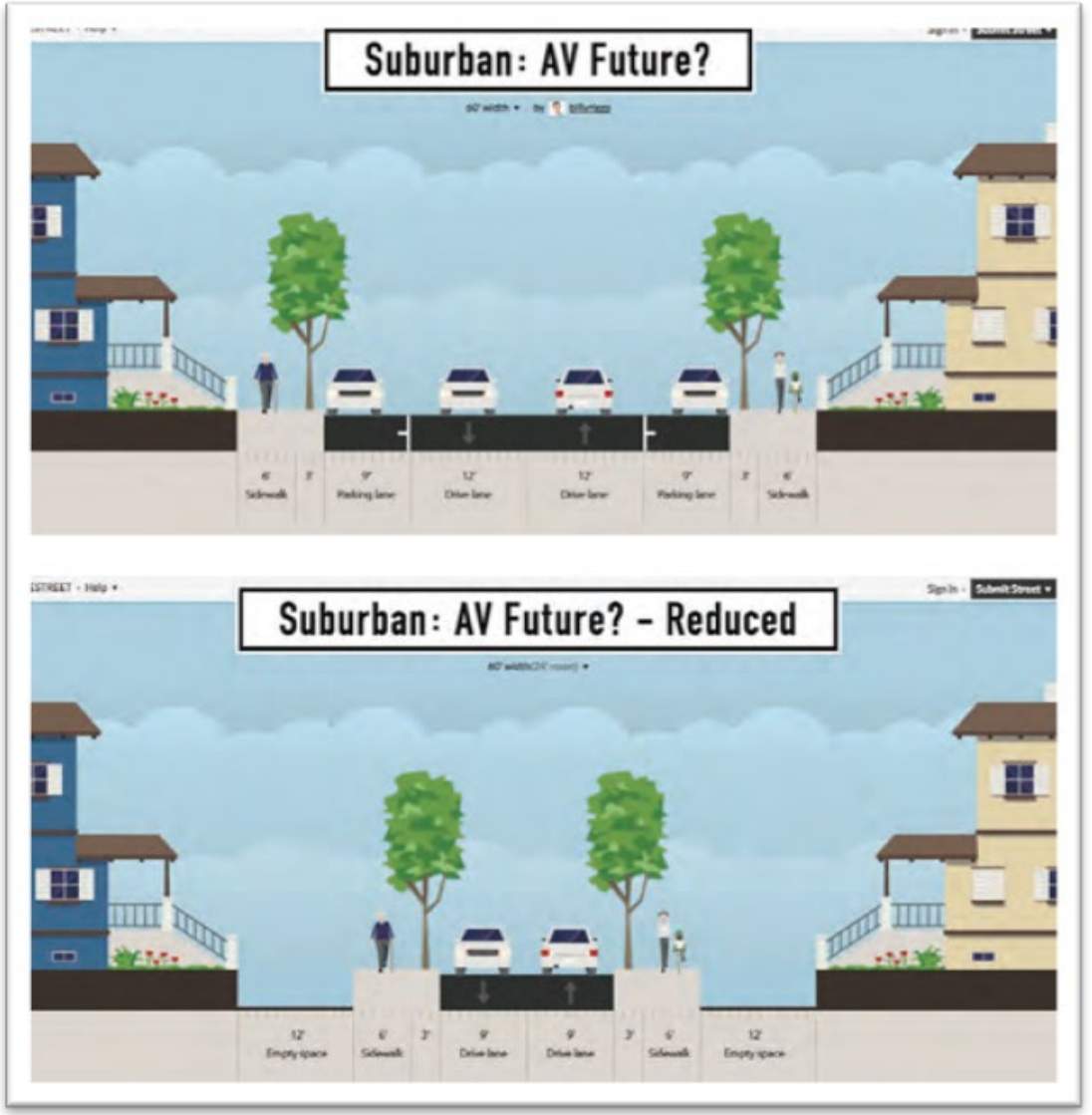
Special Considerations

- **Equity:**
  - Providing accessible public charging stations for **all Carroll County Citizens** who do not have private off-street parking.
  - Preventing "***Charging Deserts***".
- **Economy:**
  - Explore conveniently locating EV charging infrastructure adjacent to retail and other businesses so customers can charge their vehicle while they shop.
  - Industrial developments will rely on level three chargers to power large vehicles.

Quality of life will only be sustained by adapting to new forms of transportation technology.

Autonomous Vehicles

- AVs are in the preliminary stages of testing.
- Societal benefits:
  - Improved safety.
  - Supporting aging in-place.
  - Reduced transportation costs (if shared).
  - Reduced congestion.
  - Reduced right-of-way devoted to transportation.



Autonomous Vehicles

- Societal challenges:
  - Incorporating AVs into society.
- Societal Opportunities:
  - Public education
- Levels of vehicle autonomy:
  - *Level One - driver assistance (i.e., adaptive cruise control)*".
  - *Level Two - partial automation (i.e., Tesla's autopilot)*".
  - *Level Three - conditional automation (i.e., human drivers serve as backup for an autonomous system that operates under certain conditions)*".
  - *Level Four - high automation (i.e., Google/Waymo test cars)*".
  - *Level Five - full automation (i.e., no steering wheel in the vehicle)*".

Av Positive Aspects

- **Environment:**
  - Narrower right of way widths leading to increased areas devoted to green infrastructure.
  - Safer
- **Equity:**
  - Increased traffic safety.
  - Narrower right of way widths:
    - Enhanced bicycle and pedestrian facilities.
    - Opportunities to revitalize urban centers.
    - Public gathering places.
  - Increased mobility for special populations.
- **Economy:**
  - Enhance the efficiency and effectiveness of travel lanes.
    - Platooning
  - Increase trucking fuel economy by ten percent.

Av Uncertainties

- Fiscal impacts on government revenues.
- Safety challenges could be encountered with human drivers.
- Potential to reinforce auto-oriented sprawl.
- Increase in Vehicle Miles Traveled.

Connected and Autonomous Vehicles working group (CAV)

- Where action should be focused preparing for CAV impacts around the Baltimore Metro. include:
  - Travel & Mobility
  - Infrastructure
  - Planning and Land Use
  - Accessibility & Equity
  - Stakeholders and Organizational Readiness
  - Workforce & Education
  - Funding, Financing, and Fiscal Health
  - Automated Freight and Goods Delivery
  - Public Safety
  - Data Privacy and Security

BALTIMORE METROPOLITAN COUNCIL

Image Source: https://www.baltometro.org/

Shared use Autonomous Vehicles

- Rethinking parking requirements.
- Rethinking loading area allocation.
- Data connectivity and infrastructure.
- Further reduction of funding sources for governments.

Image Source: https://magicinc.org/projects/autonomous-corridor

Other Transportation Considerations

- Delivery robots
- Unmanned aerial vehicles (UAV)
- Advanced Air Mobility (AAM)
- EV-charging roads
- E-Bikes
- Cargo Bikes
- Micro mobility
- Mobility-as-a-service (MaaS)

Image Source: https://www.planning.org/planning/2020/apr/primed-for-deliveries/

Goals

- Goal 1 – Provide assessable and equitable locations for EV charging infrastructure throughout the County.
- Goal 2 – Educate the Public about EV, AV, and other new forms of transportation technology.
- Goal 3 – Collect feedback of how to best incorporate new technology on Carroll's roadways.
- Goal 4 – Coordinate with Federal, State, Regional, and Local Agencies to implement EV and AV technology.