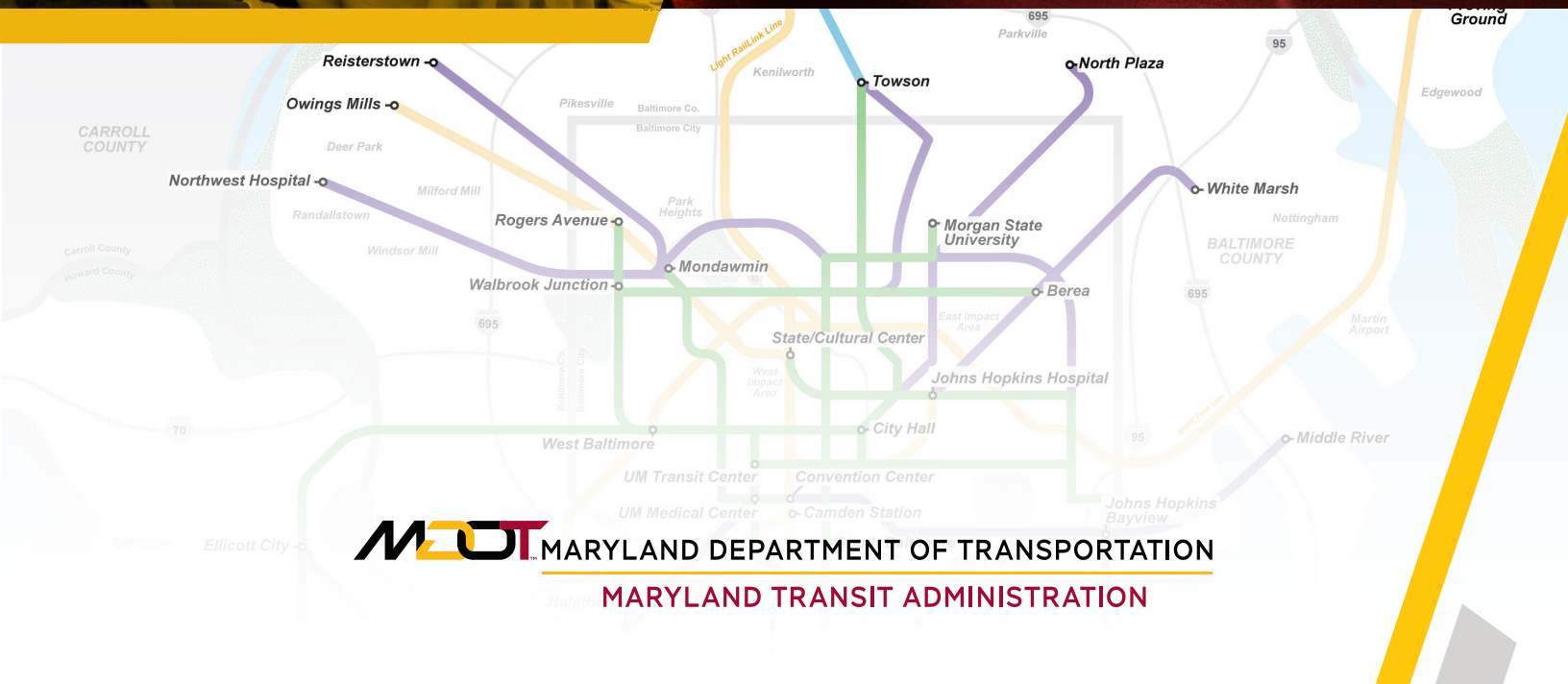
Connecting Our Future

A Regional Transit Plan for Central Maryland

Existing and Future Conditions Technical Report



MDOT MARYLAND DEPARTMENT OF TRANSPORTATION

MARYLAND TRANSIT ADMINISTRATION

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1 Introduction

This technical report outlines the existing and future conditions of the study area of the Central Maryland Regional Transit Plan (RTP). The RTP is a 25-year effort aimed at improving and expanding access to transit, and the study area encompasses Baltimore City, Baltimore County, Anne Arundel County, Harford County, and Howard County.

Context Within the RTP

Several key questions must be answered to establish a baseline of transit allocation, need and performance in the region at the outset of the RTP. Without a baseline, developing meaningful analysis of transit gaps or identifying the most effective strategies to improve the provision of transit is impossible. Similarly, an assessment of the anticipated growth areas within the region (in terms of population, jobs, and travel patterns) offers insights as to where the RTP can focus its efforts to meet future needs.

This important context for the RTP is developed by answering key questions, including:

- What transit serves the region?
- How well does existing transit cover areas in the region where people live, work, and access services?
- How do we maintain existing transit infrastructure?
- How does land use influence transportation options?
- Where do people travel within the region?
- How will future growth affect transit needs throughout the region?

In parallel to the analysis described in this technical report the RTP Project Team conducted outreach with stakeholders (including the public) to ensure that the conditions analysis is guided by those who use and benefit from the transit systems the most.

Linking Central Maryland
A CityLink Brown bus makes its way through Baltimore.

Overview

Seven public transit agencies serve the Central Maryland study area: the Maryland Transit Administration (part of the Maryland Department of Transportation and generally referred to as MDOT MTA), Annapolis Transit, the Anne Arundel County Office of Transportation (OOT), the Baltimore City Department of Transportation (DOT), Baltimore CountyRide, Harford Transit LINK, and the Regional Transportation Agency of Central Maryland (RTA). These agencies provide fixed-route local bus, light rail, heavy rail, and paratransit service in Baltimore and the surrounding counties, as well as commuter bus and MARC rail service stretching across the state.

To establish a robust baseline and foundation for subsequent tasks, and to answer the questions listed above, this technical report is organized into five sections:

- Transit Network Analysis
- Transit Funding and State of Good Repair
- Transit Market Analysis
- Travel Flow Analysis
- Existing Plans and Land Use

2 Transit Network Analysis

The study area for the RTP includes Baltimore City, Baltimore County, Anne Arundel County, Harford County, and Howard County. This five-jurisdiction region includes a wide range of geographies, densities, and land uses, from rural to urban core and from farmland to the Chesapeake Bay. Baltimore City anchors the study area, dominating in population, jobs, and transit service, but the region is also defined by its close links to the Washington, D.C. and Philadelphia metropolitan areas.

There are seven public transit agencies in Central Maryland: MDOT MTA, Annapolis Transit, Anne Arundel County OOT, the Baltimore City DOT, Baltimore CountyRide, Harford Transit LINK, and the RTA. The six agencies besides MDOT MTA are all known as Locally Operated Transit Systems, or LOTS.

These agencies work together to connect these areas with efficient and reliable public transportation services. Each jurisdiction offers fixed-route and paratransit services, and all agencies provide some connections to neighboring transit systems, allowing travel by transit across the region.

Overview of Services

Public transit in the region is provided by six fixed-route modes: local bus, commuter bus, light rail, heavy rail, commuter rail, and ferry. Paratransit is also available to qualifying passengers in every jurisdiction, and an array of private transit services offer transportation to specific destinations in and around Baltimore.

Table 2-1 and Table 2-2 describe the services offered by MDOT MTA and by the LOTS, as well as their annual ridership.

The five jurisdictions studied in the RTP.

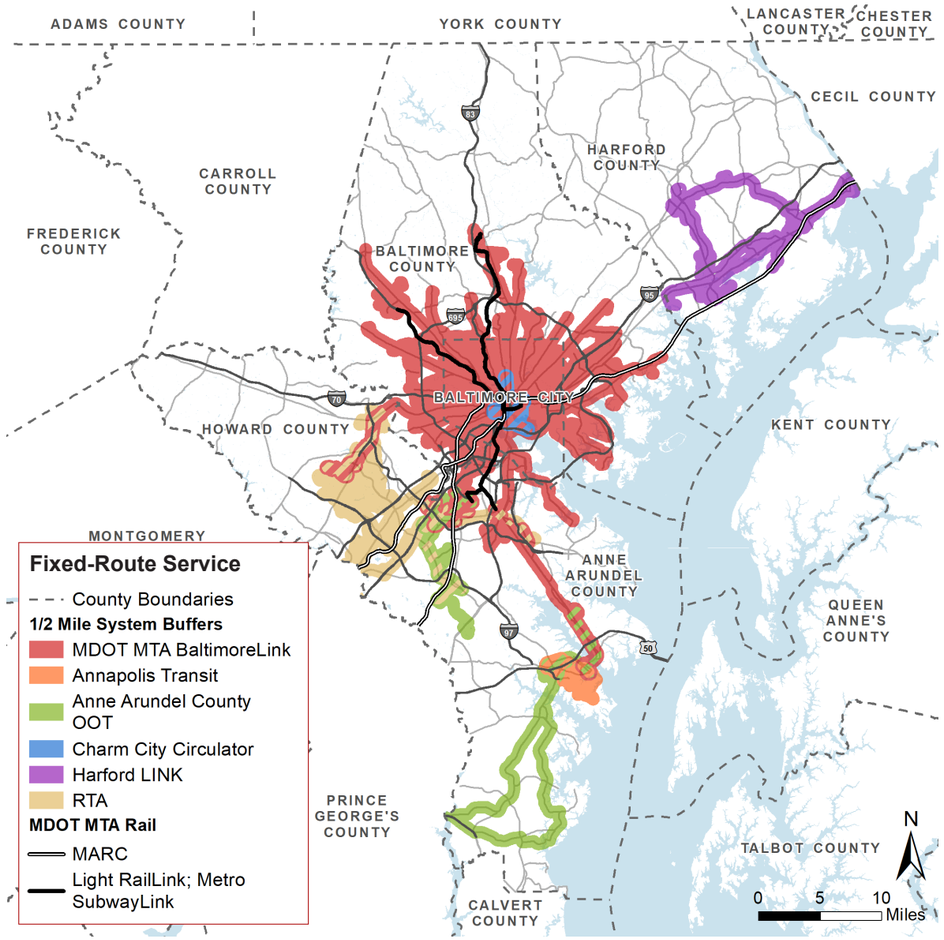
Table 2-1 | *MDOT MTA Transit Services*

MDOT MTA Services		Annual Ridership FY18
Core Bus	**LocalLink:** Neighborhood service **CityLink**: Frequent arterial service **Express BusLink**: Peak-hour limited-stop service	63,797,000
Metro Subway	15-mile heavy rail system with 14 stations from Owings Mills to Baltimore City.	8,917,000
Light Rail	30-mile light rail system with 33 stations from Hunt Valley to BWI Airport and Glen Burnie.	7,417,000
MARC Commuter Rail	**Penn Line**: 13 stations over 77 miles **Camden Line**: 12 stations over 39 miles **Brunswick Line**: 19 stations over 74 miles (outside study area)	9,327,000
Commuter Bus	36 total routes operated by six operating contractors; with 22 routes in Central Maryland.	3,820,000
Mobility and Call-a-Ride	Paratransit and on-demand services within three-quarters of a mile from all Core Bus routes and Light Rail or Metro Subway stations.	2,954,000

Table 2-2 | *Locally Operated Transit Systems Services*

Locally Operated Transit Systems (LOTS)		Annual Ridership FY18
Annapolis Transit	Local bus and paratransit within the City of Annapolis.	409,000
Anne Arundel County OOT	Local bus and paratransit services within Anne Arundel County.	108,000
Baltimore City DOT	Frequent bus service (Charm City Circulator) and Harbor Connector water taxi service.	2,753,000
Baltimore CountyRide	Call-ahead paratransit service within Baltimore County for eligible paratransit riders or rural residents.	42,000
Harford Transit LINK	Local bus and paratransit services in Harford County and southwestern Cecil County.	336,000
RTA of Central Maryland	Local bus and paratransit services in Howard, Anne Arundel, and northern Prince George's counties.	917,000

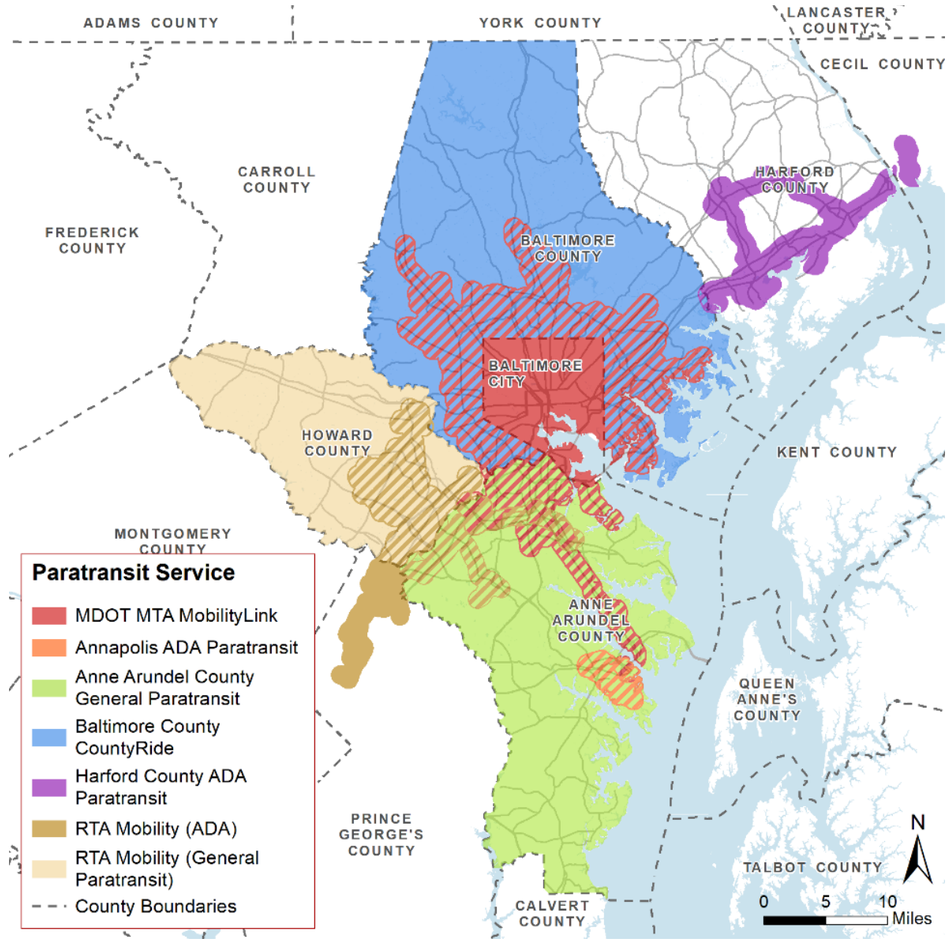
Figure 2-1
Fixed-Route Services



Fixed-route services (Figure 2-1) operate on a regular schedule, along pre-defined routes, and without deviation. These modes of transit typically include local bus, commuter bus, and rail services. Paratransit services (Figure 2-2) offer flexible, call-ahead transportation within a defined service area. These services are limited to passengers with disabilities or who meet other eligibility requirements.

All public transit agencies except Baltimore City DOT provide paratransit services (Figure 2-2). This

Figure 2-2
Paratransit Services



includes curb-to-curb or door-to-door transit for people with disabilities. As required by the Americans with Disabilities Act (ADA), paratransit services are provided by MDOT MTA, Annapolis Transit, Harford LINK, and RTA within three-quarters of a mile of local fixed bus routes. General paratransit services are also available throughout Baltimore, Anne Arundel, and Howard counties, as provided by the jurisdictions. In FY18, over 3.2 million paratransit trips were provided in Central Maryland. MDOT MTA provided 91 percent of the region's paratransit trips.

Transit Service Integration

In Central Maryland, overlapping service areas provide opportunities to transfer between the networks of different transit services. Some locations in the region are served by two providers, including Aberdeen, Columbia, and Savage. A few locations are served by three or more providers, including Annapolis, Arundel Mills, and Downtown Baltimore.

There is limited coordination among the region's public transit providers. There are opportunities to increase or improve integration of scheduling, sign and stop placement, transfer fares, and information and wayfinding. The Baltimore Metropolitan Council is currently studying ways to improve integration at key locations where customers make transfers between providers.

Trends in Transit Ridership

Central Maryland Ridership

Within the Central Maryland region, total public transit ridership decreased 9 percent between FY17 and FY18, but recent trends in fixed-route transit ridership have varied by mode. Figure 2-3 displays bus ridership trends for Core Bus, Locally Operated Transit Systems (LOTS), and Commuter Bus services. Figure 2-4 displays ridership trends for the Metro Subway, Light Rail, and MARC train, and MARC train, and Figure 2-5 shows trends in paratransit ridership for the region.

National Ridership

Nationally, transit ridership has trended downward since 2012, with ridership falling in 31 of 35 major US cities. Annual bus trips decreased from 5.4 billion in 2012 to 4.6 billion in 2018 (15 percent). Rail trips increased from 4.7 billion in 2012 to 5.1 billion in 2018 (8.5 percent), but the amount of rail service provided increased more than rail ridership during this period.[1]

While fixed-route transit trips have decreased, trips taken through transportation network companies (TNCs) such as Lyft and Uber have grown exponentially. TNC trips have increased from approximately 100 million in 2012 to 4.2 billion in 2018. Although Uber and Lyft have not reported 2019 figures, TNC trips in 2019 likely surpassed both bus and rail, which provided 4.7 and 4.8 billion trips respectively. Demand-response paratransit demand has also increased in recent years.

Gasoline prices have fallen in recent years, from $3.68 per gallon in 2012 to $2.69 in 2019.[2] The increased affordability of gasoline is believed to have a negative effect on transit ridership.

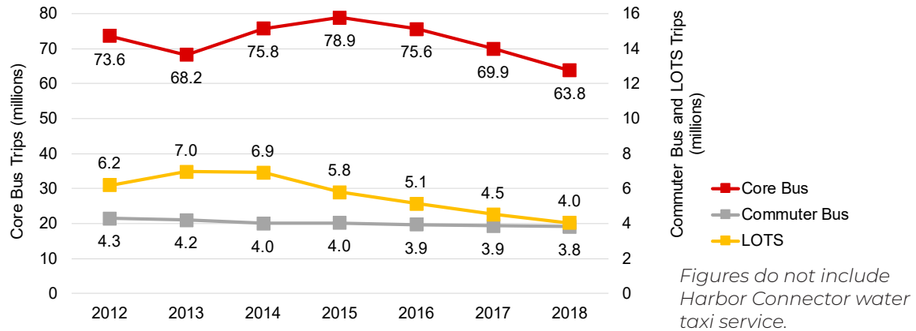
Regions with Increasing Ridership

Some transit agencies are defying national trends in fixed-route ridership. These include Seattle King

1 AccordingtotheNationalTransitDatabase,railtransitvehiclerevenuehoursincreased11.3percentandvehicle revenue miles increasd 9.5 percent between 2012 and 2018.
2 Weekly Retail Gasoline and Diesel Prices, U.S. Energy Information Administration.

Figure 2-3

Annual Bus Ridership Trends



Figures do not include Harbor Connector water taxi service.

