

# **I-40 Traffic Corridor Proposal**

**Shifting The Focus From Moving Vehicles To Moving People**

**The Sierra Club**

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## **Executive Summary**

Rush hour traffic in Knox County's I-40 corridor is a nightmare. UT's Boyd Center for Business and Economic Research predicts continued growth in the local area of more than 1% per year (an additional 200,000 people by 2050), further exacerbating the problem. A closely related issue is the limited functionality of mass transit in the region. It is imperative that we shift our planning focus from "moving vehicles" to "moving people". By doing so, we wouldn't simply reduce traffic congestion today, we would move toward a transportation system that smoothly scales with increasing population, reduces our carbon footprint, improves mobility for fellow citizens with little or no access to a car, makes Knoxville more "user-friendly", and frees up a staggering amount of downtown real estate dedicated to parking. This shift in focus can start with a relatively small amount of additional capital investment.

The majority of vehicles traveling the I-40 corridor belong to local motorists; dominated by in-county commuters, but including significant commuter traffic to/from Loudon County, Oak Ridge and Maryville/Alcoa. The two major interstate highways also inject a significant amount of truck traffic, and significant engineering deficiencies (weigh station locations, insufficient acceleration lanes, etc.) don't help. TDOT is considering ways to address the issue of congestion, and the goal of this document is to ensure that the solutions adopted include improvement of mass transit options for local commuters (including Bus Rapid Transit along I-40 and out to Oak Ridge and McGhee-Tyson airport), and allow for a graceful future upgrade of that system to light rail.

We include recommendations that could provide some immediate relief - including engineering improvements, making the use of KAT and carpools more appealing, encouraging flexible work hours (to spread out rush hour) and work-from-home, discouraging through traffic during rush hour, and improved biking network - but we expect that some additional automobile capacity will be needed.

The Tennessee Transportation Modernization Act, signed into law in April 2023, allows for the construction and implementation of "choice lanes" (express lanes, charging a traffic-dependent toll). Choice lanes offer drivers the opportunity to pay for access to express lanes, providing a revenue stream for further infrastructure improvements. They would be useful for emergency

vehicles and should be freely available to carpools and express buses. Given support for this concept in Nashville, we expect that added capacity will come in the form of such choice lanes. However, adding lanes to reduce congestion has been compared to loosening your belt to deal with obesity: it can work temporarily, but not in the long run. The Knoxville area is continuing to grow, and it will eventually become impossible to add enough lanes to reduce traffic to an acceptable level.

The conceptual breakthrough is the realization that new choice lanes would provide the most important piece of infrastructure needed for an initial Bus Rapid Transit (BRT) system. A plan that includes BRT, compared to simply continuing to add freeway lanes, would allow bus service to expand at relatively low cost to accommodate our growing population. Certainty that such a system is in the area's future would kickstart transit-oriented development, that would in turn increase the demand for the system. It is possible to imagine a future in which the demand overwhelms the BRT's capability, and an upgrade to a light-rail system is justified. We can smooth that transition, and lower its cost, by designing today's upgrade with tomorrow in mind.

## **Introduction**

Knoxville is a rapidly growing, mid-sized city, embedded in a larger region that prizes its rural roots. Growth over the last several decades has not been adequately planned for. The city is co-located with two major interstate highways whose combined throughput is merged for a seventeen-mile stretch on the west side of town, the so-called I-40 Corridor. Outside the city center there is relatively little in the way of walkable communities, and access to appealing public transportation is spotty at best. All this has combined to produce significant congestion woes - the average time each Knoxville commuter lost to congestion in 2024 has been estimated to be 52 hours! - and prompted the Tennessee Department of Transportation (TDOT) to embark on a process to identify and implement solutions. In this report we argue that now is the time to start thinking beyond just adding lanes. We must use this opportunity to make it more feasible for people to leave their cars at home. Decisions taken now will determine how easy it will be to transition to a multimodal transportation system that will better accommodate the area's future growth.

