UMD PLCY400 Capstone Project
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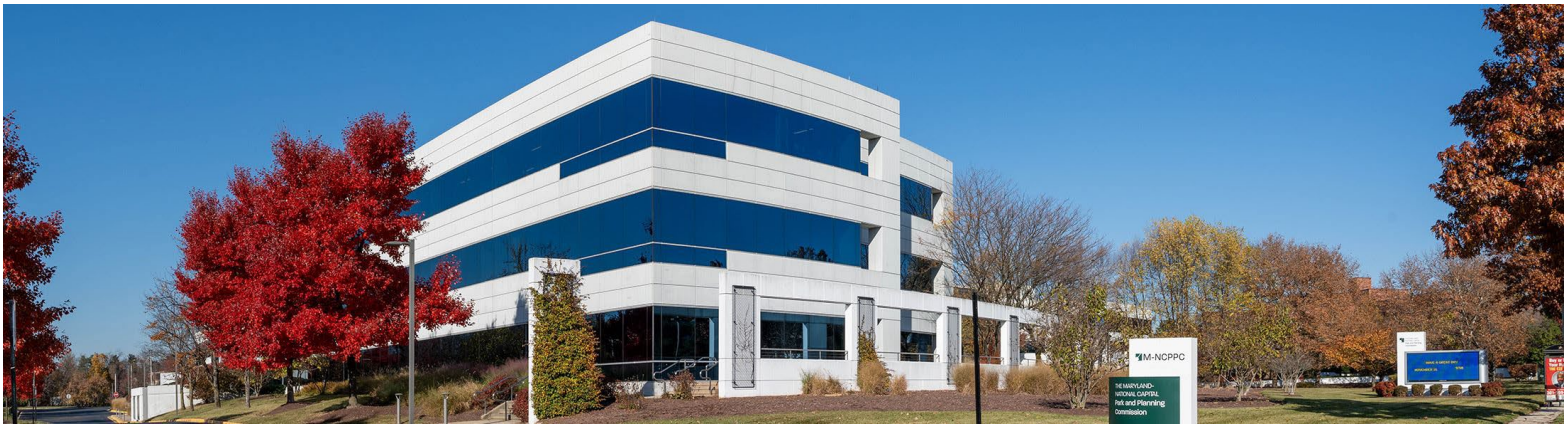
Prince George's County Planning Department Commute Mode Interventions



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Jonah Albert
Liora Petter-Lipstein
Alex Kaplan

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Abstract

Most of the Prince George's County Planning Department (PGCPD)'s employees drive to work in single-occupancy vehicles (SOVs). The department recently moved closer to the Downtown Largo Metro station and the surrounding transit network, with the intent of encouraging employees to use alternate commute modes. One of the intended goals of the move was to reduce the number of employees commuting by SOV. Unfortunately, the Metrorail station is 1.4 miles from the headquarters, making it a lengthy and difficult walk, and the surrounding transit network remains inconvenient for commuters. Further, there is a lack of multimodal transportation options in the area to bridge this gap, a common issue with public transportation often known as the first and last mile problem. Moreover, employees are commuting from throughout the Washington, D.C.-Maryland-Virginia (DMV) area, meaning a single unified solution is unlikely to create a meaningful impact on commute mode choices. There are many different possible policy interventions and alternatives, all of which vary in complexity, cost, and impact. Some of the interventions considered include carpool matching and incentive programs, increased micromobility networks, building bike infrastructure, providing transit subsidies, increasing the frequency of bus routes, and an awareness campaign highlighting the various benefits and drawbacks of different commute modes. A combination of these interventions will encourage employees to change their commute habits and reduce the number of SOV commutes.

Introduction

In today's world, commuting to work is an oft overlooked part of nearly everyone's day. Millions of Americans drive to work in single-occupancy vehicles (SOVs). Unfortunately, public transit is often not a robust enough travel alternative. Such is the case for many of Prince George's County Planning Department's (PGCPD's) 200 employees, who commute to work in-person at the department's headquarters in Largo, Maryland. The department is focused on Transit Oriented Development, which is prevalent in the modern-day push to improve public transit and limit reliance on cars.

Changes can and should be made to address the prevalence of SOV usage, but the best course of action remains uncertain. Numerous studies have been conducted to try and figure out ways to improve public transit or best practices for revitalization, which has been collated into this report. Moreover, there is a considerable lack of studies pertaining to converting people from using SOVs to other forms of transit. The goal of this report is to successfully explore and explain the best course of action to solve the problem we were presented with, with a particular focus on the Prince George's County Planning Department's needs and characteristics.

Literature Review

Commute Mode Choice

Commute mode choice is the concept about which transportation method (i.e. SOV, mass transit, etc.) a person decided to take work. Their decision is influenced by numerous subconscious factors that affect everyday choice-making. Transit by bus is especially susceptible to influences on decisions, often by three major influences: the quality and availability of information about bus service, the ways that a bus route can impact trip connectivity, and the ease of access and location of bus stops (Roy and Ramakrishnan 1054). Also, improving walkability and safety leading to the bus stop is linked to increased usage (Roy and Ramakrishnan 1069). If someone does not need to rely on the bus, then they will likely drive their own personal vehicle. This is especially true if riding the bus would add time to the journey (Roy and Ramakrishnan 1046). Lastly, programs using real-time data to prescribe arrival times have near universal appeal, even for those who opt out of riding the bus. At its core, commute mode choice usually comes down to choosing the most convenient commuting option.