Figure 2-4

Annual Rail Ridership Trends

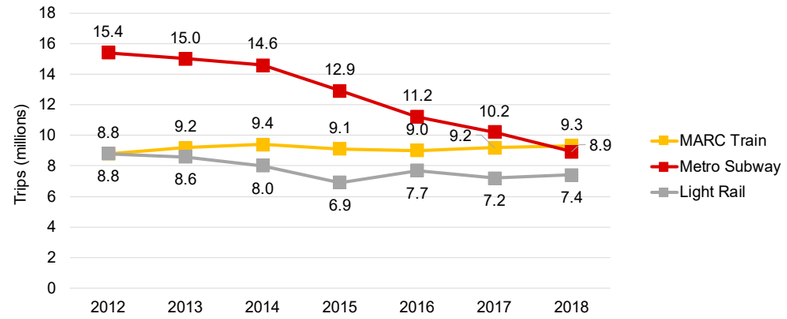
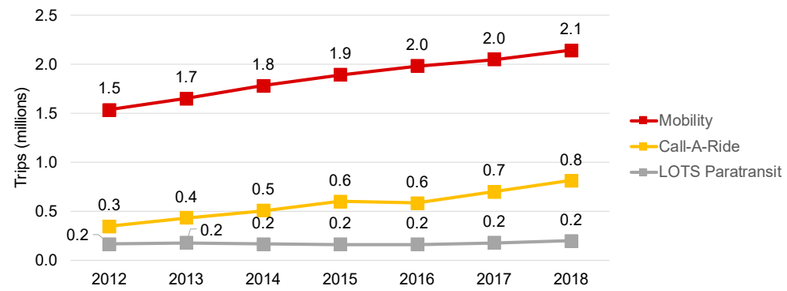


Figure 2-5

Annual Paratransit Ridership Trends



County Metro and Sound Transit, Pittsburgh Port Authority, Houston Metro, and Austin CapMetro. These agencies are taking steps to help grow their system ridership, such as:

- Implementing new service and making investments like adding new rail lines, building transit priority infrastructure, and expanding bus service
- Promoting transit through free-fare zones or periods
- Finding efficiencies through bus network redesigns that minimize duplication

Transit Network Coverage

Fixed-route transit is most useful for those who can walk to their nearest bus stop or rail station, since an entire trip can be completed without another form of transportation. Moreover, walking access to transit is crucial for people who may not have access to a personal vehicle or cannot drive themselves, such as low-income residents, people with disabilities, or seniors. Therefore, a key measure of the transit network is how many of the region's total residents and transportation-disadvantaged residents live or work within walking distance to transit.

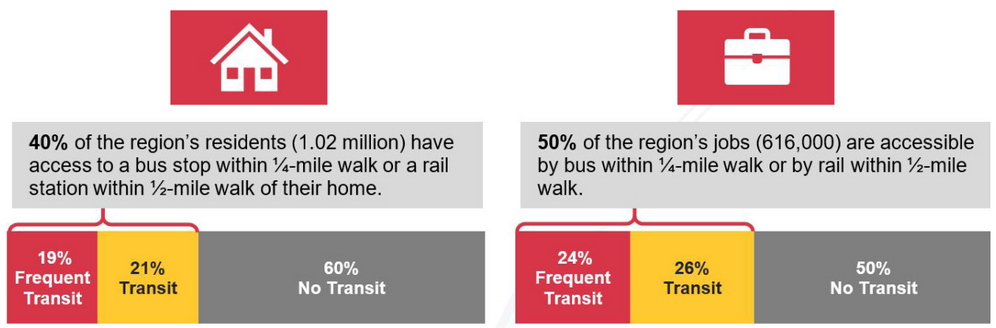
Access to transit is measured for all areas that are within a quarter-mile walk of bus stops or within a half-mile walk of light rail, subway, or commuter rail stations. The region's population and employment access to fixed-route transit is summarized in Figure 2-6.

Access to Frequent Transit

Central Maryland's frequent transit network (FTN) provides reliable, efficient transportation along high demand corridors. Accessibility was measured for the bus and rail stops that make up the FTN, which are concentrated on major roads and rail lines reaching from Baltimore City into Anne Arundel and Baltimore counties. These high-demand areas tend to be the densest parts of the region.

Figure 2-6

Access to Fixed-Route Transit



Frequent transit routes are defined as having an average frequency of 15 minutes or better over the 12-hour period from 7:00 a.m. to 7:00 p.m. on weekdays. Bus and rail stops along frequent routes are within walking distance for:

- 19% of all residents
- 38% of low-income residents
- 26% of residents with disabilities
- 17% of senior residents
- 20% of households
- 24% of jobs

Transit Potential

Public transit services are most effective when they enable the most people to travel where they need to go. Population and employment densities are valuable measures of the potential for productive transit service. Transit potential represents the combined density of people and jobs, and is not only a good indicator for where transit investment should be prioritized, but is also increased by transit investment—people and jobs tend to develop around high quality transit services.

Today, the areas with transit supportive densities are generally served by fixed-route transit (Figure 2-7 on the next page). However, some areas, such as Bel Air North, Crofton, and parts of Glen Burnie and Pasadena, are not currently served. Potential exists throughout the region for higher levels of service.

Future Conditions

The Cooperative Forecast Committee of the Baltimore Regional Transportation Board (BRTB-CFC) projects that Central Maryland will grow by 300,000 people and 440,000 jobs by 2045. Further, this data shows that while today's population centers will continue to grow, proportionally more population growth will occur in areas that are currently less dense and are not served by existing transit (Figure 2-8). If today's transit services were the same in 2045, the proportion of the population with walking access to fixed-route transit would decrease to 36 percent of all residents, despite serving a greater number of people.

Similar to population growth, some of the areas with the greatest percentage increase in jobs are outside of today's largest job centers (Figure 2-9). If today's transit system were the same in 2045, employment access to transit would decrease to 45 percent of jobs in proximity to fixed-route, despite a greater number of jobs being served by transit.

The effects of projected job and population growth on travel patterns will be discussed further in Section 3: Transit Market Analysis.

Figure 2-7

Fixed-Route Transit Supportive Densities

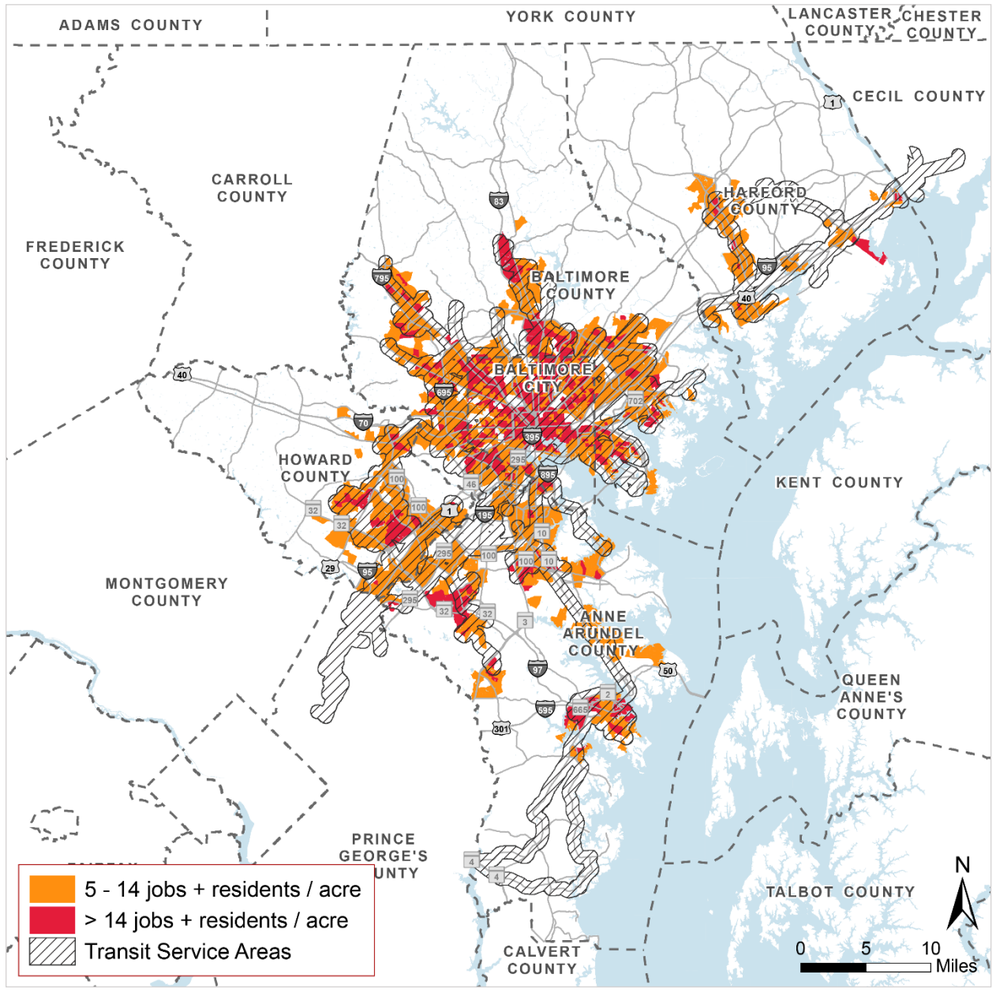


Figure 2-8

Percent Population Growth, 2020-2045

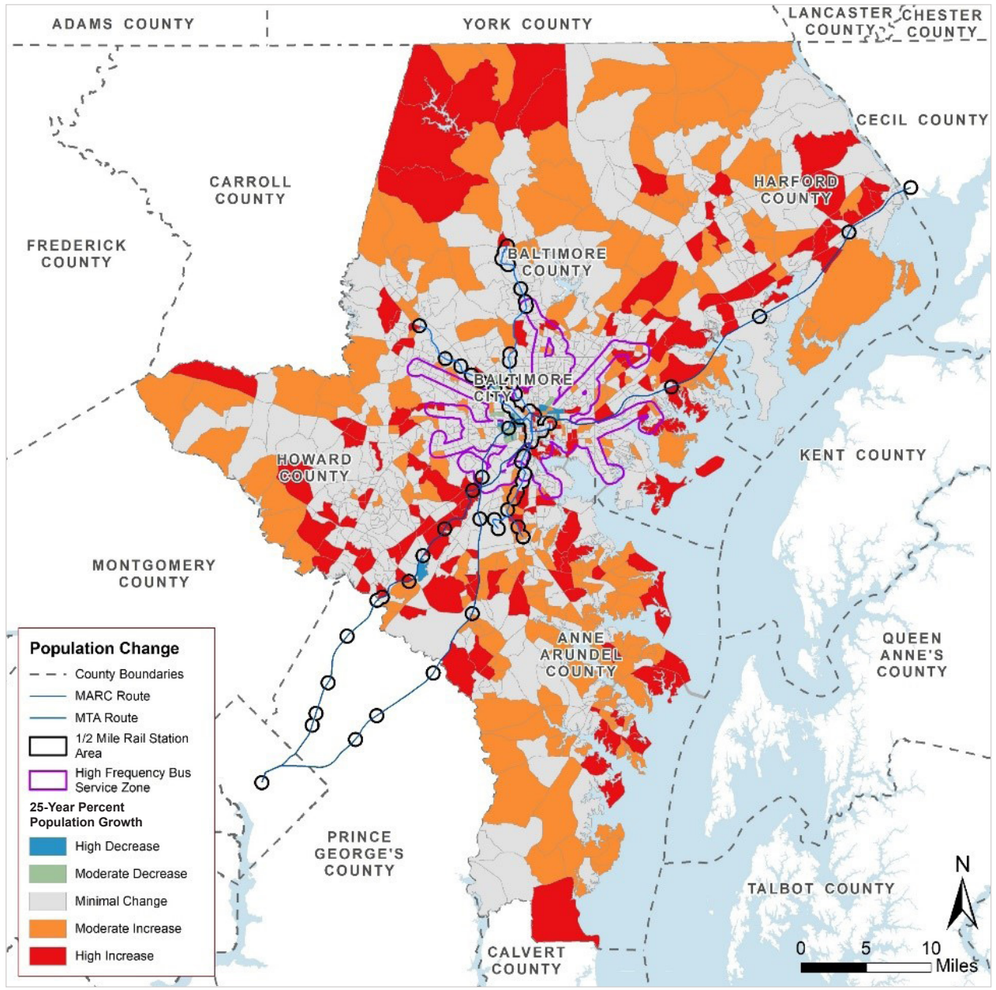
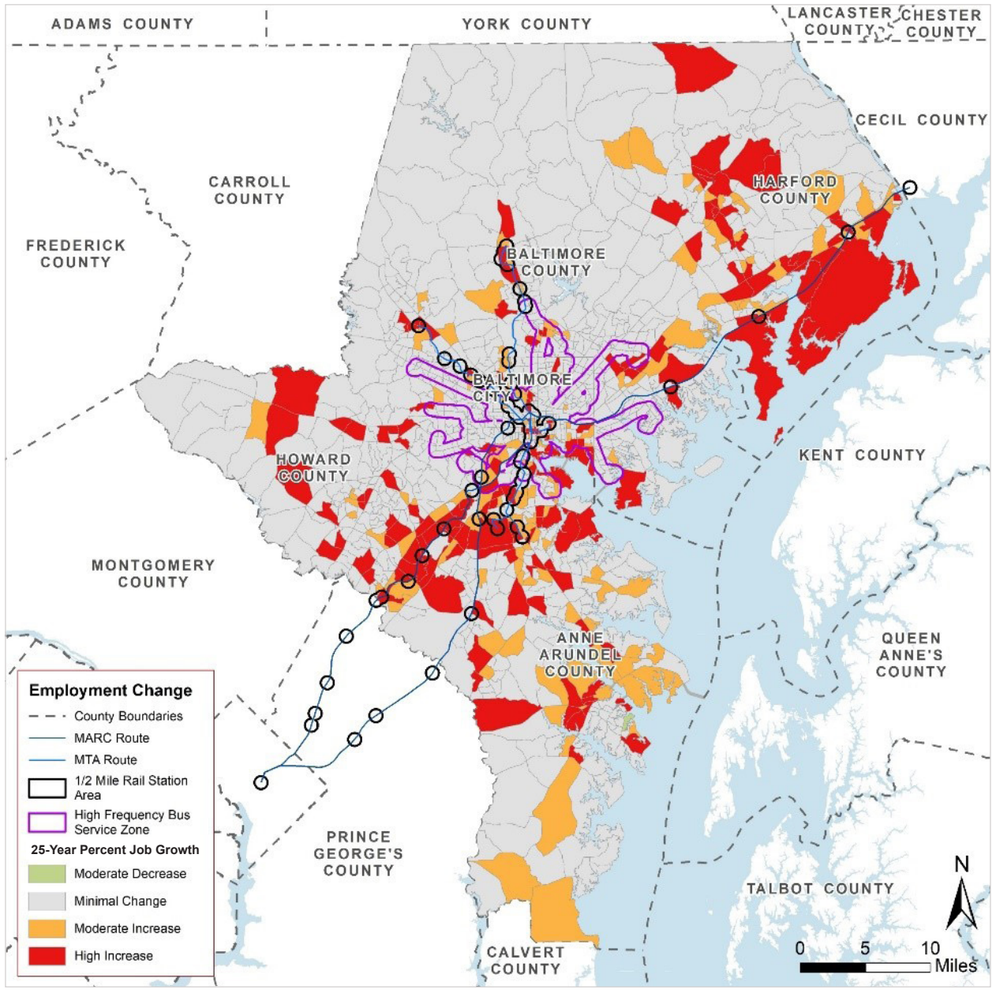


Figure 2-9

Percent Employment Growth, 2020-2045



Level of Service

For a transit service to be useful and convenient, it must operate on the days and times passengers need it. Therefore, the full picture of transit network coverage in Central Maryland must include how much service is available within the service area throughout the week. The quantity of transit service provided to an area is called level of service. It is typically measured in two ways:

Span measures the number of hours a transit route operates on a given day. Frequency measures the number of transit vehicles traveling in the same direction serving or passing by a stop or station during a given period. (See Figure 2-10 for an example.)

The level of service analysis was performed for Winter/Spring 2019 fixed-route services from the six transit agencies in Central Maryland with fixed-route service in order to convey the distribution of service in each jurisdiction.

Span of Service

For each route, the span was measured in hours from the first arrival of the day to the final departure for a typical weekday, Saturday, and Sunday.

Span of service varies across the Central Maryland region. Most of Baltimore City and its inner suburbs have 24-hour or near 24-hour service on weekdays (Figure 2-11), and some of these areas also have 24-hour service on weekends (Figure 2-12 and Figure 2-13). Most areas within the Core Bus system have at least 18 hours of service every day, and at least 12 hours of service on weekends. Outside of the region's core, most transit service operates between 12 and 18 hours on weekdays, typically from the AM peak to the PM peak. On weekends, span of service is often less than 12 hours or nonexistent.

Frequency of Service

More frequent transit means less waiting for a bus or train to arrive, which reduces travel times and increases convenience. The highest levels of frequency also increase

Figure 2-10

Span and Frequency Defined

SPAN

- Represents the number of hours operated on a given day
- If the first trip is at 7:00 a.m. and the last is at 7:00 p.m., the span is 12 hours

FREQUENCY

- Represents the number of buses passing a given point in a given time period
- If two buses pass a stop in an hour, the frequency is 30 minutes

reliability, since riders can expect an arrival within a short period of time without looking at a schedule.

Frequency was calculated for all locations by summing the total number of arrivals at the stops accessible from each location during a given hour. To prevent double-counting, a route's trips were only counted once per location, and the direction with the most trips was used to represent the number of trips for each route. To find how often, on average, a transit vehicle is available at each location, the total number of trips is divided by the number of hours of service. For example, if three buses arrive per hour, the frequency is 20 minutes. This number represents effective frequency and assumes that all transit arrivals are equally useful. This approach is not a substitute for a network analysis of the level of service available between specified points of interest.

Figure 2-14 through Figure 2-17 show transit frequency across Central Maryland during select hours in the AM peak, midday, and late night weekday periods, as well as the core period on Saturdays.

High-frequency transit is available in most of Baltimore City during the peak periods, as well as during off-peak hours in the city's core. Otherwise, frequencies in Baltimore City and the suburbs served by Core Bus are typically 30 minutes or better. Outside the region's core, most transit services have 60-minute frequencies. Effective frequencies are higher at transit centers, where multiple routes converge to increase the number of arrivals per hour.