### *Orientation to Knoxville metropolitan area transportation*

The Knoxville metropolitan area is currently home to nearly a million people. Recent growth has been steady at a bit more than one percent per year. This is expected to continue for some time, increasing the local population by more than two hundred thousand people in the next twenty-five years.

Figure 1 shows a map of the region. Interstate highways I-40 (east/west) and I-75 (north/south) merge for seventeen miles on the west side of Knoxville. The I-640 bypass allows through traffic to avoid downtown, but since the bypass radius is fairly small (roughly three miles), through traffic still has a significant impact on local commuters. Pellissippi Parkway is a controlled-access highway (I-140 south of the intersection with I-40, highway 162 north of the intersection) connecting Oak Ridge and Maryville. Alcoa Highway (highway 129) is a controlled-access highway connecting Knoxville and Maryville. Chapman Highway (highway 441) is a non-limited access road connecting Knoxville to locations in Sevier County. Kingston Pike (highway 11) is a non-limited access frontage road paralleling I-40 west of Knoxville. Clinton Highway is a non-limited access highway connecting Knoxville to Clinton in Anderson County. I-40/75 has four lanes in each direction between the Pellissippi Parkway and the I-640 bypass, and three lanes

otherwise. I-640 has three lanes in each direction. Pellissippi Parkway, Alcoa Highway, Chapman Highway, Clinton Highway and Kingston Pike all have two lanes in each direction. Recognized engineering deficiencies - in acceleration lane length and curve radius, and sub-optimal weigh station locations - exacerbate inadequate capacity.

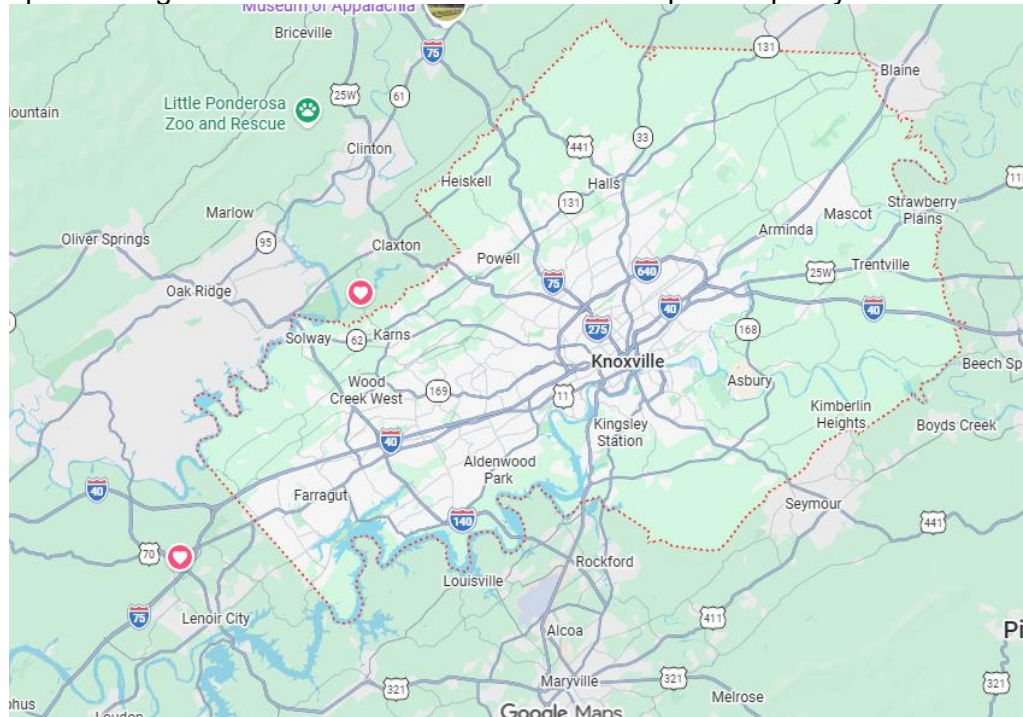


Figure 2 shows a map of Knox County commuting patterns. A little more than half of commuters live and work within Knox County. Anderson County (Oak Ridge), Blount County (Alcoa/Maryville), and Sevier County are significant nearby business and population centers, each with a large number of commuters going in both directions. Oak Ridge is booming, due to its strong ties to a rejuvenated nuclear power industry, and Alcoa is home to McGhee-Tyson, the region's primary airport. Through traffic adds roughly 25%, by vehicle, to these commuter totals. But many of the throughgoing vehicles are tractor trailers, which have an outsized impact on congestion.