Convenience is measured by the amount of effort it takes to access the transportation and trip duration. Longer travel times and unreliable bus services decrease the likelihood that someone will commute via bus (Anwar 1417). On the other hand, a direct bus service can have positive effects on usage. Direct bus services, from home to work, similar to a school bus system, increases the likelihood that commuters will ride the bus (Anwar 1417).

Existing Interventions and Pitfalls

Research on interventions aimed at reducing personal reliance on driving to work in SOVs has explored various strategies with varying degrees of success (Whillans et al). These approaches focused on decreasing SOV use and highlighted both the potential and limitation of interventions. Understanding past successes and failures is critical for designing future solutions to encourage employees to consider other commuting options besides SOVs.

One of the most successful interventions is transit subsidies sponsored by employer or local governments, which significantly increases the use of public transportation. In their paper, *The Relationship Between Financial Incentives Provided by Employers and Commuters,* Ghimire et al. found that employer-provided transit subsidies increase the likelihood of commuting by transit, particularly among college-educated individuals (Ghimire et al. 108). Furthermore, they found that when employers disincentivize driving by eliminating parking subsidies they can further shift commute mode choice toward public transit. Similarly, in their paper *Understanding the Effects of Transit Benefits on Employees' Travel Behavior*, Bueno et al. highlighted how transit subsidies such as transit passes, and bike reimbursements play a critical role in encouraging public transportation use. Their research highlights a policy in both New York and New Jersey that requires employers with 20 or more full-time employees to offer commuter benefits, such as employer-sponsored transit passes or pre-tax commuter savings accounts. This policy led to significant increases in transit use, with nearly one in ten workers in New Jersey using public transit—double the national average—demonstrating how financial incentives can influence commuting behavior (Bueno et al. 4). Financial

incentives can be highly effective in areas where public transit infrastructure is already robust, such as New York and New Jersey, but regions like Washington, D.C., may struggle to replicate this success due to infrastructural inadequacies.

Walkability and accessibility to transit are also key factors in promoting public transportation use. Ghimire et al. found public transportation ridership increased when jobs were located within a half mile of transit hubs that were easily traversed via walking, biking, or e-scooters (Ghimire et al. 106). Conversely, according to a report by the Center for Urban Transportation Research at the University of South Florida, carpooling and ride-sharing programs largely underperformed. Nelson et al. in their report *Transit in Washington, DC*, found that ride-sharing programs suffer from low participation rates, with success ranging from just 3% to 16% (236). One major barrier is the difficulty commuters face in finding reliable ride matches for carpooling, which involves coordinating shared routes, aligning schedules, ensuring safety and trustworthiness, and maintaining clear communication. These challenges often cause many to revert back to driving alone. The challenges underscore the importance of ensuring ride-sharing alternatives are convenient and accessible; otherwise, commuters may continue SOV commuting.

Another significant challenge is psychological and cultural resistance to alternative commuting methods. In their report *Using Behaviorally Informed Interventions to Promote Sustainable Transportation,* Whillans et al. highlight the deeply ingrained car culture in the United States, where many commuters are unaware of or indifferent to the hidden costs of driving such as tolls or parking fees. Moreover, public transit is often perceived as

inconvenient or difficult to navigate. The authors suggest that highlighting the cost savings of alternative commute options and making it easier to switch from SOV commuting could help overcome these psychological barriers. However, this approach does not fully consider how psychological hindrances intersect with actual infrastructural limitations, such as the availability of transit options in certain regions.

Our research also examined public transportation infrastructure in the Washington, D.C. Metropolitan Area. We found that despite significant public investment, transit infrastructure improvements have not necessarily resulted in increased efficiency or use. Outside the District of Columbia's city limits public transit, use remains strikingly low, accounting for only 3% of all trips in the region (Nelson et al. 236). This is especially concerning given the Washington Metropolitan Area Transit Authority's (WMATA) high operating expenses, which totaled $4.8 billion in fiscal year (FY) 2024, compared to the $3.4 billion in subsidies it received from federal, state, and local partners for bus and rail services ("FY24 Proposed Budget"). Simply providing transit subsidies to commuters is not enough; transit must also be efficient, accessible, and aligned with user demand to succeed.

First Mile and Last Mile

One of the most common issues with public transportation is the issue of how someone gets from their house to the transit stop and from the transit stop to wherever their destination. Often transit does not provide door-to-door service, resulting in a gap that needs to be bridged. Strong networks will get a user to within a mile of their destination, but then that last mile is not covered by public transportation. Users often end up walking or biking,

but the gap in service is a common deterrent. This paradigm is particularly relevant to the PGCPD as the closest transportation hub (the Downtown Largo Metro Station) is 1.4 miles away, requiring some form of micromobility, such as e-scooters, e-bikes, and e-boards, which have all gained popularity in recent years. One of the most common forms of micromobility are dockless e-bikes and e-scooters like Lime and Veo and docked e-bikes such as Capital Bike Share. Privately-owned micromobility devices are also used for first and last mile connections, and bikes have been a popular micromobility device long before electric versions hit the market. All of these tool's help close the gap between the last stop on the line and a rider's final destination.