Level of Service Takeaways

Transit level of service in Central Maryland directly reflects the densities and levels of development in the urban, suburban, and rural environments in each jurisdiction:

- Baltimore City and the beltway suburbs have 24/7 service with high frequency
- The core areas of other jurisdictions have less frequent service focused on the 12-hour workday
- Weekend service declines significantly compared to weekday service
- Most areas outside of the region's core lack evening, late night, and weekend service

Figure 2-11

Weekday Span of Service

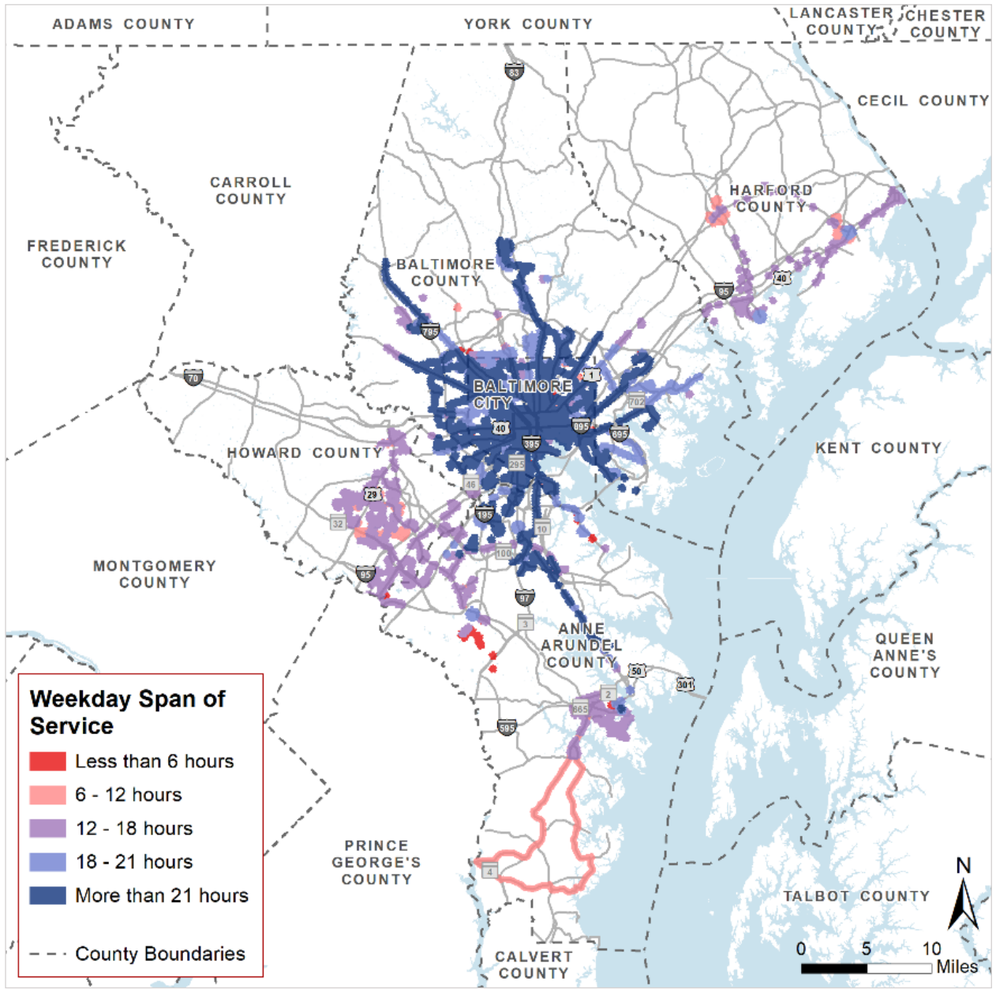


Figure 2-12
Saturday Span of Service

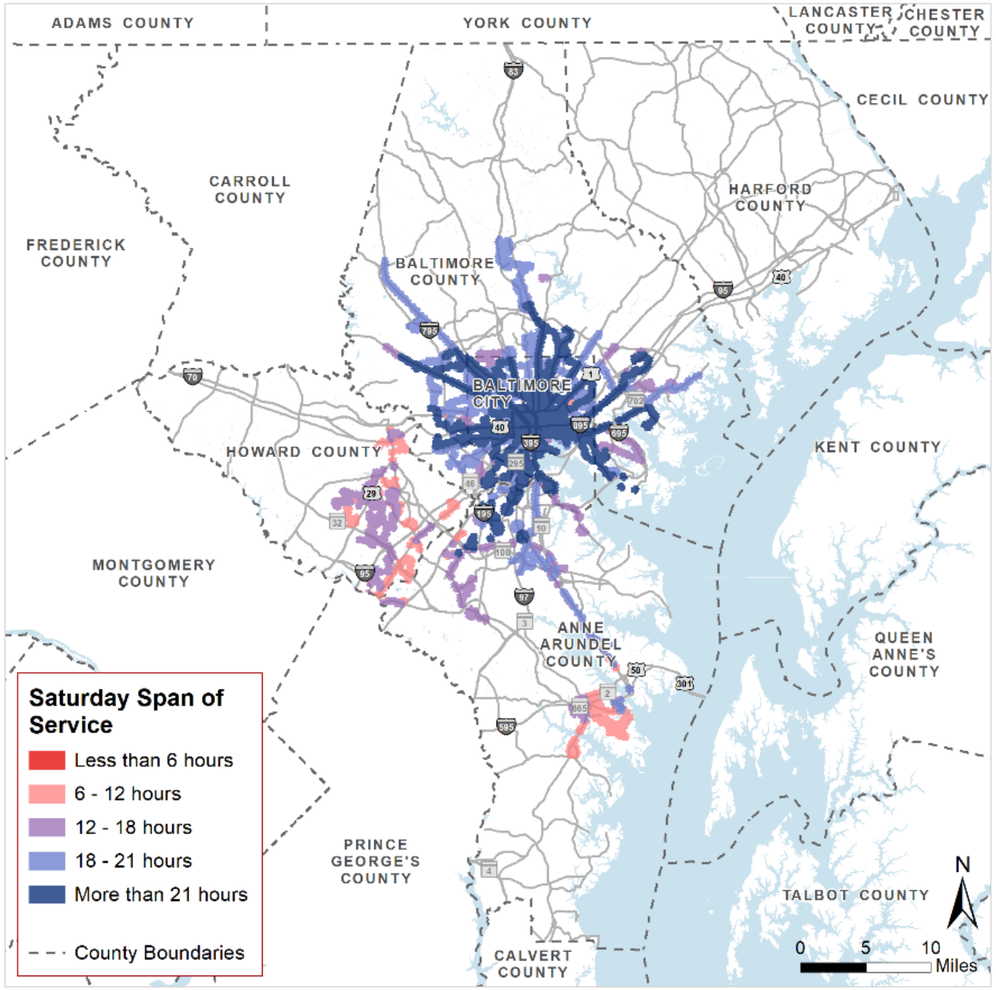


Figure 2-13
Sunday Span of Service

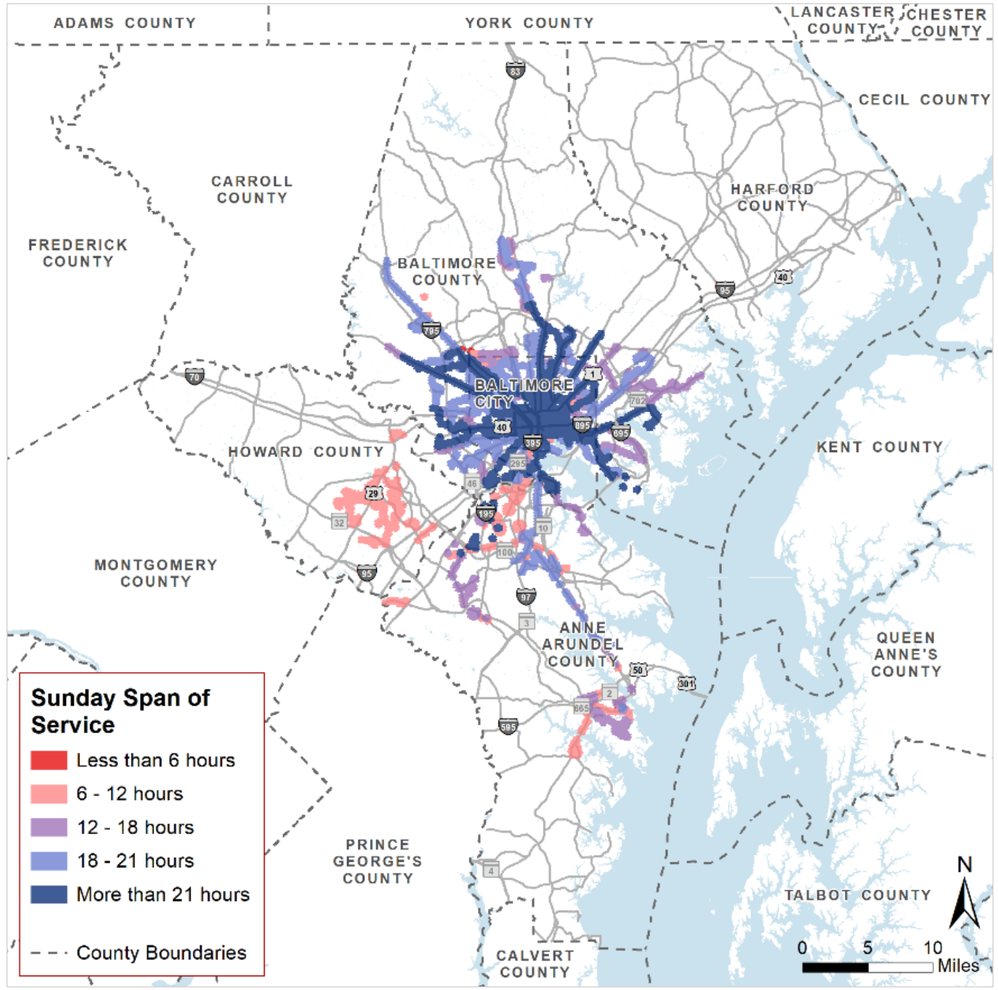


Figure 2-14
Weekday AM Peak Frequency

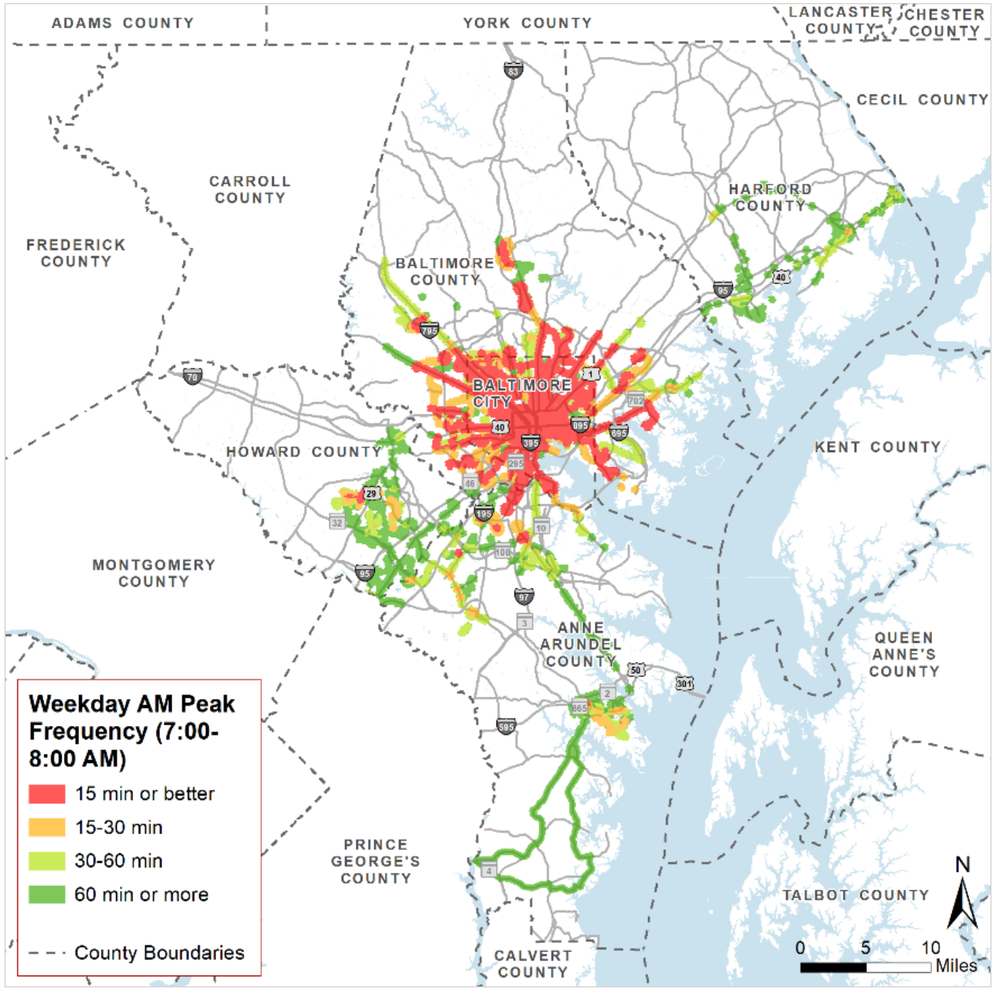


Figure 2-15
Weekday Midday Frequency

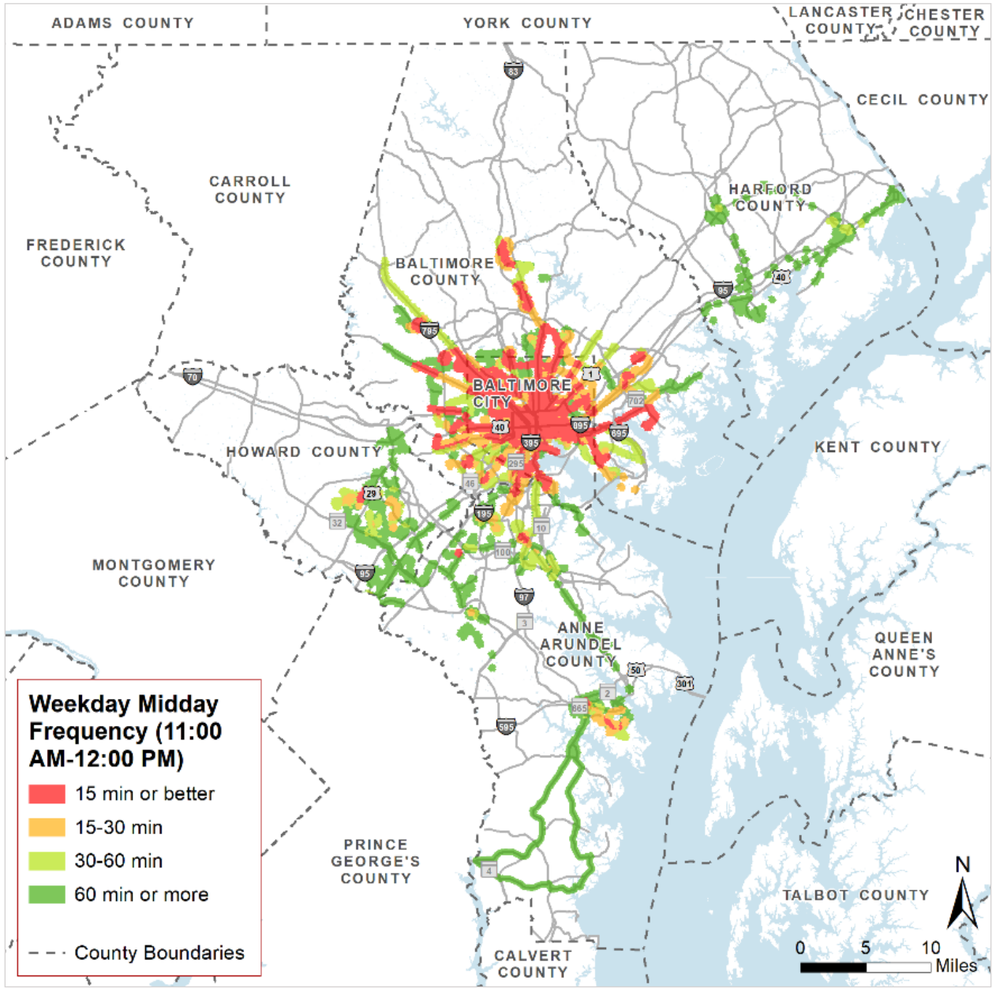


Figure 2-16
Weekday Late Night Frequency

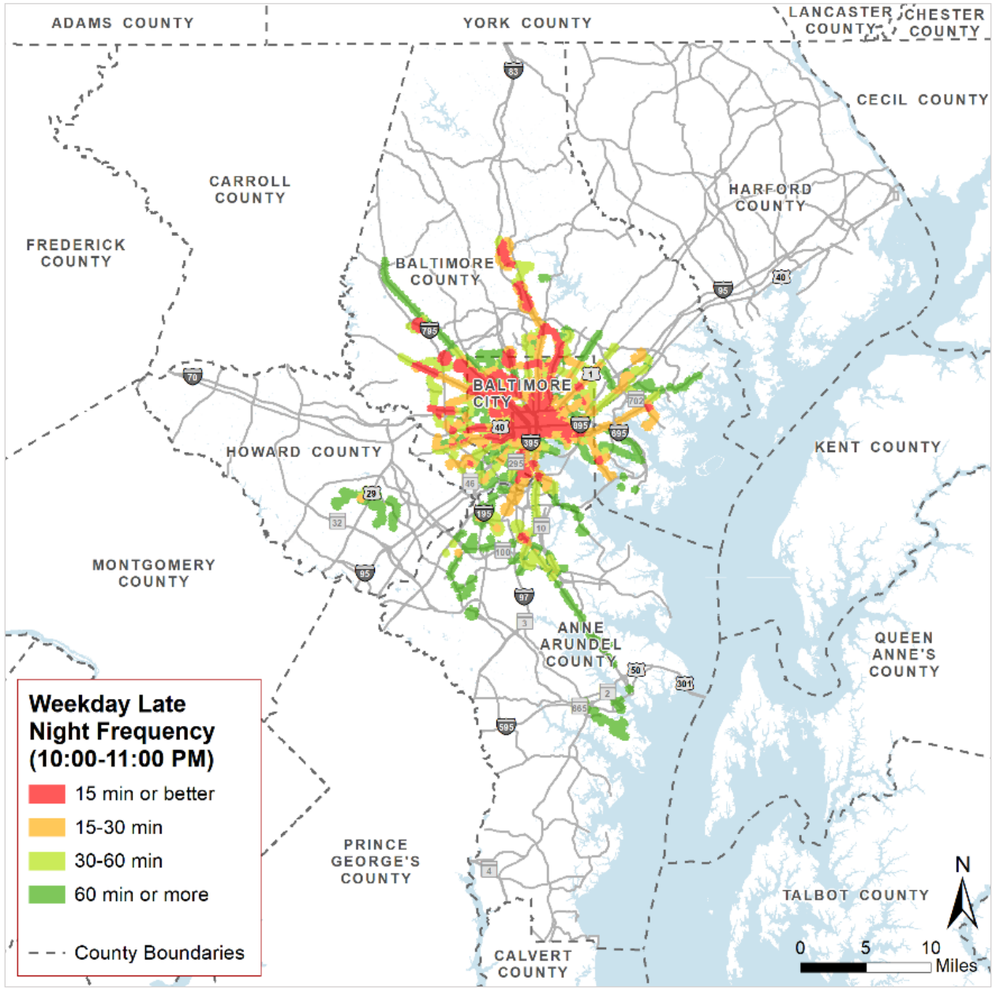
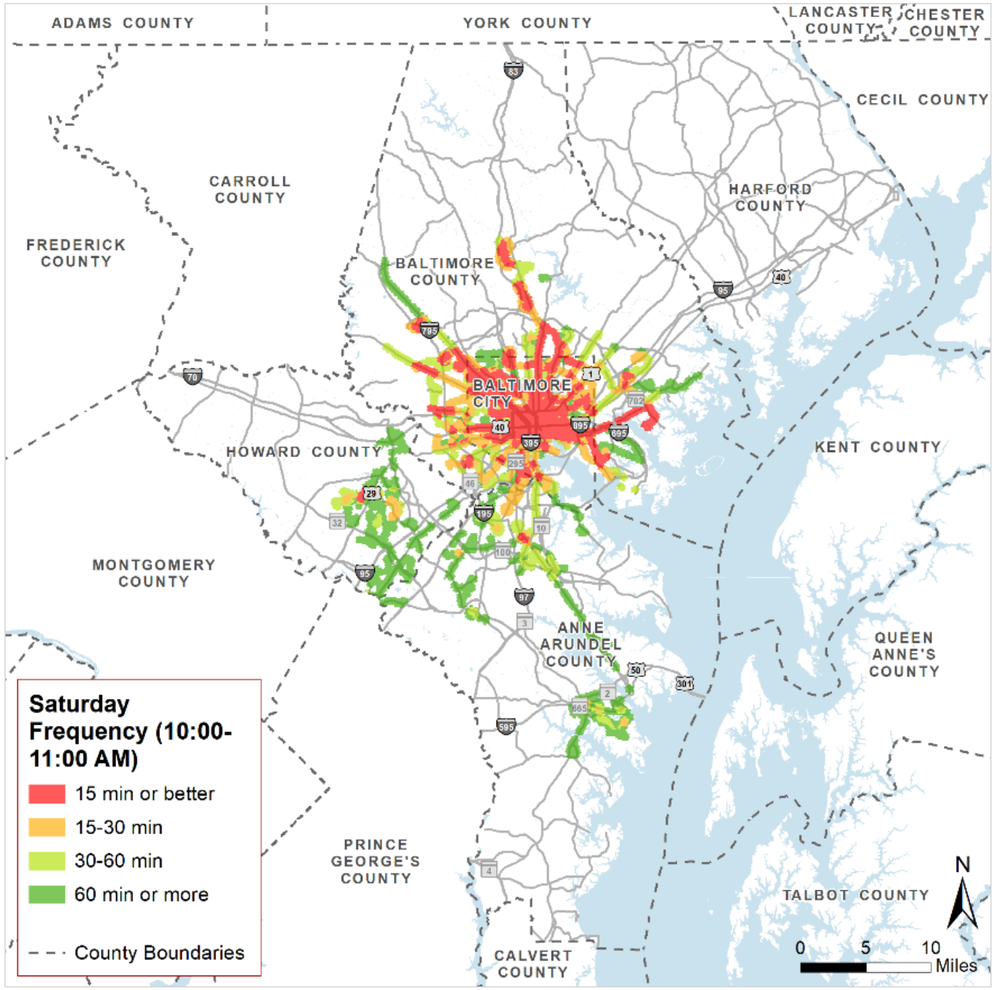


Figure 2-17
Saturday Frequency



3 Transit Funding and State of Good Repair

Transit agencies must regularly review their finances and their fleets to balance the desire to invest appropriately in staff and vehicles to ensure quality of service delivery with the realities of limited budgets. This chapter reviews the operating and capital expenses of the seven transit agencies of Central Maryland, as well as their assets and the state of good repair of those assets.