## KNOX COUNTY COMMUTING PATTERNS (2021)



**Figure 2.3:** Knoxville Region Commuting Patterns Map  
Data Source: Knoxville Area Facts and Figures (2024)

KAT (Knoxville Area Transit) is the primary mass transit option in the area. KAT has 20 routes servicing over 500 bus stops. Roughly half of Knoxville residents are within a quarter mile of a bus stop. However, due to various shortcomings (limited hours, limited routes, service frequency less than twice per hour and slow transit speeds) ridership is only about 8,000 per day. As one unscientific example, Google Maps estimates travel time between East Knoxville and the West Town mall / Cedar Bluff area via mass transit to be more than two hours.

Less than two percent of local commuters carpool.

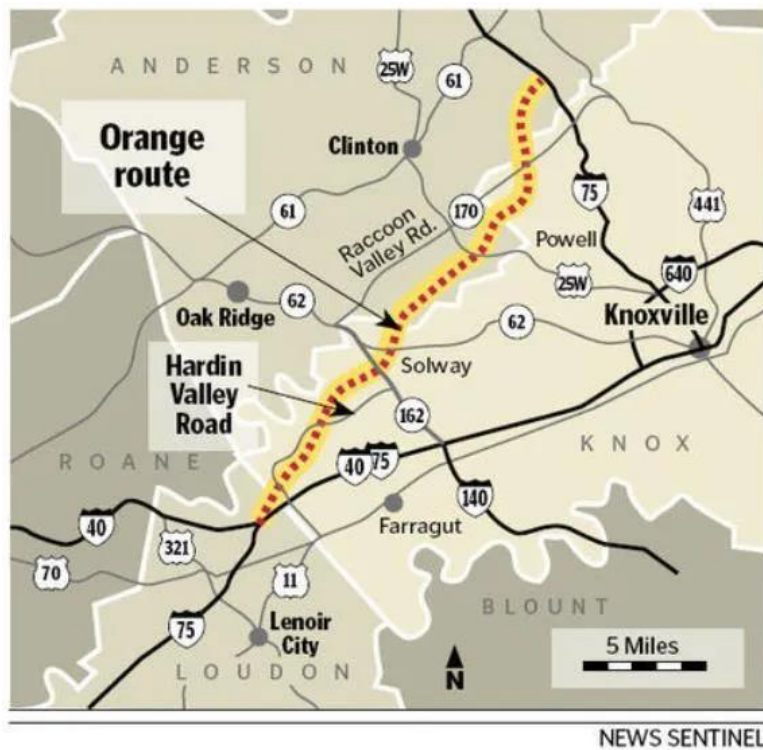
### Bypass Knoxville?

Currently, tractor trailers are limited to the right two lanes on local expressways. Commuters typically cross their path when they enter the freeway and get into the left lanes, and then again when they exit. This has a serious impact on traffic flow, and is unnerving for many people.

Starting in the 1990's, anticipated growth in Knox County spurred active planning for an Interstate bypass at a distance from Knoxville sufficient to separate through traffic from commuter traffic. Routes that went to the north and west of Oak Ridge National Lab were rejected early due to multi-billion dollar cost estimates. Figure 3 shows a map of the preferred "Orange Route". Plans for this route were abandoned in 2010, when projections showed the Orange Route would divert less traffic from I-40/I-75 than previously expected, and the cost estimate ballooned to more than a billion dollars. Today, Hardin Valley is one of the fastest growing areas in Knox County and the Orange Route passes through dozens of brand new developments, greatly increasing local opposition and adding further to cost. And, for all that money, no more than 25% of the vehicles (the through traffic component) would be diverted.