A study done by Oeschger found that e-bikes were often used to replace public transit trips rather than connecting them, and overall micromobility has the capacity to both supplement and replace trips depending on the distance, availability, and traffic. For example, in Austin, Texas, e-scooters were found to replace trips made on foot but not other methods of transportation (Oeschger et al. 2). Rather than replacing SOVs, commuters can use e-scooters to bridge the gap to and from a public transit stop. For distances that may be traversed by foot or bike, e-scooters are preferred by people who are younger or more educated; however, walking is still the preferred method for most people (Oeschger et al. 11). Between dockless e-bikes and dockless e-scooters, users are willing to pay more for reduced travel time when using shared e-scooters (Oeschger et al., 3). Overall individuals are most likely to choose a mode of transportation that they are already familiar with due to the confidence and predictability associated with that mode.

Walkability

In the realm of alternate modes of transportation, walking is often ignored due to its lack of speed and convenience. However, nearly everyone walks somewhere every day. Even if a person were to take some other form of transportation, it is likely that they will still have to travel by foot at some point on the way to or from said transportation. Differently abled people are also affected by these periods of space, so many of the improvements aimed at walkability can have positive outcomes for people using mobility aids such as canes, wheelchairs, crutches, and more. Improved walkability must be considered when revitalizing the infrastructure, as well as any other changes to the transit network.

To improve the walkability of an area, there are several factors to be considered. The following play a role in reducing walkability or intent to walk:

- Pathways and sidewalks are in a state of disrepair.
- Uncovered pathways, which leaves pedestrians exposed to the elements (sunlight, rain, strong wind, etc.).
- A lack of pathways that would deliver people to their destinations.
- Safety risks such as criminal activity and dangers from traffic (Cambra).

Jurisdictions across the country have implemented guidelines to improve the walkability of sidewalks and other paths for pedestrians. These reforms attracted more pedestrians. The San Francisco Planning and Urban Research Association (SPUR), the group

tasked with improving the walkability of San Jose, California, laid out seven elements to improve walkability (Messeidy).

Element	Design
Pathways	Should include shops, restaurants, and cafes.
Buildings	Should be located on the outside of the path, such that a road is surrounded on both sides by pathways and those paths have buildings on their non-road sides.
Cities	Should feature neutral space like green spaces, playgrounds, and outdoor markets.
Parking Lots	Should be located behind buildings or underground to avoid cluttering spaces visuals that are unappealing.
Infrastructure	Should scale with population size, so a bigger population would necessitate increased infrastructure (bigger sidewalks, roads, etc.)
Sidewalks	Should be maintained, well lit, and decorated with greenery or surrounding art.
Walkways	Should be free and clear. Bus stops, benches, streetlights, or telephone poles should be near the front edge of the walkway, not on the walking path.

Moreover, a study conducted in Lisbon, Portugal found the following interventions had a considerable positive effect on the walking experience and the incentive to choose walking a commute mode:

- Upgrades and improvements to the quality of concrete, such that it becomes newer and smoother.

- Increases in the interconnectedness of paths, adding more paths, allowing for people to have more options on pathfinding.
- Reductions to the turning radius for cars, forcing them to take slower turns, which reduces car speeds.
- Improvements crosswalks- wider lanes and electronic signaling, which improves the safety of pedestrians (Cambra).

Multimodality

Multimodality is when a commuter uses two or more forms of transportation during a single trip (Liu 2). Transit trips are often multi-modal, with users walking to a bus stop, then transferring from a bus to a rail system, then possibly to a micromobility device such as a dockless e-bike to cover the last mile of a trip. Any transfer between systems creates an opportunity for small issues to arise, whether that be building exhaustion or dealing with the unpredictable traffic. These issues can then accumulate and create a negative perception about transit and discourage commuters from consistently using transit (Meenar 10). One of the more common forms of multimodality are cycle transit users (CTUs), or people who use a combination of biking and public transit to travel.

Krizek and Stonebraker found that improving public transportation's capacity to carry bikes via bike racks and improved storage at points where one would access public transit, such as bike lockers at transit hubs, would be the most cost-effective way to improve the experiences of CTUs (Krizek et al. 166). The features that conjured the most negative

emotions were associated with bicycle facilities on board public transit, bike parking, road conditions such as a lack thereof, and other operational issues (Meenar 10). Knowing what interactions and geographic features incite negative emotions can help urban planners avoid the pitfalls outlined in this paper and remediate existing pain points within the transit network.

Another common form of multimodality is the usage of micromobility devices such as e-scooters and e-bikes. A contemporary study found that 10% of e-scooter trips in Washington DC connect with the Metro (Liu 3). A key component of multimodality and first mile/last mile connectivity is accessibility and comfortability between the point of origin and destination. Micromobility devices may be a crucial tool for commuters to travel the 1.4 miles between the Downtown Largo Metro Station and the PGCPD.

Data Analysis & Findings

Data Provided

With the information provided by the client, we found that the nearest transit hub is the Downtown Largo metro station, which is 1.4 miles away from the PGCPD. The Blue and Silver lines intersect with the Downtown Largo metro station. Two bus routes serve the department– the 21x and the 28. The client also provided information about the most common zip codes of residence for employees. Upper Marlboro, Bowie, Silver Spring, and Hyattsville all have 8-18 employees, and are in vastly different directions from the headquarters. Any singular solution based on these locations will only benefit up to 18 employees, or 9% of the total department. Due to the geographical variations in commute origin, the impact of an intervention is limited to the amount of people traveling through a given transit corridor. For example, more frequent bus service only benefits those who are on the bus lines to begin with. This means that there is no one-size solution for this issue, and for any action to be effective it must be multifaceted. Further, we also know that SOVs are the overwhelming form of commute mode in the DMV region. In 2023, 69.2% of workers in the DMV region commuted via SOVs from neighboring areas (Journey to Work). Thus, this is a challenge throughout the region and is not specific to the PGCPD.