The overwhelming majority of capital costs are dedicated to improving transit assets like vehicles and facilities. Across the region, 80 percent of the agencies' assets (by value) support rail services; LOTS assets make up 1.4 percent of the asset base. Annually, MDOT MTA is prioritizing an average of 98 percent of capital spending in the region to address State of Good Repair needs.

Transit Funding in the Central Maryland Region

Historically, approximately 75 percent of operations and maintenance (O&M) funding for MDOT MTA and LOTS combined is provided by the Maryland Transportation Trust Fund (TTF). Federal and local governments have contributed 5 percent or less to the combined O&M costs. However, local governments contribute a much greater percentage, usually 50 to 70 percent, to fund operations (not maintenance) of LOTS services.

Capital funding for transit in the region is roughly split equally between the Maryland Transportation Trust Fund (TTF) and federal government sources. Local government and other funding sources (neither state nor federal) contribute 0.3 percent of capital funding. Sources of capital funding are documented in the annual MDOT Consolidated Transportation Program.

All statewide funds dedicated to MDOT are deposited into the Transportation Trust Fund and disbursements for all transportation program and projects are made from the TTF. The TTF is funded through motor fuel taxes, motor vehicle titling taxes, bond sales, other State revenues, and federal aid. Most of these TTF revenue streams lose their buying power over time due to inflation. Funds deposited in the TTF are not earmarked for specific purposes. There are almost always more transportation needs than funds available.

MDOT's six-year combined capital and operating program is split among its several Transportation Business Units and WMATA. Expenditures across all of MDOT increased significantly between 2013 and 2019 due to new revenues approved by the Maryland General Assembly via the 2013 Transportation Infrastructure Investment Act. MDOT MTA represents 30 percent of MDOT's $30.2 billion, 6-year FY19-24 combined capital and operating program.

This share of statewide capital and operating expenditures remained steady around 30 percent between 2009 and 2019. Total TTF transit spending in Maryland, combining funds for MDOT MTA and WMATA, represented 47 percent of MDOT's FY 19-24 six-year combined capital and operating program.

MDOT MTA receives both formula funds and discretionary grants from the federal government to fund a portion of overall transit needs.

Formula funds are granted in fixed amounts based on service area population and population density. The amounts of federal formula grants apportioned to Central Maryland have grown from under $120 million in 2013 to $150 million in 2019 (4 percent per year). Some examples of formula funds include:

- Urbanized Area Formula Grants (Section 5307) funds both capital projects and some maintenance expenses
- State of Good Repair Grants (Section 5337) funds projects to maintain and replace existing fixed guideway and high intensity motor bus (HIMB) assets and perform preventative maintenance
- Grants for Bus and Bus Facilities (Section 5339) funds bus purchases, bus replacement, and bus facilities

Federal discretionary grants are typically awarded through competitive processes. Examples of federal discretionary grants that have supported MDOT MTA funding needs in the past include:

- Better Utilizing Investments to Leverage Development (BUILD) Discretionary Grants, formerly known as Transportation Investment Generating Economic Recovery (TIGER)
- Grants for Buses and Bus Facilities Program (Section 5339)
- Congestion Mitigation and Air Quality (CMAQ) Improvement Program

Historically, federal funds have supported various transit asset needs for MDOT MTA. These include vehicle replacement (buses, MARC cars, light rail vehicle overhaul, and Metro cars); guideway rehabilitation; and station and facility maintenance and upgrades.

MDOT MTA is one of the few transit agencies that receives no local funding contributions. Salt Lake City UTA is MDOT MTA's only peer agency that also reports not receiving local funding. Five of MDOT MTA's peers are funded almost exclusively through local sources. Local contributions include general revenues or dedicated funding levied by agencies or local governments. Sales tax and local government general funds are the most common local sources. Most peer agencies draw upon two or more local funding sources.

Current Spending and Future Needs

Operating expenses for Central Maryland transit agencies totaled $704 million in FY 2018 ($858 million for MDOT MTA statewide). Operating expenses account for the cost of management and administration, O&M transit vehicles, collecting fares, and maintaining safety and security. MDOT MTA operating costs are driven by the costs of labor, including contracted service.

O&M costs are increasing with national trends and faster than inflation. For fixed-route O&M, costs are increasing 4 percent annually; for Mobility/ Paratransit, costs are increasing 7 percent annually, a rate that is projected to persist over at least the next decade.

Financing and Partnerships

When considering how to fund transit, it is important to recognize the differences between funding and financing. Funding refers to the cash flows and revenue sources, whereas financing refers to the methods used to leverage future cashflows and revenue sources, including financing tools such as debt. When considering various financing tools, a distinction is sometimes drawn between traditional financing and alternative financing. Traditional financing tends to include public sector debt mechanisms, such as Consolidated Transportation Bonds or other forms of MDOT debt. On the other hand, alternative financing tends to include public-private partnerships (P3s) involving a private equity and/or private debt.

Alternative financing sometimes requires the identification of a separate, dedicated funding source. Due to the added complexity and risk allocation considerations, only certain projects are suitable candidates for alternative financing. While alternative financing is an excellent tool in the toolbox for delivery of transit infrastructure assets, it is important to recognize that traditional financing and project delivery still plays a very important role in most transportation infrastructure.

Some recent examples of public transit projects that have utilized alternative finance and project delivery include:

- Larger Alternative Financing Projects (>$150 million)
  - Purple Line Light Rail Transit P3 (Maryland)
  - Denver Eagle P3 (Colorado)
  - Massachusetts Bay Transportation Authority Fare Collection P3
- Small to Medium-Sized Alternative Funding and Financing Projects (<$150 million)
  - Boston Landing Station: New commuter rail station and fund O&M for 10 years (Massachusetts)
  - Dunwoody Station Extension: Provision of additional station access (Georgia)

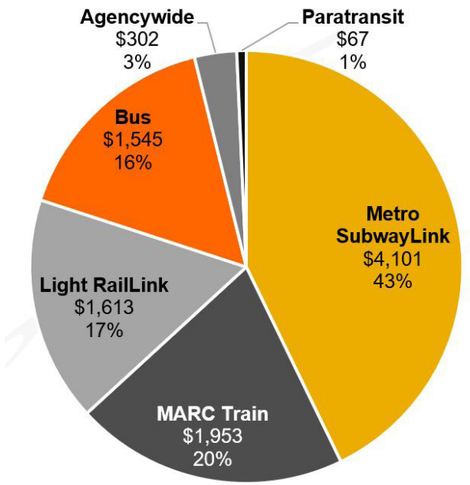
There are other ways that partnering with the private sector may benefit transit, even if the mechanisms are not formally recognized as a P3. For instance, some transit agencies are partnering with new mobility companies to achieve greater efficiencies. The city of Santa Monica, California, replaced its existing dial-a-ride paratransit program with on-demand service through Lyft. The MBTA has also supplemented its ADA paratransit service with service provided by TNCs to reduce costs. While specific partnerships with TNCs are not likely to result in new funding or financing for public transit, they may help to reduce costs in certain areas.

Assets Supporting Public Transit

Central Maryland transit agencies own or operate $9.4 billion in physical assets. The distribution of these assets across the different modes is shown in Figure 3-1. Bus includes Core Bus, Commuter Bus, and assets that support LOTS bus services. Paratransit includes Mobility, Call-A-Ride and assets that support LOTS paratransit services. MDOT MTA assets shown in this report do not include a majority of the MARC Train assets on the Brunswick Line as those fall outside of the Central Maryland region.

Overall, more than 80 percent of the assets (by value) support rail services including Metro Subway, Light Rail, and MARC Train. LOTS assets make up 1.4 percent of the asset base, or about $132 million in value.

Figure 3-1
Central Maryland Asset Base by Mode ($ millions 2018)



These assets are vital to the continued operations of public transit in Central Maryland. Reinvestment in these assets is required to keep them operating at high levels of performance. For example, aging rail cars have both lower reliability in terms of distance between failures and higher corrective maintenance costs. Replacing aging vehicles or rehabilitating them improves asset condition and service reliability.

State of Good Repair

State of good repair (SGR) addresses the condition of transit infrastructure and its ongoing maintenance to provide safe, efficient, and reliable service. SGR focuses capital investments on the replacement and rehabilitation of aging assets to

maintain service quality and minimize the cost of asset maintenance.

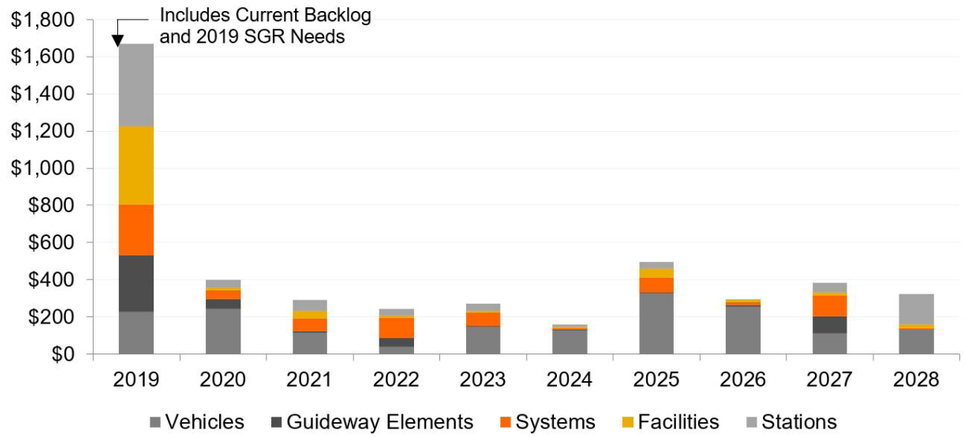
Recognizing the importance of renewal, MDOT MTA is prioritizing an average of 98 percent of capital spending to address SGR needs. The remaining 2 percent of capital spending will be used for enhancements, including compliance with current and future regulations, satisfying forecasted demand for transit, and adaptation to new technologies and mobility options.

As reported in the MDOT MTA 10-Year Capital Needs Inventory & Prioritization report, an estimated $4.6 billion in SGR needs have been identified from 2019 to 2028. This unconstrained value includes $1.5 billion in deferred capital maintenance ("SGR backlog") that is presented in the first year (see Figure 3-2). The needs vary each year, both overall and by mode. Needs are estimated based on the inventory of existing transit assets and the lifecycle plans for rehabilitation, overhaul, annual capital maintenance, and/or replacement of those assets.

The largest portion of SGR needs by asset category is driven by vehicles reaching the end of their useful life, planned fleet rehabilitations, and overhauls. Over the 10-year period between 2019 and 2028, this represents $1.7 billion (37 percent of SGR) in vehicle needs; $1.1 billion of the $1.7 billion has committed funding over the next six years.

Similarly, the LOTS assets in Central Maryland require periodic replacement and rehabilitation. The 10-year unconstrained SGR needs for LOTS is estimated to be $112 million.

Figure 3-2
Summary of MDOT MTA 10-Year SGR Needs ($ millions, YOE)



Capital costs are inflated at 3 percent annually.

National State of Good Repair

SGR and underfunding are transit concerns nationwide. In 2017, the American Society of Civil Engineers gave the country's transit infrastructure a grade of D-, the lowest grade for any category of infrastructure in the national report card.[1] The report cited chronic underfunding in preservation and replacement of existing assets as the lead cause of the $90 billion State of Good Repair backlog. The current annual investment in preservation is so insufficient that, if maintained over the next 20 years, the backlog would balloon by 36 percent to $122.2 billion.

MDOT MTA is not alone in experiencing rail service disruptions due to SGR work. With aging assets but limited funding to address their assets' needs, most transit agencies in the Northeast Corridor are finding they must prioritize safety-critical investments. They have drawn on innovative solutions, or, when necessary, dramatic budget rearrangements, to extend dollars and achieve enhancements in the near-term.

For example, in 2016, the Washington Metropolitan Area Transit Authority (WMATA) introduced an accelerated track work program called SafeTrack to improve safety and reliability on the Metrorail system. The program increased maintenance time during off-peak periods to accelerate the completion of necessary work. However, it also reduced capacity and increased travel times.

In 2017, New York's governor signed an executive order declaring a state of emergency for the New York City subways. This happened amid a period of unreliable service and rush hour malfunctions, and days after a train derailment. The executive order was a mechanism to more quickly provide money and other tools for immediate repairs and system improvements: the governor announced an additional $1 billion for capital improvements and the temporary suspension of any laws that would hinder immediate work to repair transit assets.[2]

After a winter of severe weather in 2015, the Massachusetts Bay Transportation Authority's repair backlog exceeded $7 billion.[3] The system experienced equipment breakdowns, canceled trains, and some passengers were left stranded. To address these issues, the T dedicated approximately 60 percent of its annual capital budget that fiscal year to SGR issues.

The experiences of peers demonstrate that achieving and maintaining a SGR is a serious and widespread issue. MDOT MTA has responded by prioritizing an average of 98 percent of capital spending to address SGR needs.

1 American Society of Civil Engineers, Infrastructure Report Card, 2017.
2 Emma G. Fitzsimmons, "Cuomo Declares a State of Emergency for New York City Subways," *The New York TImes*, June 29, 2017.
3 Bob Salsberg, "MBTA's repair backlog climbs above $7 billion," *Associated Press*, August 31, 2015.

4 Transit Market Analysis

To evaluate how effective a transit network is and to identify where investments should be targeted, it is essential to first determine where potential transit users live, where they want and need to go, and how those travel patterns may change in the future. This chapter examines the transit market in the Central Maryland region today and in the future. The topics covered in this chapter are:

- Existing Job and Population Densities
- Projected Job and Population Growth
- Transit Supportive Markets
- Transit Propensities

These characteristics are not the only conditions that drive the demand for transit; existing or planned land uses impact transit demand as well. An area with high traffic congestion and limited parking or with a high demand but that currently has a low level of service is more likely to attract transit riders and support transit service. Conversely, an area with minimal traffic congestion and ample, cheap (or free) parking at major activity centers may have a difficult time attracting transit riders and supporting transit service. Land use and zoning are discussed further in the Existing Plans and Land Use section.

The purpose of the market analysis is to broadly identify the regions, activity centers, and travel patterns that may be supportive of future transit investment. Data sources include: American Community Survey 2013 to 2017 5-Year Estimates and 2015 Longitudinal Employer–Household Dynamics (LEHD) data from the U.S. Census Bureau; Baltimore Regional Transportation Board's 2045 population and employment model projections; and schedule data and ridership counts from the transit agencies operating in the study area.

Due to the range of population densities and land uses across the expansive study area, the specific needs of each jurisdiction within this plan vary. However, many areas outside of Baltimore City and Baltimore County demonstrate a strong or moderate market for transit services but lack frequent connections to and from major job centers, such as Arundel Mills and Columbia. Many of the suburban areas also demonstrate demand for transit services outside of peak hours that is currently unmet, such as in Perry Hall and Crofton. In addition, the areas with the lowest densities, such as Edgewood or Severna Park, may be good candidates for microtransit or other demand-response service pilots as opposed to fixed transit service that would increase access at a lower cost.

Existing and Projected Jobs and Population

The distribution of population and employment plays a determining role when planning regional transit services. High-capacity transit is most efficient in dense, well-connected areas, while areas of low density or disconnected jobs and residents pose greater barriers to cost-effective, direct transit service. As population and employment growth alter the patterns of density across the region, Central Maryland's transit providers must adapt to shifting demand between these areas.

According to projections from the BRTB-CFC, most of the region's growth will occur outside of existing areas of density, increasing the extent of transit-supportive communities and destinations in all five jurisdictions.

Figure 4-1 and Figure 4-2 show the existing and future population densities of the region using data from the American Community Survey 2013 to 2017 5-Year Estimates and BRTB Round 9 forecasts for 2045, respectively. Figure 4-3 and Figure 4-4 show the existing and future employment densities of the region using data from the Longitudinal Employer-Household Dynamics 2015 survey and BRTB Round 9 forecasts for 2045, respectively.

Population density is expected to increase throughout Baltimore County, as well as in Bel Air, Aberdeen, Edgewood, Columbia, Laurel, Severn, and Parole. Job density is expected to increase in Downtown Baltimore, Owings Mills, Towson, Sparrows Point, White Marsh, Aberdeen, the US 1 Corridor in Howard County, Elkridge, and Fort Meade.