Throughgoing and local traffic can also be separated without a bypass, by including dedicated through-lanes (no exits) on the stretch of I-40/75 within Knox County. A recent proposal

suggests a three-dimensional approach, installing such lanes on a platform elevated above the center of the existing highway. Although this would be expensive and have engineering challenges, it would avoid the need for taking more land.



### Choice Lanes

In 2023, Tennessee passed the Transportation Modernization Act, specifically supporting public-private partnerships and choice lanes as a funding and delivery model. Choice lane access can be obtained by paying a toll, riding in a multi-occupancy vehicle (a carpool or a bus), or both, depending on policy decisions. Choice lanes have the benefit of bringing in private money to help cover capital costs. They also reduce the risk of congestion-related delays for emergency vehicles.

Tennessee's first choice lanes will soon be incorporated into I-24, between Nashville and Murfreesboro. Given the realities of trying to build a bypass around Knoxville, they seem likely to be the preferred solution for adding capacity here as well. However, it is important to acknowledge the reality that adding capacity by simply adding lanes is not sustainable.

### **Recommendations**

In all likelihood, it will be decades before major infrastructure upgrades, undertaken by TDOT today, will be completed. Twenty-five years from now, the Knoxville metropolitan area will have two hundred thousand more people. Given the current dominance of car-oriented development, it is difficult to conceive of addressing the region's growth without adding freeway capacity. However, it is impractical to build a bypass around the city, and it is impractical to add more than a lane or two to existing freeways. Adding lanes will entail significant cost, significant changes to the infrastructure (e.g., lengthening local overpasses or converting them to

underpasses), taking property to increase the size of the right-of-way, and major disruptions to local commuters during construction. It will be even more difficult to do it again in twenty-five years. Thus, it is imperative to maximize the impact of the lanes we add today, and it is imperative to minimize re-work required to make the inevitable move toward a transportation system that can handle a larger number of people in the same geographical footprint. Since the majority of cars are driven by local commuters, that means making it more feasible for people to get to work without their car: making it easier to carpool, and improving mass transit options. It is also imperative to offer even limited relief on a much faster timescale.

### *Immediate Relief*

The current congestion situation has a significant impact on the lives of the vast majority of Knoxville area residents. With more people here every day, and the decades-long timescale for adding any significant capacity, **we recommend vigorously exploring a wide array of solutions that may be relatively inexpensive and quick to implement to provide some immediate relief:**

- Lengthen acceleration lanes at entrance ramps and merges - Cars that fail to get up to speed before merging wreak havoc with traffic flow. Longer acceleration lanes and alternative lane markings may help. Implementing such changes would likely focus on re-working the rapid-fire set of exits between the Pellissippi Parkway and the West Town Mall.
- Ramp-metering - This is another way to reduce the impact that oncoming vehicles have on traffic flow that various cities have had success with. It could be implemented instead of, or in conjunction with improved entrance ramps.
- Additional capacity at off-ramps - Traffic flow is also disrupted when exit ramps get clogged up because surface streets can't handle the influx of cars. Longer and/or wider ramps at key exits may be helpful.
- Move the weigh stations - Trucks entering and exiting the weigh stations near mile marker 372 have a noticeable effect on congestion. Moving them to less congested areas may be helpful.
- Discourage non-local traffic during rush hour - Congestion in the I-40 corridor is almost entirely limited to a few hours in the morning and in the evening. Significant relief could be obtained if throughgoing traffic was reduced during those hours. This could be accomplished by charging a toll on vehicles coming into the region during rush hour (although such a system would need to be carefully designed and enforced to avoid simply redirecting such traffic onto already overburdened surface roads). Another possibility, perhaps more politically palatable, is offering tax incentives to spread out the times when businesses open and close.