Site Visit

On September 24th, 2024, our team conducted a site visit to analyze and evaluate the needs of the Prince George's County Planning Department. We found several issues related to walkability, bike-ability, and the accessibility of alternative transportation modes. These

factors informed our analysis and recommendations. We believe that changes to walkability, bike-ability, and overall accessibility will make alternative commute modes more enticing.

The existing bicycle infrastructure such as bike parking racks at PGCPD are not in compliance with local ordinances and code and are insufficient for long-term storage. Zoning ordinance 27-6309 states that "At least four of the required spaces serving nonresidential development shall be located within 50 feet of the main entrance to the use. They shall be located where they do not interfere with pedestrian traffic and are protected from conflicts with vehicular traffic" (Prince George's County Zoning Ordinances). The existing racks are not covered and are located inconveniently far from the main entrance. Further, there is neither a sidewalk nor pathway that leads to the bike racks from the entrances, cyclists must ride in the driveway to reach the bike racks. There is only room for 18 bikes at the racks, yet 200 people work at the PGCPD. Due to insufficient space and overhead cover, many bikers bring their bikes into the office with them rather than leave them to the elements outside. The difficulties of storing bikes present a significant deterrent to using them as a commute mode.

Figure 1 – Existing Bike Infrastructure

In addition to a lack of biking infrastructure at the PGCPD, the surrounding area is also not conducive to biking. The road in front has a speed limit of 30 miles per hour (MPH), has no speed limiting elements such as speed bumps or curves, and is four lanes across with sparse crosswalks. There are no bike lanes, but there is sidewalk the entire way between the PGCPD and Downtown Largo Metro Station. However, the sidewalks are narrow without streetlights and in many spots are covered with low hanging tree branches which makes the path difficult to traverse for pedestrians and cyclists.

The bus stop near the PGCPD does not have an adjacent crosswalk. To cross safely, one must go to the four-way intersection down the road, which is not pedestrian friendly. Moreover, the intersection does not have any devices to force cars to slow down enough for pedestrians to cross safely. Further, people must cross four lanes of traffic at once without a break in the middle (Figure 3). Currently, given the level of traffic in the area, it is unlikely that pedestrians can cross all four lanes at once. Overall, the area is not friendly to pedestrians, and there are no safety measures in place to protect pedestrians.

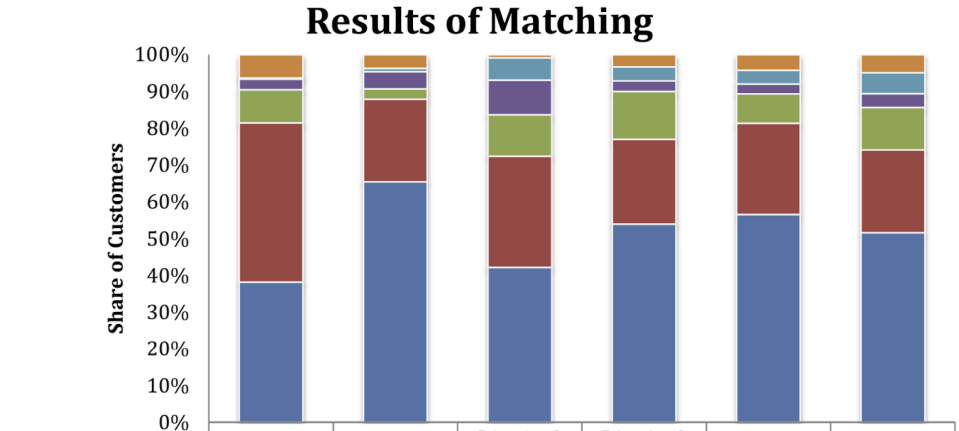
Figure 2 – Pedestrian Infrastructure at Intersections

Beyond the lack of pedestrian and bicyclist infrastructure near the PGCPD, the bus routes that serve the PGCPD only come every 30 and 45 minutes, which is not frequent enough for commuters. Both routes stop at the Downtown Largo Metro Station and the New Carrollton Metro Station. This sparse service combined with the inconvenient and dangerous street crossing makes bus travel unattractive.

Subsidies and Tax Credits

Incentivizing and encouraging employees to utilize public transit or move away from commuting in SOVs is not a new concept. The Federal Bike Commuter Benefit Tax Credit provides up to $81/month for employees who use their bike regularly to commute (Harper). Tax credits and similar financial incentives increase the likelihood that commuters will take public transit rather than SOVs. Public transit incentives reduce the probability of driving by 16% and increase the likelihood of using public transportation by 15% in the New York-New Jersey region (Bueno et al. 10). This suggests that providing benefits such as public transportation passes, vouchers, or reimbursements could be highly effective in encouraging PGCPD employees to switch from driving alone to using transit. Additionally, the research indicates that encouraging bike commuting through bike-related transportation benefits increases the probability of cycling to work by 2% (Bueno et al. 10). Further, private transport-related benefits such as free car parking or mileage reimbursement are strongly associated with a low likelihood of choosing public transportation or other sustainable commuting modes, suggesting that these types of benefits should be minimized to reduce car dependency.