Downtown Columbia (Photo Credit: Downtown Columbia Partnership)

Figure 4-1
Existing Population Densities

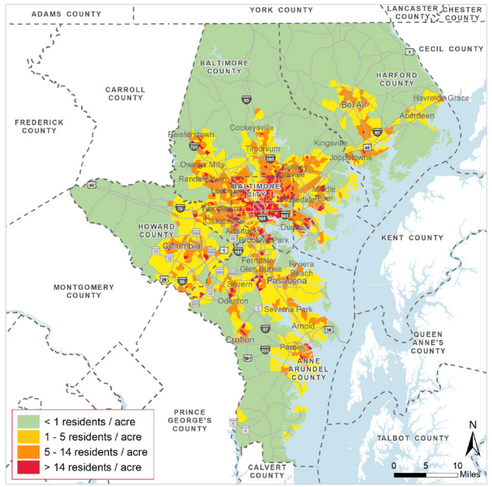


Figure 4-2
Projected Population Densities

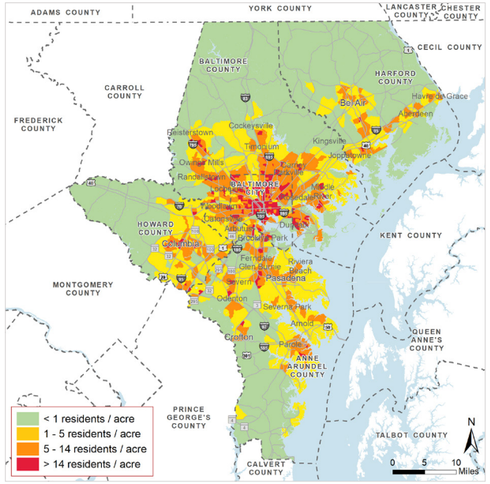


Figure 4-3
Existing Job Densities

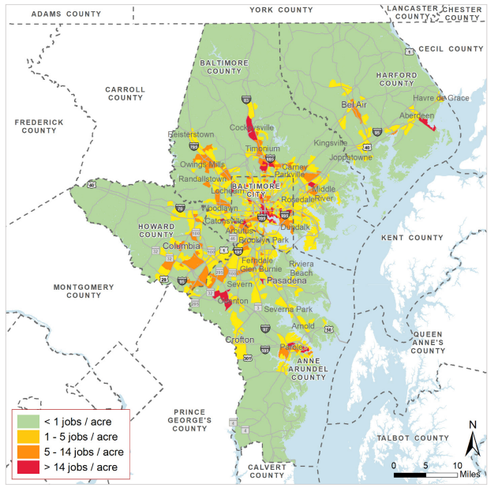


Figure 4-4
Projected Job Densities

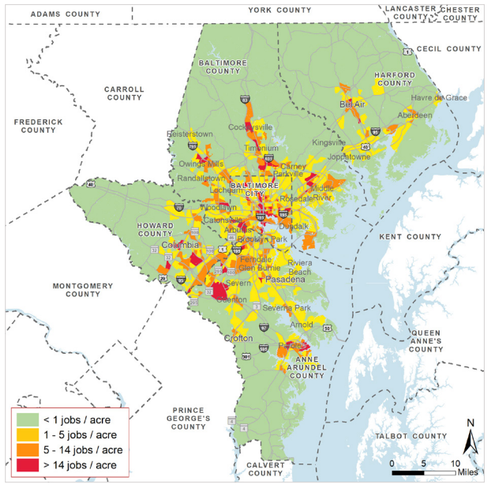


Table 4-1
Transit-Supportive Densities

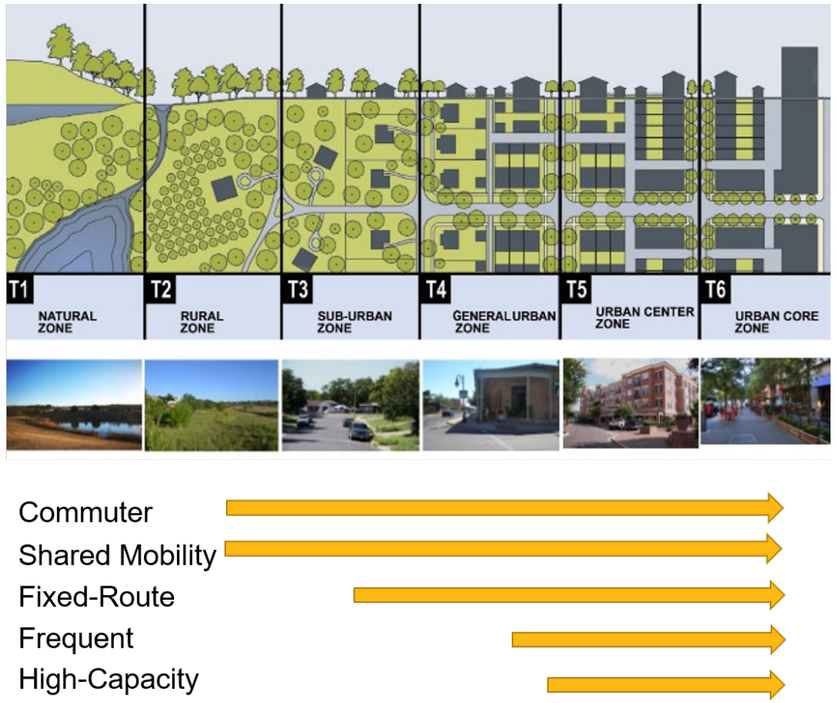
Job and Population Density	Level of Transit Demand	Example Areas
< 1 jobs + residents/acre	Not supportive of transit	Western Howard County, Northern Baltimore County, Southern Anne Arundel County
1-5 jobs + residents/acre	May justify alternative or new mobility solutions	Edgewood, Severna Park, Middle River
5-14 jobs + residents/acre	Justifies headways of 60 minutes or less	Owings Mills, Bel Air, Ellicott City
14+ jobs + residents/acre	Justifies frequent and high capacity transit	Downtown Baltimore, Towson, Columbia Town Center

Transit-Supportive Areas

The type and amount of land use in a given area directly impacts transit use or how supportive of transit an area might be. As development increases and diversifies, more transit and different types of transit can be justified. Therefore, many transit and planning agencies produce guidelines that align transit to land use for planning purposes. Table 4-1 provides an overview of the expected support of transit in the study area based on job and population densities.

As discussed in the Transit Network Analysis section, most of the portions of the study area that have five or more jobs, residents, or a combination thereof per acre are already served by transit. However, outside of Baltimore City and the inner suburbs in Baltimore County, existing transit does not meet the thresholds to qualify as “frequent” transit service. Service often only operates hourly, and weekday evening service or weekend service can be limited or non-existent. However, there are areas where there is already sufficient demand and land use types to support additional service.

Figure 4-5
Transit-Supportive Densities

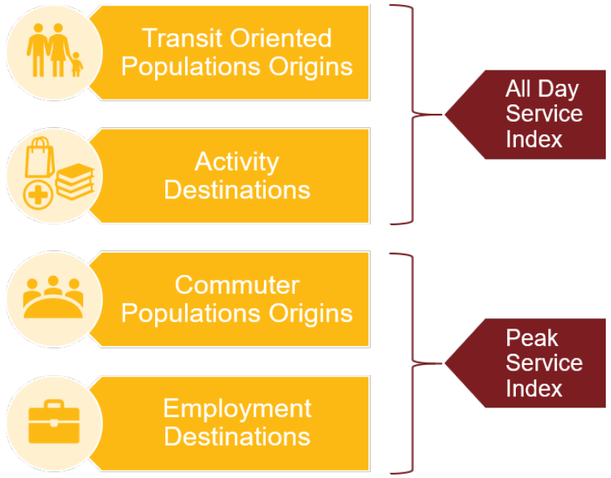


A transect showing the types of land use found in Central Maryland and the general guidelines of what type or types of transit service are suitable for that specific land use.

Projected Change in Population and Job Densities (2045)

Over the next 25 years, many new parts of the region will be able to support micromobility, fixed-route transit, or high capacity transit services. As of 2016, 40 percent of the study area's 2.55 million people lived in areas served by transit. By 2045, the BRTB-CFC expects the study area's population to grow by nearly 300,000 people, with 55 percent of this growth occuring in suburban areas that are not currently served by transit. Employment growth is also expected to be concentrated in the suburbs in the next 30 years. As of 2016, about half of the region's 1.24 million jobs were served by existing transit. By 2045, the BRTB-CFC expects an additional 440,000 jobs to be created, with about 46 percent not accessible by existing transit. With this growth, the region's transit network will need to expand its coverage to serve these new transit-supportive areas.

Figure 4-6
Components of Hybrid Indices



Transit Propensity

Transit propensity is an analysis used to indicate the strength of a transit market in different areas. Transit propensity analysis combines a broad array of data sources into indices that identify where the highest propensity for transit use exists. Every census block group in the study area receives a unique score in each propensity index and is then ranked relative to the study area. There are four primary propensity indices:

- Transit-Oriented Populations Origin Index
- Commuter Origin Index
- Workplace Destination Index
- Activity Destination Index

These indices are designed to be visualized and combined with other information about trip and travel patterns, transit routes, and transit level of service to help evaluate the need or demand for transit service at the block group level and to develop recommendations for transit service modifications or additions of transit service. Each of the primary indices are comprised of one or more "analysis factors" (Table 4-2).

In addition to the four primary indices, there are two hybrid indices that combine multiple analysis factors in order to identify where the highest propensity for transit use exists at specific times of day (Figure 4-6 and Table 4-3). For example, an office park with a high density of jobs may have a high employment destination index score, but this high level of demand may exist only at peak commuting times due to the lack of other activity generators in the area.

Table 4-2

Analysis Factors used for Primary Transit Propensity Indices

	Index	Analysis Factor
Primary Indices	Transit-Oriented Population Origins	Population
		Age
		Households
		Income
		Vehicle Ownership
		Disability Status
	Commuter Population Origins	Labor Force
		Non-Single Occupancy Vehicle (SOV) Commute Mode
	Employment Destinations	Employment
	Activity Destinations	Retail & Restaurant
		Recreation
		Healthcare & Social Assistance
		Education
		Government

Table 4-3

Analysis Factors and Datasets used for Hybrid Transit Propensity Indices

	Index	Analysis Factor
Hybrid Indices	Peak Service	Higher of Commuter Population Origins or Employment Destinations Scores
	All-Day Service	Higher of Transit-Oriented Population Origins or Activity Destinations Scores

Transit-Oriented Population Origin Index

The transit-oriented population index consists of six categories: population, age, households, income, vehicle ownership, and disabled persons. The data sets that contribute to these categories are all indicative of higher population or household density, or persons that are likely to be more reliant on transit. Therefore, this index is indicative of where transit-dependent populations live (Figure 4-7).

Commuter Origin Index

The commuter origin index consists of two categories: labor force and commute mode. Employed persons, commuters, and transit commuters all contribute to this index, which is indicative of where traditional peak hour commuters live, and where those that currently use transit to commute live (Figure 4-8).

Employment Destination Index

The employment destination index has a single category: employment. Total employment and employment density contribute to this index, which is indicative of where people commute to for work purposes (Figure 4-9).

Activity Destination Index

The activity (non-work) destination index has five categories: retail/restaurant, recreation, healthcare/social assistance, education, and government. These categories are weighted based on the typical trip purpose proportions for transit commuters (Figure 4-10). The data sets that make up these categories are employment in the sectors represented by these categories (e.g., the recreation category contains data sets from the entertainment sector and the recreation sector). The employment by sector data sets serve as proxies for how much travel demand businesses that fall into these sectors would produce, and therefore, this index is indicative of where people make non-work trips.

Peak Period Index

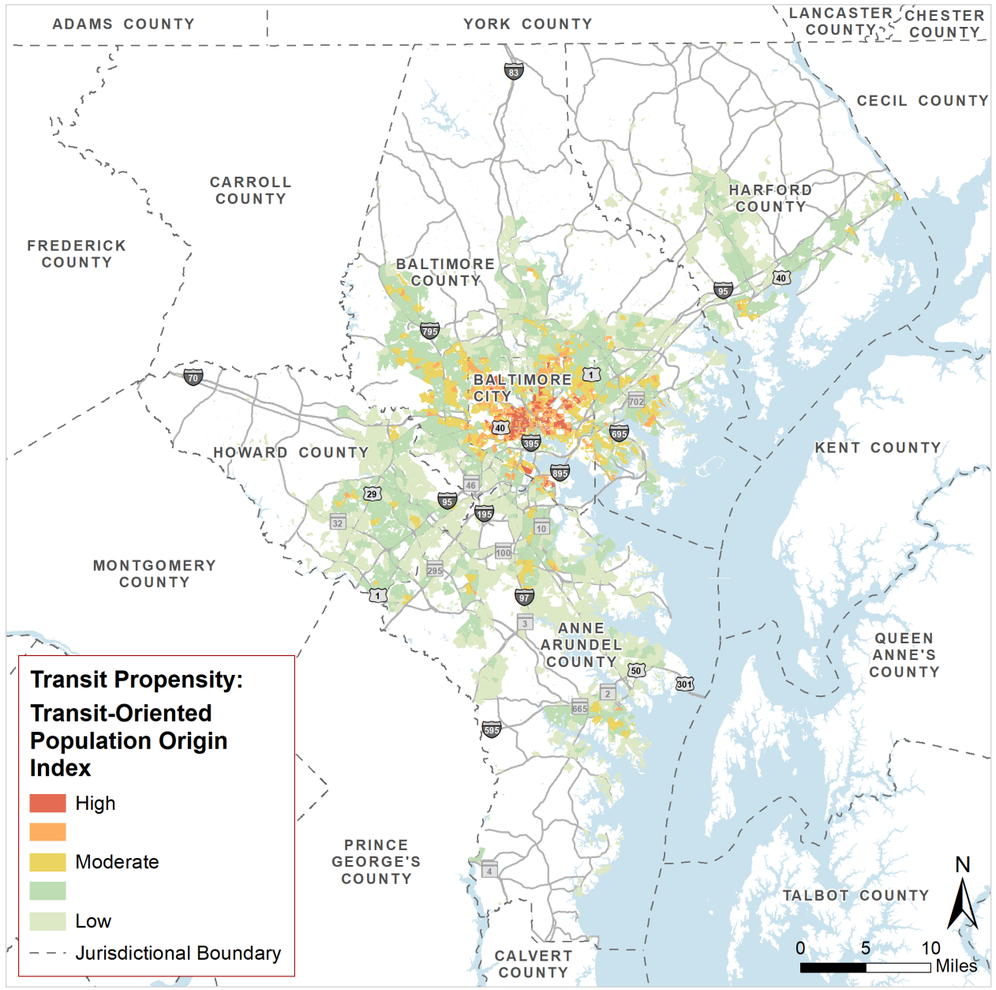
The peak period index for each block group is calculated by finding the Commuter Population Origins Index score and the Employment Destinations Index score, and then using the higher of those two values. This hybrid index (Figure 4-11) uses both where people live and where they work within the region to determine where the highest propensity for transit during the traditional “peak” commuting times.

All-Day Index

The all-day index for each block group is calculated by finding the Transit-Oriented Population Origins score and the Activity Destinations score, and then using the higher of those two values. When combined in to the single all-day index, one can see which areas have the highest propensity for transit service over the course of the entire day (Figure 4-12).

Figure 4-7

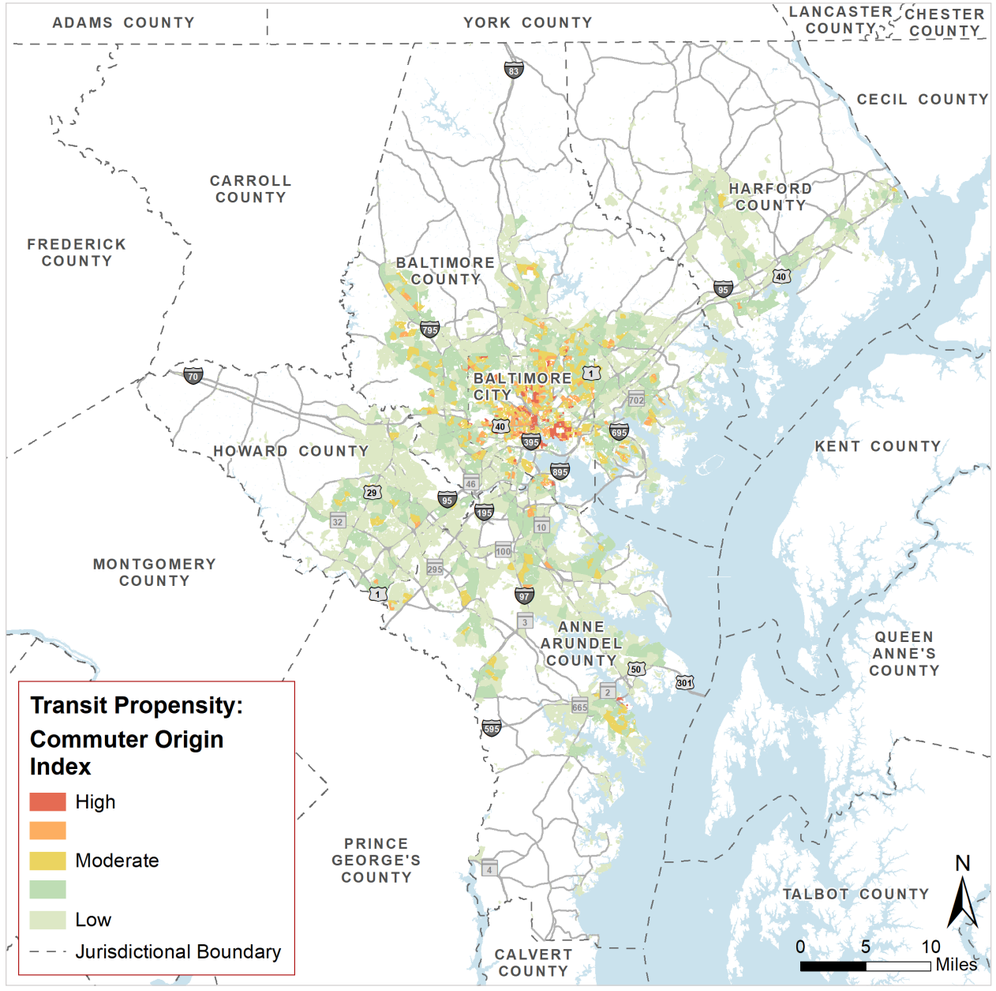
Transit-Oriented Population Origin Index



In Central Maryland, most of these areas are already served by transit, although the span of service and frequency of the service outside of peak periods can be lacking in some of these areas outside of Baltimore City.

Figure 4-8

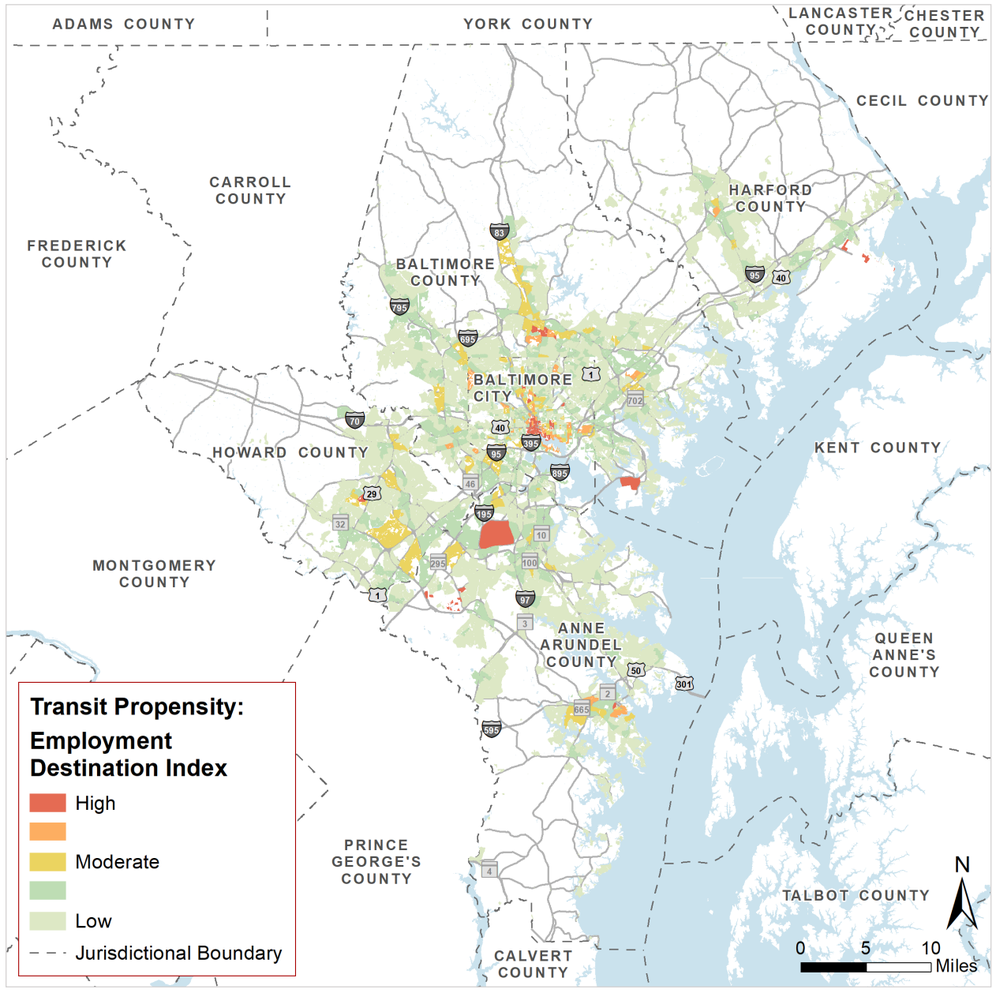
Commuter Origin Index



The largest number of employees likely to commute using transit live in urban residential areas well served by frequent transit during the daytime hours as well as routes that operate nearly 24 hours a day. However, outside of Baltimore and its close-in suburbs, transit is often unavailable to workers on who are not on a typical 9-to-5 schedule, as many routes lack weekday evening or any weekend service.