In a study based in the Atlanta metro area commuters had an average commute of 12 miles but only 9% of residents used public transit to commute. However, employers provided transit subsidies increased the likelihood of people using public transit to commute by 156%. This effect was especially pronounced amongst college-educated individuals. However, employees who had free or subsidized parking were 71% less likely to commute via transit than their counterparts (Ghimire et al. 1).



	District 1	Jacksonville	District 3 - Pensacola	District 3 - Tallahassee	District 4 and District 6	District 7
incomplete data	6%	4%	1%	3%	4%	5%
joined VP	0%	1%	6%	4%	4%	6%
joined CP	3%	5%	9%	3%	3%	4%
contact, no match	9%	3%	11%	13%	8%	12%
list, did not contact	43%	22%	30%	23%	25%	22%
no list	38%	65%	42%	54%	57%	52%

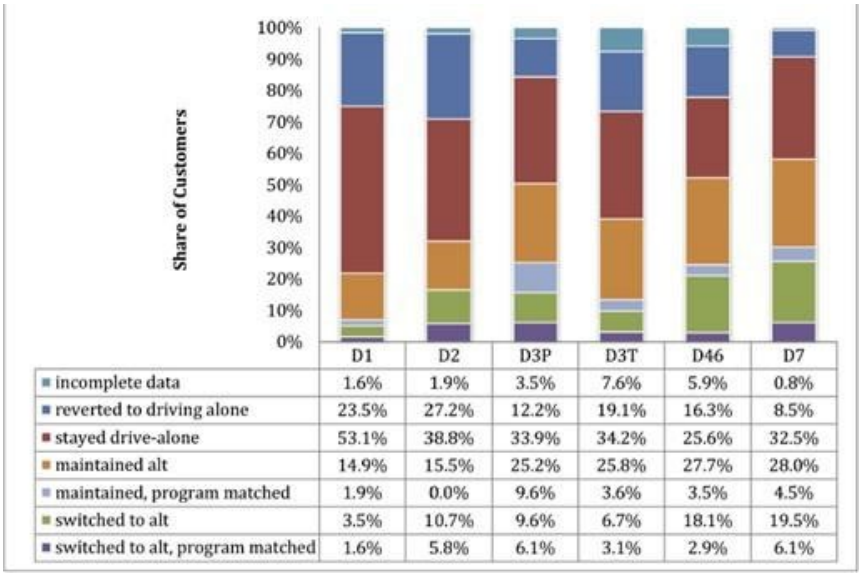
Figure 3 - Results of Carpool Matching Survey

A South Florida case study observed opportunities and challenges to changing commute behavior in a carpooling and vanpooling (using a van that has the capacity for more people than a car) commuter assistance program. The data in Figure 3 shows that carpooling and vanpooling are not particularly popular commuting options. Only 3% to 16%

of those who received a match achieved a successful match, suggesting a limited impact of these programs (Winters 53). Additionally, a large portion—between 22% and 43%—did not attempt to contact anyone on their match list, while 3% to 13% did try but were unsuccessful in securing a match (Winters 53). This lack of engagement underscores the fact that simply providing match lists may not be enough to motivate significant ridesharing participation. Florida's experience reveals that ridesharing solutions need to address barriers such as scheduling mismatches, convenience, and a general lack of interest or motivation among commuters. This case study suggests that for carpooling to become a more popular option, strategies like personalized match recommendations, clear communication about benefits, and incentives for participation might be necessary. Other regions can learn from Florida's efforts by recognizing the importance of targeted engagement and addressing the specific needs and reservations of potential participants to make carpooling a viable and appealing commuting choice.

The data from Figure 4 reveals key trends in how participants in Florida's ride matching programs adjusted their commuting habits. A substantial portion—between 26% and 53%—continued to drive alone both before and after engaging with the program, indicating limited success in changing commuting choices for many participants. Additionally, between 8% and 27% initially used alternative modes but reverted to driving alone after contacting the program, potentially due to inconvenience or an inability to find suitable rideshare matches. However, a smaller group, around 1% to 10%, successfully joined a carpool or vanpool through the program, while an additional 2% to 6% who had not previously used alternative

modes also reported joining a carpool or vanpool. Between 15% and 28% of participants consistently used alternative modes both before and after contacting the program, though not necessarily in program-organized carpooling or vanpooling. Furthermore, between 3% and 19% shifted from driving alone to using alternative modes after engaging with the program and showed some openness to change.



	D1	D2	D3P	D3T	D46	D7
incomplete data	1.6%	1.9%	3.5%	7.6%	5.9%	0.8%
reverted to driving alone	23.5%	27.2%	12.2%	19.1%	16.3%	8.5%
stayed drive-alone	53.1%	38.8%	33.9%	34.2%	25.6%	32.5%
maintained alt	14.9%	15.5%	25.2%	25.8%	27.7%	28.0%
maintained, program matched	1.9%	0.0%	9.6%	3.6%	3.5%	4.5%
switched to alt	3.5%	10.7%	9.6%	6.7%	18.1%	19.5%
switched to alt, program matched	1.6%	5.8%	6.1%	3.1%	2.9%	6.1%

Figure 4 - Changes in Customers' Patterns of Mode Use

We can infer that many commuters are willing to try alternative commuting options initially but often revert to driving alone. This pattern suggests that while there is openness to exploring carpooling, vanpooling, and other methods, barriers such as inconvenience, inflexible schedules, or insufficient program support may lead commuters back to solo driving over time. For Prince George's County, this implies that any proposed alternative commuting solutions should address these barriers directly, perhaps through more

personalized matching, incentives, and ongoing support, to encourage sustained participation in alternative modes of transportation.

Bikeability and Walkability

The physical experience of walking or biking somewhere greatly impacts individuals' willingness to use those methods of transportation. Improvements to sidewalk material and structure, changing the layout or design of the surrounding area, and making safety revisions to improve the pedestrian experience all increase the likelihood of people walking in an area (Cambra et al. 12). The Downtown Largo Metro station is underutilized due to the limited pedestrian access and lack of surrounding amenities such as retail and employment centers. In Lisbon, Portugal, these types of improvements were found to increase walking experience by anywhere from 1.92 to 2.37 points on a scale from 1-10 when rated by pedestrians. The seven best practices for sidewalk and pathway design are:

1. Pathways should include various different shops and restaurants.
2. Buildings should be on the outer perimeter of a path (meaning that the road is in the center with both sidewalks on either side, and buildings outside of that).
3. Cities should have plenty of greenery, especially more open spaces like parks.
4. Parking should be located out of view, so that it doesn't take up any of the visual real estate.
5. Infrastructure should be sized appropriate to its population size, the bigger the population, the bigger the city.
6. Pathways should be maintained so that they don't fall into disrepair.

7. Nothing should block the pathways, especially infrastructure (Cambra et al. 4-6).

In regard to infrastructure when integrating bicycles and transit, different interventions have different impacts. Currently, there are many points within a trip where Cycle Transit Users (CTUs) run into problems such as issues with bicycle facilities on busses or trains, bike parking, poorly maintained bike lanes or a lack thereof, and other operational issues have large negative impacts on a CTUs' mood and favorability toward biking and public transit (Meenar et al. 10). Improvements to bike parking at transit stops and storage on transit such as bike racks on buses and trains was found to cost anywhere from $97 to $323 per CTU, and had favorability ratings ranging from 18.5% to 47.1% depending on the improvement (Krizek et al. 166).

Dockless Micromobility

Dockless micromobility is most often e-scooters and e-bikes like the one pictured in Figure 6. These newly popular devices are powered by battery and unlocked and paid for via a smartphone application (app). Micromobility devices, like e- bikes, have the capacity to both supplement and replace public transit or personal vehicle trips depending on the surrounding context. In Austin, TX e-scooters were found to replace walking trips, but not transit trips (Oeschger et al. 2).

Dockless micromobility devices are most effective in the first and last miles of transit trips and are used for trips between walking and biking distances. Studies have found that in Washington, DC 10% of e-scooter trips connect with the metro (Oeschger et al. 3). A 2019

survey stated that 45% of trips taken on dockless micromobility replace personal vehicle/ride hailing trips, out of 96 million dockless micromobility trips (Liu et al. 1).

Figure 5 – Lime Scooters

Buses

Given that the closest metro stations are at least 1.4 miles away, buses are one of the only ways to make last-mile connections. If the public bus is easily accessible by safe, well-maintained footpaths and crosswalks, then people are more likely to use it. This is one of the top two policy recommendations highlighted in the literature. The second is to provide private direct bus service from home to work location. If a bus is inconvenient, then people will not use it. Bus headways– the time between scheduled buses– larger than 10 minutes are inconvenient, making the 21x and 28 lines that serve the PGCPD unideal for commuters with 30- and 45-minute headways respectively. An increase in travel time decreases the likelihood that a commuter will take a bus. This aligns with the preliminary findings from our survey, which indicate that people are unwilling to increase their commute time significantly by switching their mode of commute.

However, if buses are convenient, people will consider taking them. In a 2016 study conducted by researchers at University of Wollongong (UOW), Australia the direct bus service had the biggest increase, 48% compared to a 10.2% increase with park and ride services (Anwar et al. 1421). This suggests that increased access to bus services that link key destinations would still be useful in altering commute methods.

Part of the difficulty of getting people to switch commute modes stems from their understanding of the alternatives available and potential hurdles to changing their commute mode. People are resistant to change, and because SOVs are the norm, it is difficult for them to see the costs of driving such as electronic tolls and parking fees that are automatically deducted. Emphasizing cost savings when commuting via alternative methods versus cars is very effective in changing habits compared to other behavioral-based interventions. However, these types of interventions have at most a 9% impact on commute mode choice (Whillans et al. 44).

Survey Data

Our team created a survey as a screening tool prior to holding focus groups to gather data about employee commute mode choice, and the factors involved in their commuting decisions. The goal of the survey was to understand how people commute and their perspectives on alternative commute modes. We gained significant insights from this survey as employees volunteered information about why they could only commute by car. Ideally, we would have completed focus group interviews based on the survey results, but we ran out

of time in the semester. We have included instructions and recommendations for running these focus groups in Appendix A.

The survey gathered preliminary information on employees' commute methods and willingness/ability to utilize alternative commute modes. We received 53 responses, or about 26% of the total number of employees in the Planning Department from across the different divisions. Most of the responses came from the Community and Countywide Planning Divisions, and employees who reside across the DMV. This was an academically rigorous survey, but it does provide useful demographic data about commute mode and decision factors. 80.8% of respondents drive alone to work, while the remaining 19.2% use some combination of Metrorail, bus, bicycle, and carpool. Many use multiple types of transit in one trip, or alternate the type of transit they use, for example driving two days a week and taking the metro one day. 49.1% of respondents have never considered an alternate method of commuting, while 45.3% say that they have considered it. The remaining 5.7% state that there are no alternative methods available for them to commute, or it would take too long (2 hours). We also asked respondents about what they would do in the event that their usual form of commute became unavailable. These responses were grouped into six categories; bicycle, carpool, metro rail or bus, telework or take leave, borrow/rent a car or utilize rideshare, or no way to adjust (see Figure 6).