Figure 4-9

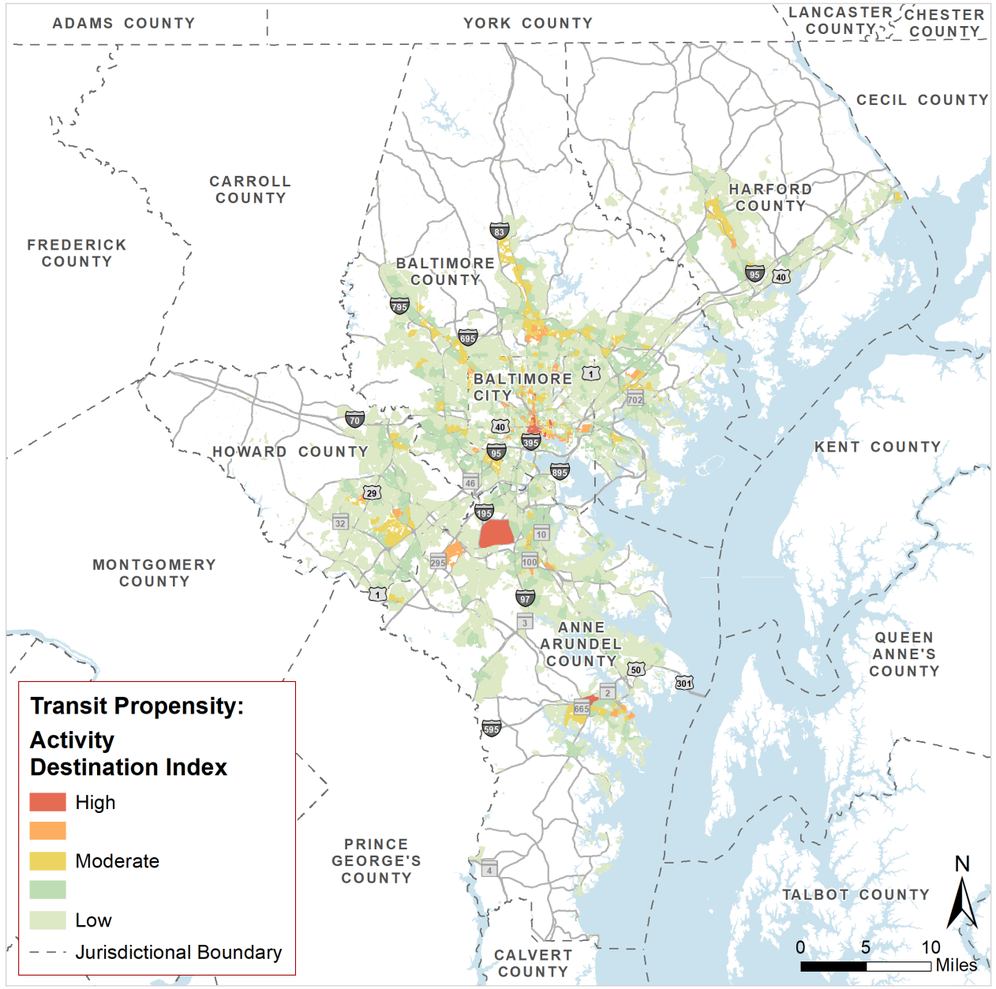
Employment Destination Index



Many of these areas show high transit propensity scores due to the presence of healthcare or shopping centers at these locations; these are activity centers that have workers and visitors arriving and departing throughout the day each day. While most of the areas with moderate or high scores have transit service, workers who are not on a typical 9-to-5 schedule may not be able to rely on transit as many routes lack weekday evening or any weekend service.

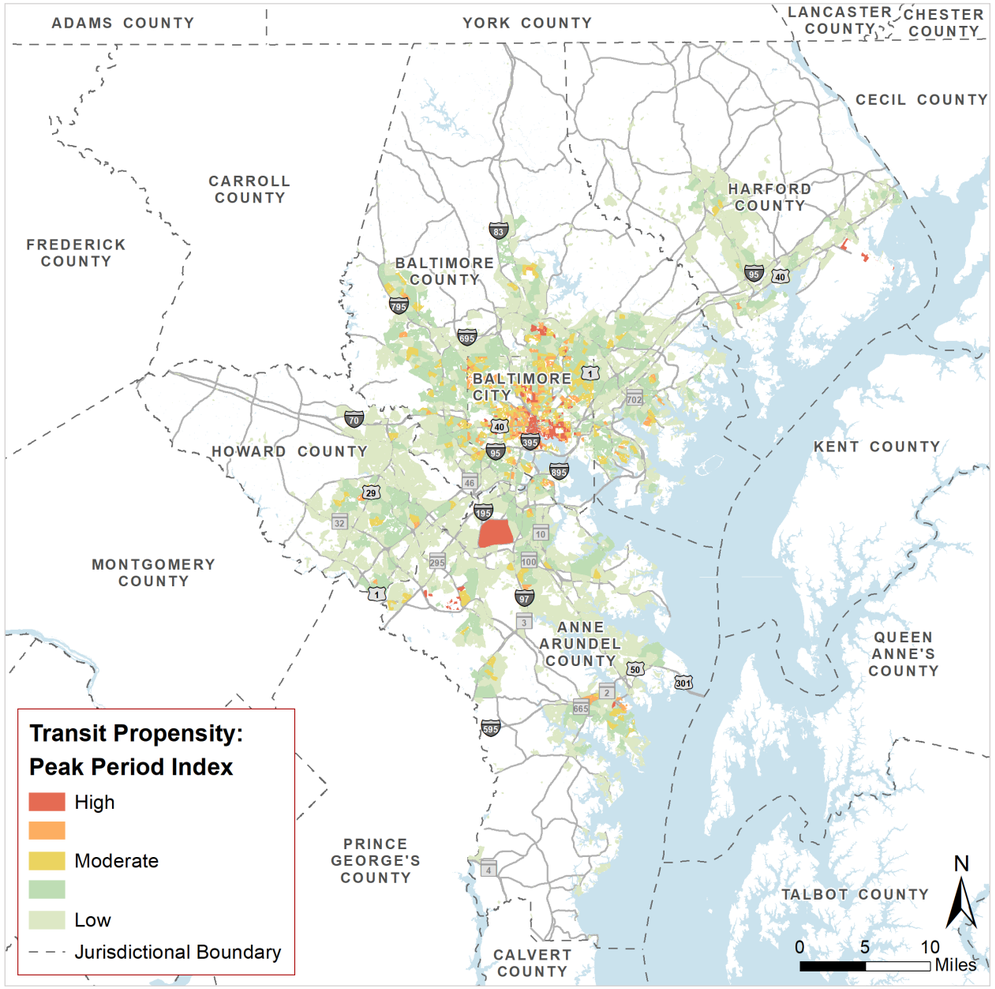
Figure 4-10

Activity Destination Index



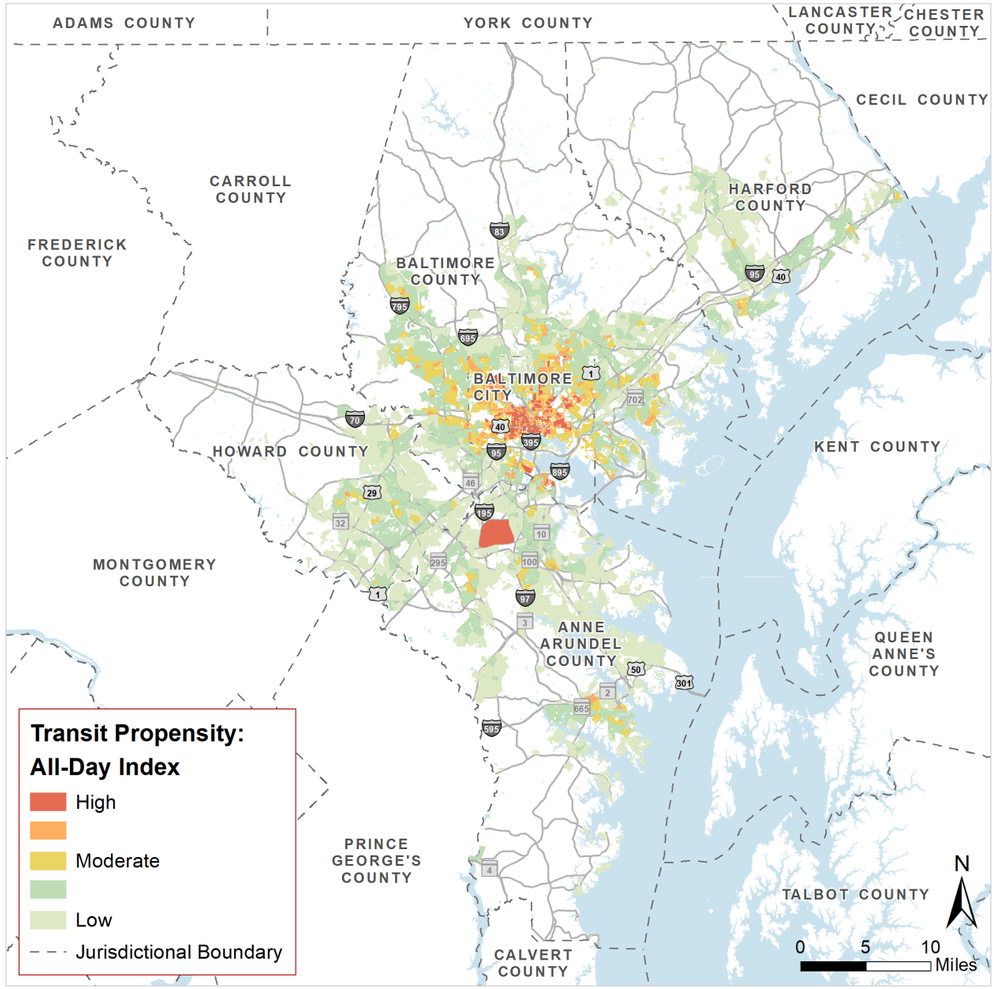
The areas with high propensity scores include major shopping centers, healthcare centers, higher education institutions, and regional county seats.

Figure 4-11
Peak Period Index



Densely populated urban areas have the highest peak period propensity. Areas with all-day activity centers, such as hospitals and shopping centers, have lower scores on this index than on other indices since this index emphasizes commuters with jobs that are likely to adhere to a typica 9-to-5 schedule on weekdays. Therefore, these areas most often have transit access at peak periods.

Figure 4-12
All-Day Index



The areas with the highest all-day propensity are broadly distributed across Baltimore City, while many suburbs of Baltimore County have moderate levels of all-day propensity. Nearly all of these areas are served by transit for over 20 hours a day seven days a week, with service provided every 15 minutes or better on weekdays on many routes. However, many of the areas with moderate propensity or low propensity only have weekday service or infrequent service that operates only once or twice an hour and can hinder transfers.

5 Travel Flow Analysis

Transit providers offer service to meet the needs of many types of passengers. For those who use transit to commute, direct and often long-distance connections are the most important aspects of a service. For those who rely on transit for all transportation, it is critical that transit can get them from home to their places of work, school, shopping, recreation, healthcare, or other services.

In order to create a plan for transit that connects all passengers with their destinations, MDOT MTA and the transit agencies of Central Maryland must understand where people go. Travel flow analysis reveals the most common origins and destinations for travel in the region and, when combined with transit market analysis, helps to evaluate how transit services can best meet demand today and into the future.

Central Maryland's metropolitan planning organization, the Baltimore Regional Transportation Board (BRTB), maintains a regional travel demand model that represents all trips starting and ending within the region or in nearby areas, including Carroll County and parts of the greater Washington, D.C. metropolitan area. The trip tables in this model use existing travel, population, and land use data to predict travel behavior and estimate the number of trips between traffic analysis zones by purpose, mode, and time period.

The RTP evaluates travel patterns at the regional and jurisdictional level, for both today and the plan horizon in 2045. The focus for transit will be on key trip generators throughout the region, which attract and produce large volumes of trips to and from a single area. These generators are found in each jurisdiction, as shown in Table 5-1.

Table 5-1

Largest Key Trip Generators in Each RTP Jurisdiction

Anne Arundel County	Baltimore City	Baltimore County	Harford County	Howard County
Annapolis	Bayview	Owings Mills/ Reisterstown	Aberdeen	Columbia
Fort Meade	Downtown	Towson	Bel Air	Ellicott City
Glen Burnie/ Pasadena	Port Covington	Sparrows Point	Edgewood	

Overview of Regional Travel Patterns

Every day, millions of trips are made throughout Central Maryland and the surrounding areas. Commute trips make up a significant portion of daily trips and are a key market for transit. Work is a primary need for many passengers and an economic priority for the region, jobs are often found in concentrated areas (increasing transit productivity), and commute trips are the same every day (ensuring consistent ridership on commute-oriented services).

Overall, 55 percent of Central Maryland commuters work in the jurisdiction they live in. Table 5-2 shows how many existing commuter trips from each jurisdiction end in other jurisdictions. In all jurisdictions except Howard County, a majority of commutes begin and end in that same jurisdiction.

Table 5-2

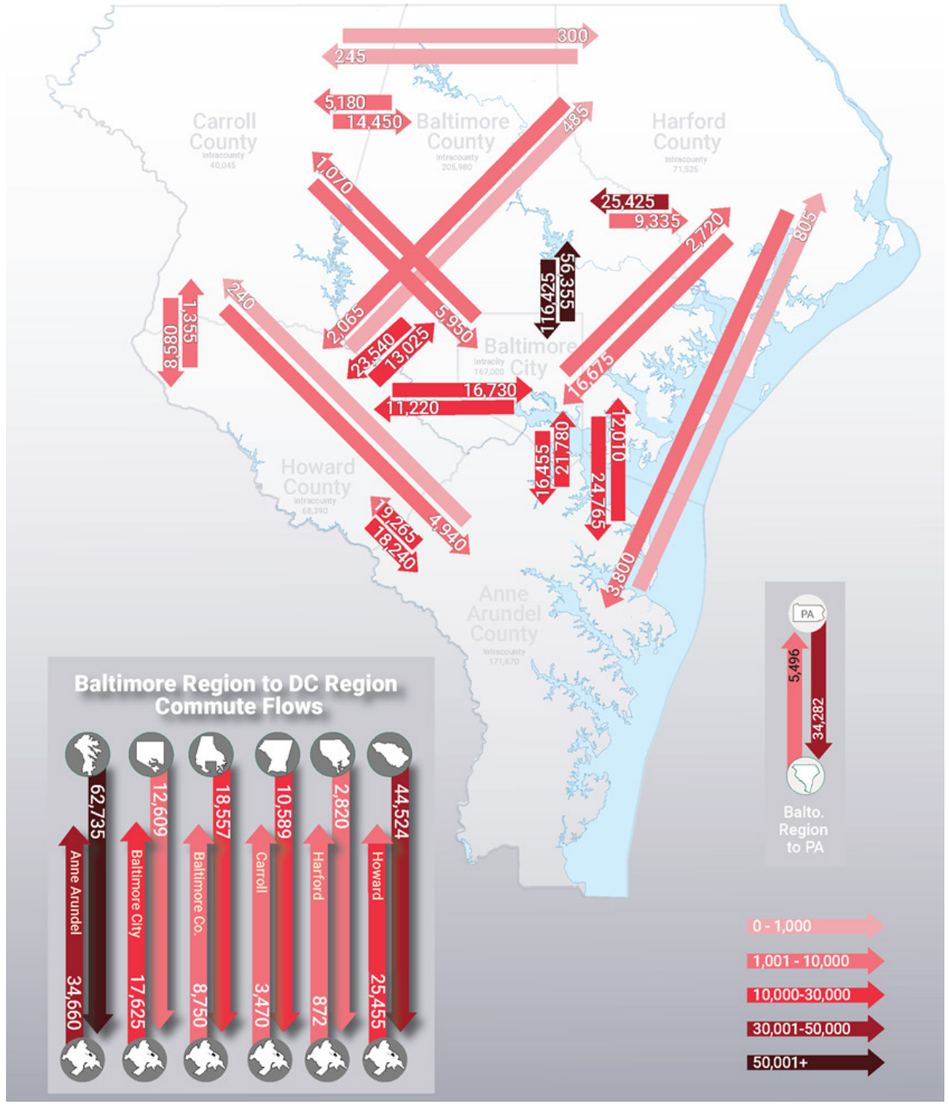
Proportion of Existing Commute Trips between Jurisdictions

		From				
		Anne Arundel	Baltimore City	Baltimore County	Harford	Howard
To	Anne Arundel	60%	6%	6%	3%	11%
	Baltimore City	8%	62%	29%	14%	10%
	Baltimore County	4%	21%	51%	21%	8%
	Harford	<1%	1%	2%	58%	<1%
	Howard	7%	4%	6%	2%	42%
	D.C. Region	22%	5%	5%	2%	27%

Note: Percentages represent the proportion of trips from the "From" jurisdiction. Darker figures represent higher percentages. Due to rounding, not all columns add to 100 percent.

Figure 5-1

Central Maryland Existing Commuting Travel Flows



Graphic by Baltimore Metropolitan Council. Data source: U.S. Census Bureau, American Community Survey 5-Year Estimates, 2012-2016: County-to-County Commuting Flows.

Figure 5-1 shows the volume of commute trips that cross jurisdictional borders in Central Maryland. The greatest commute flow that crosses a border occurs from Baltimore County into Baltimore City. Many commutes also cross into or out of the Central Maryland to the D.C. region and Pennsylvania.

Trip Purpose

Since most trips do not cross jurisdictional lines, more detail is required to understand travel patterns for shorter distances. Analysis of flows between regional planning districts, which are areas of comparable size, allows for the necessary level of detail. Within these districts, flows are separated into two purpose-related categories: home-based work trips (HBW), which are typical work commutes, and non-home-based work trips (non-HBW), which cover any other trip purposes. The following patterns emerged for the two categories of trips:

Home-based work trips:

- Within each county, high volumes of commuters travel to that county's employment centers
- Residents from all over the region commute into Downtown Baltimore
- Most residents live within proximity of their workplaces
- Commute volumes are the greatest in areas with high population and job density

Non-home-based work trips:

- Trips are more evenly distributed throughout the region
- Most significant travel flows occur in the densest areas (Columbia, Towson, Annapolis)
- There is also a high volume of travel connecting northern Anne Arundel County, eastern Howard County, and southern Baltimore County
- It is harder to discern strong trends or patterns for travel in Baltimore City, likely because the city's high density means there is a much higher volume of trips

HBW trips are visualized in Figure 5-2 and non-HBW trips are visualized in Figure 5-3.

Figure 5-2

Region: Home-Based Work Trips

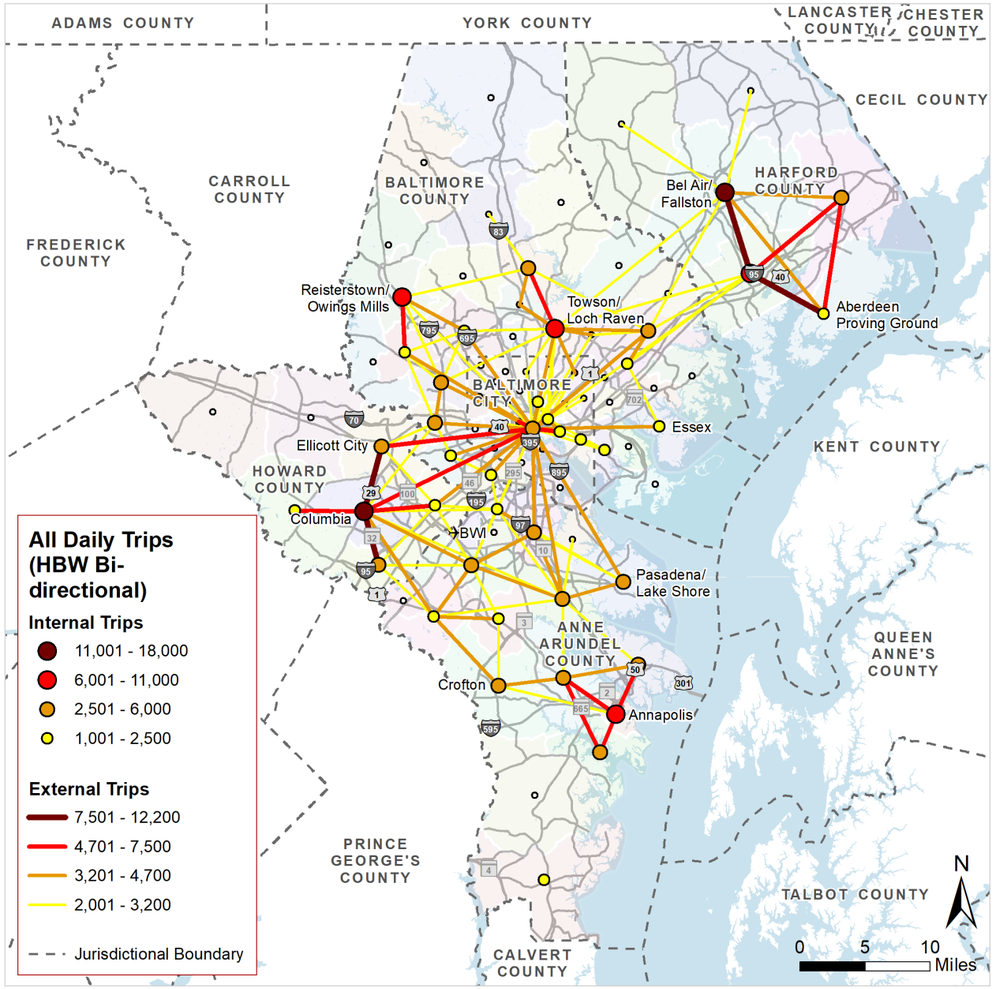


Figure 5-3

Region: All Trips Other Than Home-Based Work Trips

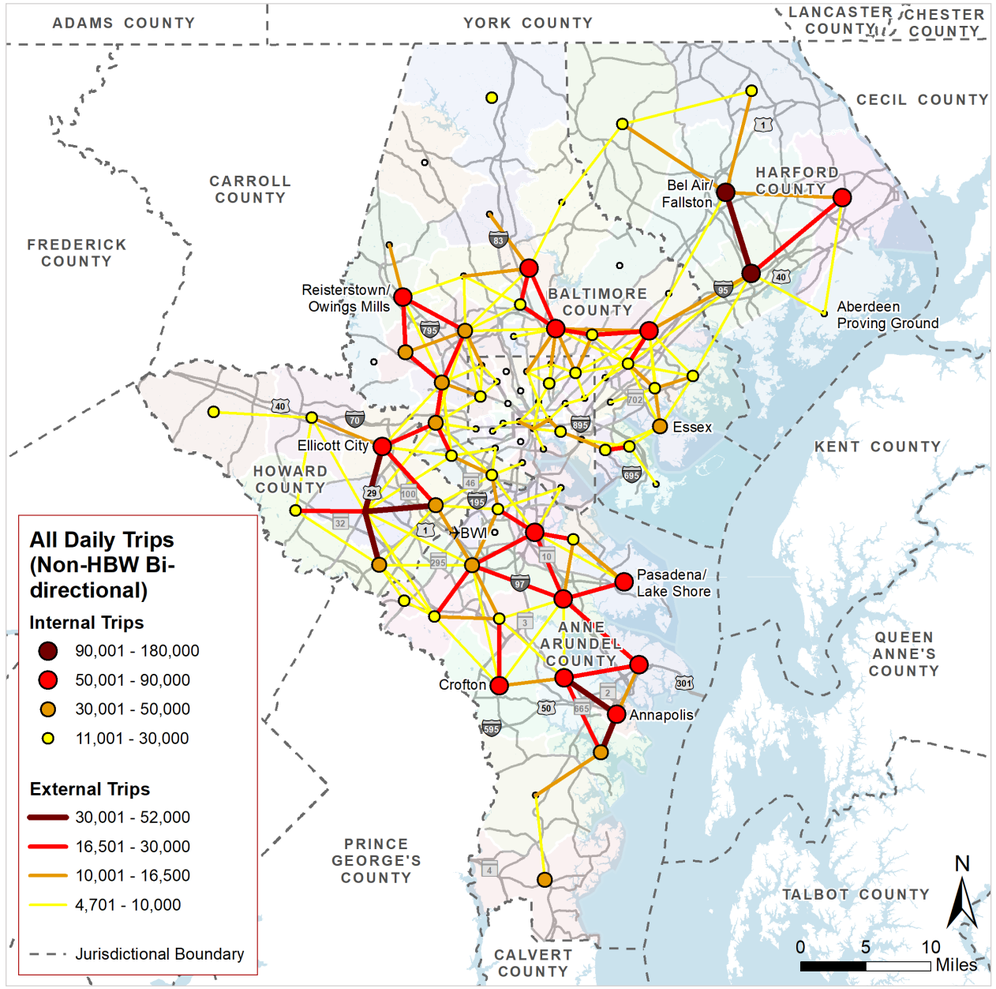
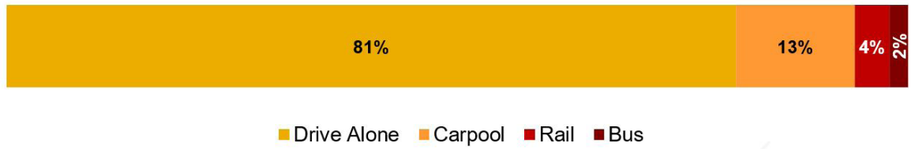


Figure 5-4
Regional Mode Split (Home-Based Work Trips)



Source: BRTB Travel Demand Model, 2012

Mode Split

The major travel patterns for the different modes of motorized transportation are varied according to the available modal infrastructure and the transportation needs of the typical users of each mode. Personal vehicles dominate as the mode of choice for most trips in Central Maryland (Figure 5-4). Transit trips, which include local bus, commuter bus, and rail modes, form a smaller part of the region's travel patterns and exhibit transit-specific characteristics. These existing transit use patterns inform planning decisions on where to provide transit in the future.

Figure 5-5 shows the most significant transit flows within the region for home-based work transit trips and Figure 5-6 shows non-home-based work transit trips. The following patterns emerged for the two categories of trips:

Home-based work transit trips:

- While overall work trips, across all modes, focus on the many employment centers, the transit work trips are more concentrated to and from central Baltimore

Non-home-based-work transit trips:

- Overall, the patterns and distribution of non-work transit trips are similar to non-work trips on other modes
- Flows are distributed across Anne Arundel, Howard, and Baltimore Counties, with the strongest volumes occurring in Ellicott City and Columbia
- Harford County also experiences high volumes of non-commute transit trips in Bel Air and Edgewood
- The most transit trips in Baltimore occur within the central part of the city, while volumes throughout the rest of the city are spread across many origins and destinations

Figure 5-5
Region: Home-Based Work Transit Trips

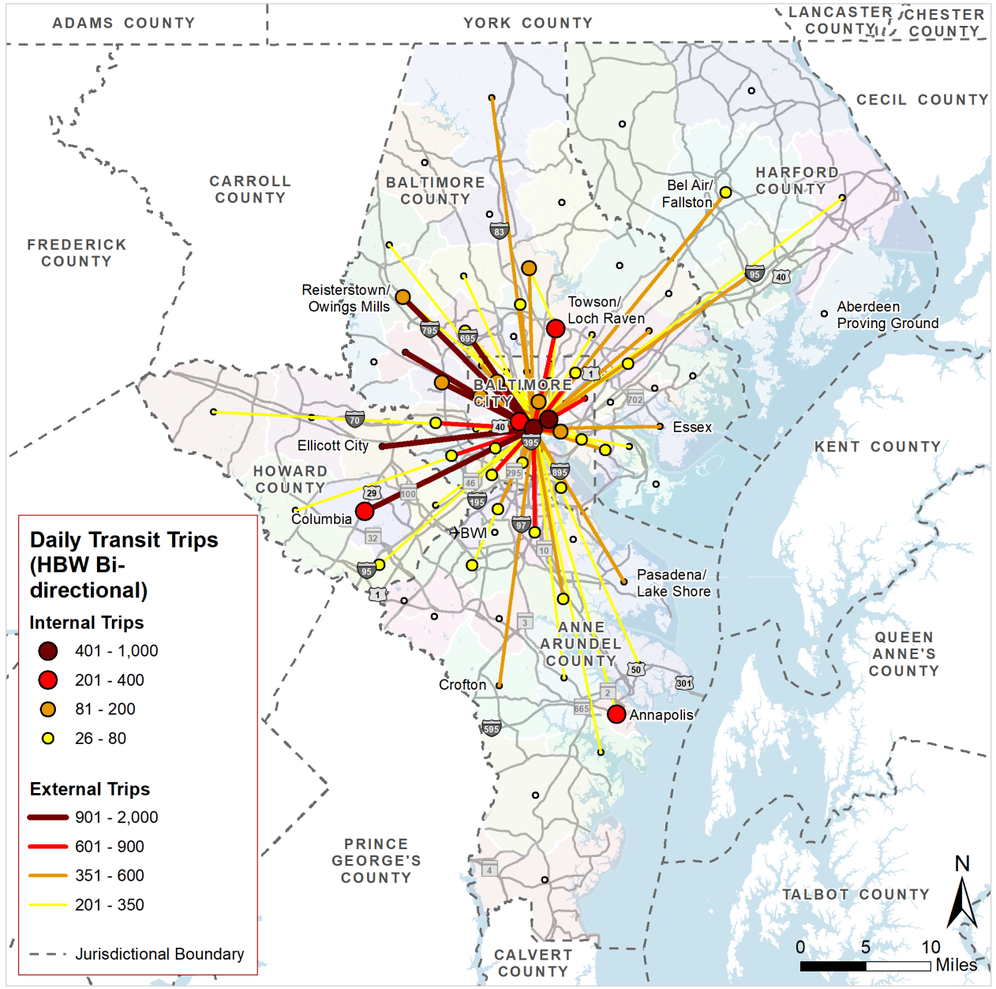
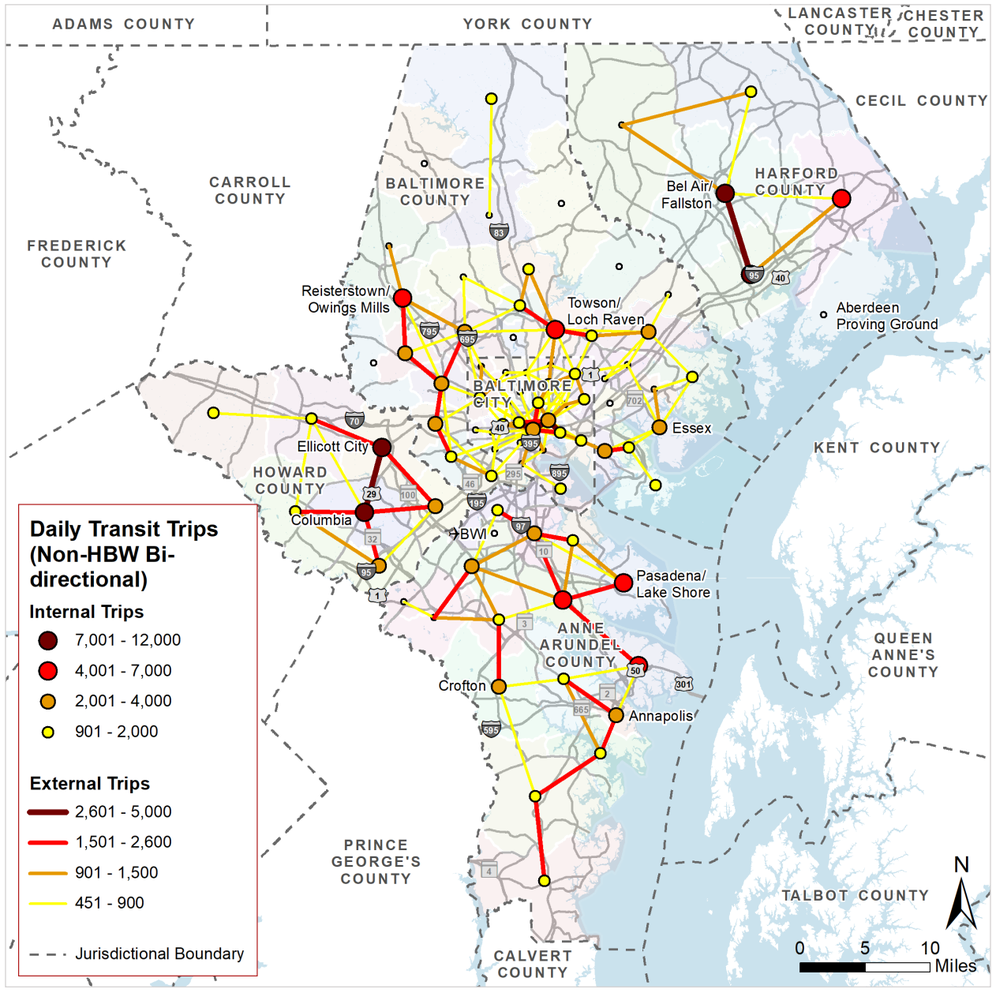


Figure 5-6

Region: All Transit Trips Other Than Home-Based Work Trips



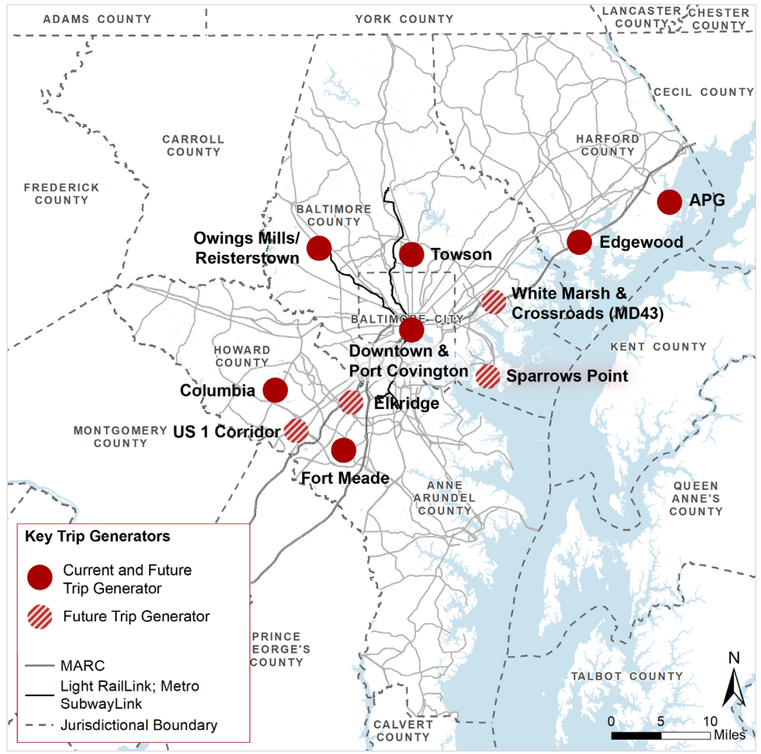
Key Trip Generators

The regional travel flow analysis reveals several key trip generators in each of the five Central Maryland jurisdictions (Figure 5-7). These areas are most often characterized by high density of either population, jobs, or both. They may also draw people to other places such as school, recreation activities, or public services.

Based on BRTB-CFC's forecasts, there will be new generators of trips that influence travel patterns across the entire region in 2045. Figure 5-7 also shows the expected future trip generators with the greatest increase in trip volumes from today. While travel demand will increase in most parts of the region, greater demand increases in these areas reflect significant population growth or plans for large developments that will create new housing and jobs and thus require new transit. These new key trip generators include Port Covington, the US 1 corridor near Laurel and Savage, Elkridge, Sparrows Point (Tradepoint Atlantic), and White Marsh and Crossroads development on MD-43.

Figure 5-7

Key Current and Future Trip Generators



6 Existing Plans and Land Use

Regional Planning

Coordinating transit planning efforts at the regional level with local land use plans ensures that regional investments and interventions are working in harmony with local growth goals. Though existing transit services are a major driver of growth in the region, areas of proposed major growth do not always align with existing transit networks. State incentive programs to attract development in targeted areas may also not correspond to existing transit service. The Plan reviewed and evaluated major planning documents affecting the Central Maryland region to identify areas of planned growth that may require additional investment in transit services.