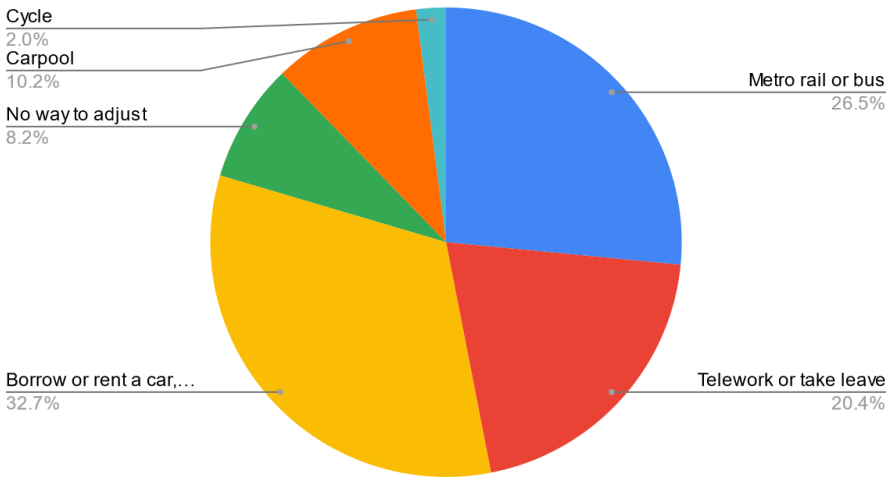


Figure 6 – How Would Employees Adjust Commute

Employees listed various reasons for why they could not adjust their commute to use public transportation, including living too far from PGCPD which is not served by public transit, the distance between the metro (both Downtown Largo and New Carrollton) and headquarters being insurmountable, and the alternative commute mode taking too long (in the realm of over an hour increase in commute time). This survey provided a good surface-level insight into the barriers employees face to consider alternative commute modes. Focus groups are needed to understand what types of policies to implement for the best impact.

Recommendations

Our recommendations are grounded in an evidence-based approach informed by our literature review and the data collected during our assessment of commuting patterns to the Planning Department. Our analysis focused on addressing the specific challenges employees face when traveling from the metro station to the office and reducing SOV commutes. To evaluate alternatives and identify the most effective solutions, we applied four key criteria:

1. Cost Effectiveness: considers the financial feasibility of each recommendation;
2. Implementation Viability:- assesses the practicality of execution given available resources and timelines;
3. Outcomes and Expectations: examines the potential to improve commuter experiences and achieve desired results;
4. Client Preferences: ensures alignment with stakeholder priorities and anticipated adoption levels.

Using these criteria allowed us to balance tradeoffs and propose targeted, actionable recommendations tailored to the unique commuting challenges identified in this project.

Infrastructure Revitalization

Given the 1.4-mile distance between the metro station and the Planning Department office, our initial site visit identified several infrastructure deficiencies that may deter commuters from walking or biking. These include narrow and uneven sidewalks, poorly marked or unsafe crosswalks, the absence of dedicated bike lanes, insufficient signage, and overgrown vegetation obstructing pathways. Addressing these deficiencies through targeted improvements—such as sidewalk expansions, installation of protected bike lanes, enhanced

wayfinding signage, and vegetation maintenance—can significantly improve safety, accessibility, and overall commuter experience. Importantly, crosswalk enhancements must extend beyond simple repainting to ensure pedestrian safety and visibility. Comprehensive solutions should include measures such as raised crosswalks, pedestrian-activated flashing beacons, improved lighting, and traffic-calming designs like curb extensions or speed bumps. These interventions are essential to ensure that drivers notice pedestrians and yield appropriately, creating a safer commuting environment.

From a cost-effective perspective, these improvements require a moderate financial investment but have the potential to yield substantial long-term benefits by improving safety for everyone and encouraging sustainable commuting. In terms of implementation viability, smaller-scale actions such as painting crosswalks and installing bike racks can be achieved relatively quickly, while larger changes, like sidewalk expansions, may take more time. The outcomes and expectations are promising, as these enhancements would significantly improve the pedestrian and cyclist experience and contribute to the broader community well-being. Finally, client preferences suggest a willingness to embrace these changes, provided they are integrated into a larger initiative to promote meaningful infrastructure revitalization. These improvements align well with both departmental goals and the needs of commuters.

Increase Micromobility Options

The 1.4-mile distance between the metro station and the PGCPD office presents a challenge for many commuters, particularly those for whom walking is inconvenient or impractical. Micromobility options, such as e-scooters (e.g., Veo or Lime) and e-bikes through

Capital Bikeshare, offer a fast, efficient, and low-effort alternative that could significantly improve the commuting experience. These options not only address the physical barriers of the commute but also add flexibility for employees, allowing them to cover the distance quickly regardless of weather or time constraints.