Maximize2045

BRTB Maximize2045: A Performance-Based Transportation Plan lists major medium- and long-term capital transportation projects for the Baltimore region through 2045. Maximize2045 also allocates funds for operations and preservation of transportation systems in the region, and establishes the region's broad transportation goals and performance measures. Maximize2045 is a fiscally constrained plan, with funding allocated into the following categories:

- Roadway System Operations
- Roadway System Preservation
- Transit System Operations
- Transit System Preservation
- Major Capital Projects

The Maximize2045 plan proposes 74 major roadway and transit capital projects with an estimated cost of $12.162 billion. Major transit capital projects for the region include:

- **Anne Arundel County**: bus rapid transit from New Carrollton to Parole
- **Baltimore City**: MARC train storage and maintenance facility, Penn-Camden Connector, West Baltimore MARC station relocation
- **Howard County**: bus rapid transit to BWI Airport, bus rapid transit on US 1 Corridor, bus rapid transit on US 29 Corridor
- **Harford County**: MDOT MTA commuter bus service to downtown Baltimore, Transit Signal Priority on MD 22 and MD 924, Transit Oriented Development at the Aberdeen MARC Station

State Incentive Programs

The Central Maryland region has several active state-designated incentive zones. Many of these incentives are directly associated with transit or provide increased eligibility for projects related to transit. A summary of the programs is provided in Table 6-1:

Table 6-1 | *Maryland Transit-Related Incentive Programs*

Opportunity Zones	The Opportunity Zone program is a nationwide initiative administered by the U.S. Treasury created under the 2017 Tax Cuts and Jobs Act to provide federal tax incentives for capital investment in distressed communities over the next 10 years. The state was entitled to nominate 149 low-income census tracts to be Opportunity Zones. The Maryland Department of Housing and Community Development will administer the program with support from the Maryland Department of Commerce.
Designated Transit-Oriented Development Areas (TOD Areas)	In 2008 the Maryland legislature adopted a formal definition for TOD as "a dense, mixed-use, deliberately planned development within a half-mile of transit stations that is designed to increase transit ridership." Transit-oriented developments promote the efficient use of land and transportation infrastructure with higher density and comprising a mix of residential, office, commercial, and civic uses in a pedestrian friendly environment within walking distance of a transit station.
Sustainable Communities	The State's Sustainable Community program is a geographic designation to more efficiently allocate and concentrate resources to support coordinated revitalization efforts. Jurisdictions submit a plan that consists of a specific geography and a broad set of revitalization goals that support housing, transportation, economic development and neighborhood revitalization and strategies to achieve these goals. Sustainable Communities should be within or near a town center or transportation center. Designation as a Sustainable Community is required to be eligible for related grant programs.
Priority Funding Areas	Priority Funding Areas are existing communities and places where local governments want State investment to support future growth. The 1997 Priority Funding Areas Act capitalizes on the influence of State expenditures on economic growth and development. Funding for projects in municipalities, other existing communities, industrial areas, and planned growth areas designated by counties receive priority State funding over other projects.

Planned Growth

Each of the five jurisdictions in the Central Maryland region have a comprehensive plan to guide long-term growth. These comprehensive plans identify growth areas for each jurisdiction. MDOT MTA also met with stakeholders from each jurisdiction to identify and confirm planned local growth areas as part of the RTP planning process. The next section describes planned growth areas by jurisdiction in more detail.

Anne Arundel County Land Use and Growth Areas

Growth Areas

Anne Arundel County adopted the General Development Plan in 2009, and an update is underway.

Anne Arundel County is organized into Small Planning Areas, with plans for each area tailored to address the specific needs of the area. Plans for Brooklyn Park and Glen Burnie focus on attracting investment to revitalize older commercial corridors and provide needed community facilities and infrastructure. South County and Crownsville small area plans focus on retaining the rural character of the areas and preserving sensitive natural environments. Providing adequate public services and multimodal transportation connectivity are high priorities in Jessup and Odenton, which have experienced recent growth.

The BRTB-CFC projects 81 percent of population growth in Anne Arundel County to take place outside of areas served by existing transit. Roughly 17 percent of population and households in the county are projected to be within walking distance of existing transit in 2045, about the same proportion as is currently served by existing transit. (Walking distance is considered to be a quarter-mile for bus stops and a half-mile for rail stops.)

The BRTB-CFC projects 78 percent of job growth in Anne Arundel Country to occur outside of areas served by existing transit. Though job growth in northern Anne Arundel County is focused in areas served by MARC and Light Rail, the county's only frequent transit services, only 25 percent of jobs in the county would be served by existing transit by 2045.

Anne Arundel County planning officials identified the following growth/focus areas and priority transit needs at a July 2019 meeting:

Growth/Focus Areas
- Odenton Town Center/MARC station area
- NSA/Fort Meade
- Annapolis/Parole Town Center
- Glen Burnie Town Center
- Light Rail Stations, Cromwell
- Marley Neck
- Laurel Race Track MARC area

Transit Needs
- Three major corridors, Routes 2, 3, and 50, need high-quality transit options
- Funding for pedestrian improvements
- Transit to connect travel demand to areas outside the region, particularly to DC and Northern Virginia
- Park and Rides to facilitate suburban residents' access to transit
- Envisioned transit center in Parole
- Reduced auto use to Fort Meade/ NSA
- More transit is needed to attract amenities from developers

Land Use

The county's 16 Small Area Plans provide the most information about county land use plans. Most of these plans, however, are outdated and may not reflect current priorities to focus growth along older corridors, where small parcel sizes and numerous property owners create redevelopment challenges.

Move Anne Arundel!, the county's draft Transportation Master Plan, prioritizes investment in "mature areas" through improvements to major state-owned roadways, increased transit service, and retrofits to roads to create shared-use paths and protected bicycle lanes.

A customer loads a bike onto the front of an MDOT MTA bus.

Land use plans for Odenton Town Center, Parole Town Center, and Arundel Preserve Town Center encourage the creation of jobs and mixed-use development in areas walkable to transit.

Plans for BWI/Linthicum encourage revitalization of existing commercial districts, preservation of forested area adjacent to residential uses, and buffers between off-site airport uses and existing communities.

The Odenton Town Center Master Plan concentrates development and zoning regulations and guidelines to promote a pedestrian-friendly transit-oriented development center near the Odenton MARC rail station.

Baltimore City Land Use and Growth Areas

Growth Areas

Most areas of Baltimore City already have transit-supportive levels of density. Many of the region's highest-demand destinations are located within the city. *LIVE, EARN, PLAY, LEARN: A Business Plan for a World-Class City*, the city's most recent comprehensive master plan, defines achievable goals for each of the plan's subject areas. These goals include:

- Adapt Baltimore's housing stock to changing residential demands
- Meet the employment needs of Baltimore's resident and grow key employment sectors
- Enhance cultural and entertainment amenities
- Improve schools and libraries

Baltimore City also relies on a number of plans prepared by other city agencies and institutions. The Department of Housing and Community Development's Framework for Community Development recommends major public investments in transit centers and neighborhoods that "offer near-term opportunities to achieve inclusive, economically sustainable growth."

The BRTB-CFC projects most growth in Baltimore City by 2045 to occur within areas already served by transit. By 2045, 86 percent of the city's population and 85 percent of its jobs are projected to be within existing transit service areas.

Land Use

Baltimore City's land use patterns vary based on the prevailing transportation modes of the time in which an area was built. The city's intricate networks of connected streets in pre-industrial neighborhoods around Inner Harbor were built when walking was the predominant form of transportation. Electric streetcars, introduced to the city in 1885, allowed the city to extend radial arterials and create suburban neighborhoods west and north of job centers around the harbor and downtown. Most of the city is built and organized at transit-compatible scales, with densities above 15 residents or jobs per acre, connected blocks, sidewalks, and neighborhood commercial centers.

TransformBaltimore, adopted in 2017, is the city's first comprehensive rezoning plan since 1971. The plan's stated goal is to "foster growth and development while maintaining neighborhood character." The plan established four new TOD zoning categories:

- TOD-1: Restrictive height limits and a limited retail use mix
- TOD-2: Restrictive height limit but a full mix of uses
- TOD-3: Significant height with a limited retail use mix
- TOD-4: Significant height and a full mix of uses

TOD-4 areas are concentrated around the West Baltimore MARC, the Cultural Center, Westport and Cherry Hill Light Rail Stations, Penn Station, and north of Johns Hopkins Bayview. A recent zoning code update introduced the possibility of TOD-3 upzoning in Upton and Penn-North Station areas. Other Light Rail and Metro Subway stations are surrounded by more restrictive TOD designations.

The Southeast Strategic Transportation Vision plan recommends that Transportation Management Associations (TMAs) manage transportation demand in Harbor East, Canton, and beyond. The plan mentions the "A Smarter Way to Get There" program organized by the Waterfront Partnership as a model for TMAs in the city.

Baltimore County Land Use and Growth Areas

Growth Areas

Baltimore County's comprehensive plan, Master Plan 2020, identifies growth areas in Owings Mills, Middle River, and Towson. The plan identifies employment centers along the Light Rail/York Road corridor, and in Dundalk, Rosedale, and Woodlawn. These areas are mostly served by frequent bus, with a sub-area of Owings Mills and the York Road corridor also served by rail transit. The Middle River Redevelopment Area and most of the Owings Mills growth area, however, are not served by frequent transit.

Population growth projections from the BRTB-CFC show proportionally large increases outside of the plan's designated growth areas in the north, east, and southwest corners of Baltimore County. Many of these areas are not served by existing transit. Job projections more closely align with the growth and employment designated areas with significant increases along the York Road corridor, downtown Owings Mills, Middle River, and Dundalk; job growth is also projected for Woodward. Some job growth areas, such as the area northeast of Middle River, the north end of the York Road corridor, and most of Woodward, are outside of existing transit. Only 38 percent of jobs in Baltimore County will be served by existing transit networks, down from 40 percent.

Baltimore County planning and economic development officials identified the following additional growth/focus areas and priority transit needs at a July 2019 meeting.

Growth/Focus Areas
- TOD around the former General Services Administration Depot near Martin State Airport
- US 1 Guinness
- UMBC Research Park
- Sparrows Point
- Trade Point Atlantic
- LaFarge site near Middle River

Transit Needs
- More direct transit connections within the county
- Pedestrian and complete streets improvements
- Moving from free parking to priced parking in strategic locations
- Solution for Halethorpe MARC parking shortage
- CountyRide expansion to fixed route service

Land Use

Baltimore County's Master Plan 2020 organizes future land use according to a rural-to-urban transect with six zones. Natural and rural zones on the transect are located outside the Urban-Rural Demarcation Line (URDL), while suburban and urban zones are located inside the URDL. County policy focuses redevelopment inside the URDL to allow greater density, reduce vehicle miles traveled (VMT) and greenhouse gas emissions, and accommodate population and employment growth.

Proposed future transit-supportive land uses mostly align with proposed growth areas in Baltimore County. T5 Urban Center density (as defined in the transect diagram in Figure 4-5) is mostly located along corridors, including York Road, Route 1, Route 40, and Route 26. Outside corridors, T5 is also located at Middle River, Oakleigh, Woodlawn, Catonsville, Lansdowne/ Halethorpe, and White Marsh. The only T6 Urban Core designation in Baltimore County is in Towson. Most of these areas are also served by frequent transit; however, the T6 designation in Towson has only frequent bus transit, not rail.

Harford County Land Use and Growth Areas

Growth Areas

Harford County adopted Harford Next in 2016. The plan proposed a modest 0.36 percent increase to the county's Development Envelope, reinforcing the county's policy to focus growth and protect natural and rural places, established in 1977. The county's preservation effort has largely been successful, as 91 percent of residential development since 2013 has occurred within the Development Envelope.

The BRTB-CFC projects 94 percent of the county's population growth by 2045 to occur outside of areas currently served by transit. The CFC also expects 20 percent of new jobs in the county to be within areas served by existing transit, slightly increasing the share of jobs in the county served by transit to 19 percent.

Planning and economic development officials from Harford County, the Town of Bel Air, the City of Havre de Grace, and the City of Aberdeen identified the following additional growth/focus areas and priority transit needs at a July 2019 meeting.

Growth/Focus Areas
- In-migration from more rural parts of the county
- Bel Air MD 24 corridor
- Harford Community College
- Aberdeen/Aberdeen Proving Ground (APG)
- US 40 (Employment)/Perryman

Transit Needs
- Route 22 between Bel Air and Harford Community College, Aberdeen
- Transit priority and crossing safety treatments on MD 924 near Harford Mall
- Connecting Harford Transit's service to MTA near the US 40 corridor
- Crossing the commuter rail gap between MARC in Perryville and SEPTA in Newark

Land Use

Harford County defines land use categories for Agricultural, State and County Parks, Low, Medium, and High Intensity Residential, Industrial/ Employment, Mixed Office, Rural Villages, and Aberdeen Proving Ground, which is not subject to local land use rules.

Areas designated for High Intensity Residential use (above seven units per acre) are concentrated at the edge of the town of Bel Air, in and around the unincorporated community of Emmorton, around the intersection of MD 924 and Abingdon Road, and around the intersection of Philadelphia Road and Riverside Parkway (which is also situated between Mixed Office and Industrial/ Employment concentrations). Low and Medium Intensity Residential zoning is spread across the Development Envelope. The Town of Bel Air, the City of Havre de Grace and the City of Aberdeen each designate their own zoning categories.

Harford County Planning / Economic Development officials, including representatives from the City of Aberdeen and the Town of Bel Air, indicated interest in responding proactively to ongoing growth near Harford County Community College, and along US 40, particularly near Perryman. Additionally, the City of Aberdeen is planning for transit-oriented development near its Amtrak/MARC Station area to promote growth and investment through regulation, and incentives, such as waiving minimum parking requirements, adopting form-based code, and giving parking credits to developers who implement transportation demand management measures.

Officials indicated that several key locations are difficult to serve efficiently with transit due to site design, such as Harford Mall and the strip commercial corridors on US 40 and MD 22.

RTA buses serve Howard, Anne Arundel, and northern Prince George's counties.

Howard County Land Use and Growth Areas

Growth Areas

Howard County adopted its general plan, PlanHoward 2030, in 2012 and amended it in 2018. According to the plan, most growth within the county has occurred within the county's Priority Funding Area (PFA) and is consistent with the 2012 Sustainable Growth and Agricultural Preservation Act requiring land to be classified according to established Growth Tiers.

The county is currently working on another plan update to address concerns about the quality and character of development, neighborhood infill, adequacy of public infrastructure, and environmental protection. The county is still developing initial plan concepts, presenting an excellent opportunity to ensure alignment of the county's transportation goals with the goals of this plan.

PlanHoward 2030 designates areas for Growth and Revitalization to focus on stimulating economic activity in existing commercial areas and older communities. These areas include Columbia's Downtown (including the Mall and Symphony Woods), older Village Centers, the Route 1 corridor east of I-95, the Route 40 corridor, and older industrial areas such as the Snowden River Parkway area south of MD 175.

The BRTB-CFC projects that most new growth in Howard County will occur outside of areas currently served by transit. The percentage of population and jobs served by the existing transit network by 2045 is also projected to hold steady at current levels of 25 percent and 38 percent, respectively. The only areas in Howard County served by high-capacity transit are the areas surrounding the county's four MARC stations.

Howard County and Columbia Association planning, public works, transportation, and economic development officials identified the following additional growth/focus areas and priority transit needs at a July 2019 meeting:

Growth/Focus Areas

- Downtown Columbia
- Route 1 Corridor
- Snowden River Parkway
- Maple Lawn
- Emerson (North Laurel)
- Turf Valley
- Route 40 Corridor
- Columbia Village Centers

Transit Needs

- US 29 Corridor connection to Silver Spring with connections to Downtown Columbia, Fulton, and Maple Lawn
- Transportation demand management at the neighboring University of Maryland, Baltimore County
- US 1 Corridor, with six nodes or opportunity areas for redevelopment focus and possible increases in jobs/residents
- North Laurel/Laurel Park Racetrack area
- Models to enhance development review to increase transit compatible amenities from new investment

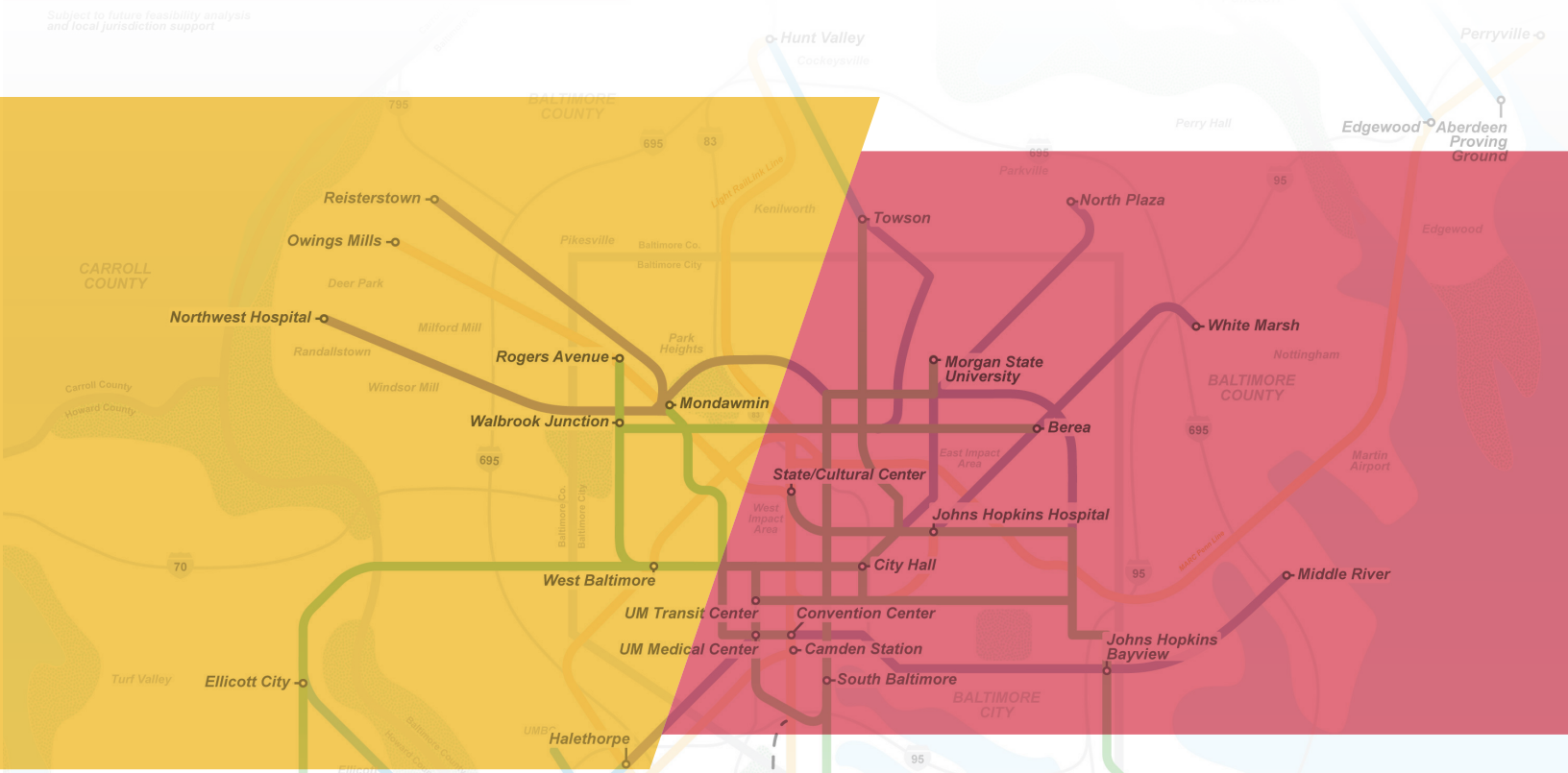
Land Use

PlanHoward 2030 categorizes county land by Growth Tiers identified in Maryland's 2012 Sustainable Growth and Agricultural Preservation Act. Areas west of the PFA have Low Density and Rural Resource land use designations, except for an area planned for water service extension just west of the county's PFA. Areas east of the PFA are organized in Established Community and Growth and Revitalization designations, with the latter expected to focus especially on jobs, housing and mixed-use redevelopment. Most of the land designated as Growth and Revitalization is currently single-use and relatively low-density.

Many areas along the county's major highways and arterials are developed as business parks and employment districts or strip commercial areas. Downtown Columbia and the Route 1 corridor, where development has been particularly active, has been the focus of many recent planning efforts. Design guidelines have been established for the Route 40 Corridor, and a major redevelopment of the Laurel Racetrack area introduces a dense mixed-use plan in the vicinity of the MARC station. Many new developments in the county include higher density uses, transforming single-use districts into more mixed-use environments, and improve conditions for travel via foot, bicycle, and transit.

Connecting Our Future

A Regional Transit Plan for Central Maryland



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MARYLAND TRANSIT ADMINISTRATION