Implementing micromobility solutions is both practical and cost-efficient. Rather than requiring major infrastructure investments, these programs rely on partnerships with existing providers, making them relatively low-cost to initiate. Minor adjustments, such as creating designated hubs or parking spaces near the metro and office, would ensure a smooth rollout. Coordination with providers to expand service areas would build on ongoing county efforts, such as the expansion of the Capital Bikeshare program, further streamlining the process. The expected outcomes of introducing micromobility are substantial. For commuters, these options reduce travel time and effort, increasing the appeal of public transportation as part of their journey. They also enhance accessibility for employees who may find walking challenging or time-consuming. On a broader level, the presence of micromobility hubs near the metro station and office sends a clear signal that the Planning Department is committed to innovation and meeting the needs of its employees. This shift could encourage more employees to explore non-car commuting options, reducing parking demands and easing congestion. Additionally, the flexibility and ease of use offered by e-scooters and e-bikes make them an attractive option, likely to result in strong adoption rates among employees. By incorporating micromobility options, the Planning Department can reduce the number of

employees driving to work by providing a viable alternative for those who use public transit but find walking the 1.4 miles impractical.

Carpool Matching Program

Implementing a carpool matching program offers a strategic way to reduce the number of employees driving alone to work by facilitating shared commutes. By investing in software that matches employees based on their zip codes, PGCPD can connect individuals living in nearby areas such as Hyattsville, Silver Spring, Bowie, and Upper Marlboro, making carpooling a more practical option. This approach aims to improve commuting efficiency, ease the strain on parking, and encourage collaborative transportation solutions. The program is cost-effective, requiring only a minimal investment in software procurement and maintenance, making it an affordable initiative for the department. While implementation is feasible, it would require a well-planned educational campaign to highlight the benefits of carpooling and ensure high participation. Reliable software would be essential for ensuring accurate matches and ease of use. However, the expected outcomes should be approached with caution. As a case study in South Florida (see page 17) illustrates, carpool programs often struggle with widespread adoption, largely due to employees' preferences for flexibility and the challenges of aligning individual schedules. While there is some interest among employees, participation may be limited unless supported by targeted outreach and incentives to address potential concerns. Though predicting the success of a carpool matching program can be challenging, it remains a feasible solution to reduce single-

occupancy vehicle trips, especially when combined with strong promotional efforts and active engagement from the department.

Conclusion

Having been tasked with the problem of figuring out how to reduce the number of the 200 employees driving to work at the Prince George's County Planning Department, we have conducted extensive research to determine what the best way to accomplish this may be. After a site visit in which we walked from the new PGCPD building to the nearby Downtown Largo Metro Station, having read numerous papers, many discussions, and hours upon hours of work, we have chosen what we believe to be the three best recommendations to address the issue. As it stands, we believe the best courses of action would be to invest in infrastructure revitalization, increasing the availability of micromobility options, and introducing a carpool system for the employees.

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Appendix A

Focus Group Addendum

Though we did not have time to complete the focus groups, we have included recommendations and guidelines for conducting those interviews for your use. Start by organizing the field of potential participants. We advise grouping individuals by the length of their time with PGCPD (this will be referred to as a "time bracket" from here on), resulting in a minimum of five groups (based on our survey).

From here, you would want to include some people who commute by SOV and some who do not in each group. The maximum group size should be three people per commute mode group, and each group should have the same ratio of commute type. During this part of the process, avoid picking people from the same time bracket per commute mode, so that you will not have two individuals from the same time bracket in either commute mode group. As an example, let's say you were looking to interview three people per commute mode, you would choose three individuals from any different time bracket, so this may be a person in each of the 0-3 years, 5-7 years, and 10+ years brackets, each who drives SOVs to work. This doesn't mean that you can't then select someone from the 10+ years bracket that doesn't take SOVs to work, just that the three in the non-SOV group shouldn't have the same time brackets as anyone else within that commute mode group. At this point you should have (by our recommendation) a maximum of six total participants split into an SOV driving group and a non-SOV driving group, each with different time brackets within the commute mode groups.

At this point you can begin conducting interviews now that your interviewees have been selected. Once you complete the interviews you should have a better idea of what course of action would create the biggest impact, as well as what results may resonate more than others, but be mindful of the fact that this is a comparatively small sample size. Below are example questions for the interviews by the commute mode group. Feel free to add questions to the interviews or modify them. These could also function as the only questions you ask, but we highly advise that you ask follow-up questions when appropriate.

SOV Commuter Questions:

- Why do you choose to drive to work?
- Have you ever considered taking public transportation to work? How do you think it would fit into your schedule and lifestyle? ?
- How would you get to the office by public transportation?
- Would you be willing to carpool? Would you be willing to carpool if the department matched you with others who you could carpool with?
- In an ideal world what would need to be done for you to get to work without driving?
- Would you be willing to take an alternate commute method if the changes you mentioned earlier were put in place?
- Besides distance alone, what do you think is the biggest factor in keeping people from choosing alternate forms of commuting?

Non-SOV Commuter Questions:

- How do you get to work? Do you use this method every time you commute?
- Why do you choose to commute this way?
- How long have you been commuting this way and what is keeping you from changing to driving?
- Are you satisfied with this method of commuting? Do you think it could be improved? How?
- Do you think the transit facilities (bike racks, bike lockers, crosswalks, sidewalks, bus stops, etc.) at and around the office are sufficient?
    a. If not, what specifically is lacking?
- Are there any recommendations you would make to decrease the number of individuals driving to work?