- Modest enhancements to existing mass transit - If we could double KAT's ridership it would eliminate 8,000 commuter trips daily. Without express lanes and a move toward transit-oriented development, it may be difficult to achieve even this modest goal (a few percent reduction in the number of cars on the road). But bus stop improvements, increased service frequency, and subsidized fares should be carefully considered, since they could be implemented quickly.
- Encourage carpooling - If we could double carpooling it would eliminate several thousand commuter trips daily. Establishing carpool partnering platforms would be useful, especially if shared with the wide community in a timely fashion. Large employers, schools, and event planners should be encouraged to establish and use such platforms. Convenient park and ride may also help and may be available via sharing arrangements negotiated with schools, churches, and businesses near freeway interchanges.
- Significantly increase the network of off-road bike trails and connect them directly to bike-friendly public transit stops, office buildings, schools, businesses, and residential areas. There are quite a few American cities with bicycle commuter fraction exceeding several percent. If that level could be achieved here, it would remove 6,000 commuter trips daily. Knoxville has twice been certified a "Bronze Bicycle Friendly Community" by the League of American Bicyclists; let's go for gold.

#### Medium-term Recommendations (2050)

We would love to vociferously advocate for immediate construction of a sustainable multimodal transportation infrastructure, anchored by a light-rail system providing rapid transit along today's existing corridors. Knoxville is geographically well-suited for such a system, and it would be environmentally ideal. It would be a boon for local citizens who can't afford a car, and it would be a significant economic relief for many others if they could forgo the costs of car ownership. But, in our judgment, the prevalence of car-oriented development and car-oriented culture, combined with the large capital investment required to implement a light-rail system from scratch, renders this course of action infeasible at this time.

Twenty-five years from now, when today's upgrades are finally completed and there are 200,000 more people in the area, there will surely be a new generation of Knoxvilleans clamoring once again to reduce congestion. But it will be all that much harder to add more lanes to the freeway. If we can move the needle today, making both culture and development more transit-oriented, those hypothetical future Knoxvilleans will thank us for making it possible for them to implement the ideal system.

The relatively quick and inexpensive improvements advocated above may provide some immediate relief, but they seem unlikely to be insufficient to cope with the region's expected growth. Presumably, TDOT will conclude that capacity must be added to the existing system. **Our medium-term recommendations focus on shaping that additional capacity so that it puts us on a path towards a more sustainable transportation system:**

- No bypass - Adding a bypass around the city seems likely to run into the same roadblock it did fifteen years ago; too much money to reroute too few vehicles. Thus our opposition may be moot. But it is worth documenting it for the record. A new bypass is surely the most disruptive of all options for adding capacity. The “orange route” would go through many newly constructed neighborhoods. Other bypass routes, at larger distances from the city, would carve a path of destruction through dozens of miles of forest and farmland. Additionally, if capacity is added with a bypass, the existing corridor would not be updated with express lanes - the enabling infrastructure needed to move towards a mass transit system.
- Consider the elevated highway solution for adding capacity - This may have significant advantages compared to widening the freeway directly (less interference with local traffic during construction, less impact on development encroaching on the existing right-of-way, natural segregation of throughgoing truck traffic) that warrant a detailed cost/benefit analysis.
- Further encourage carpooling - The obvious way additional lanes relieve congestion is by adding capacity. But their impact is doubled if they help keep cars off the road in the first place. Assuming that choice lanes are included in the upgrade, carpools should be allowed to use them for free. Carpooling should also be encouraged by incorporating convenient park and ride lots into the upgrade.
- Include a Bus Rapid Transit (BRT) system - Ideally, such a system would run along the major arteries: to start with, along the 17-mile I-40 Corridor, up the Pellissippi Parkway to Oak Ridge and down the Alcoa Highway to Maryville and the Airport. For the BRT to be effective, people would actually need to choose to use it. That requires frequent service (every 10-15 minutes during peak commute times) and it requires commute times competitive with a personal car. The anticipated choice lanes provide the key piece of enabling infrastructure. Given these, and park and ride lots included for carpools, the only missing pieces are the buses and three transfer stations. Buses could be put into service gradually, as demand increases. With the BRT system transporting people quickly along the arteries, KAT could re-focus on getting people from their homes to/from the BRT, and increase service frequency along Kingston Pike and Chapman Highway.
- Create a Knoxville Regional Transit Authority (KRTA) with appropriate stakeholders to coordinate planning and implementation of a regional public transit system.

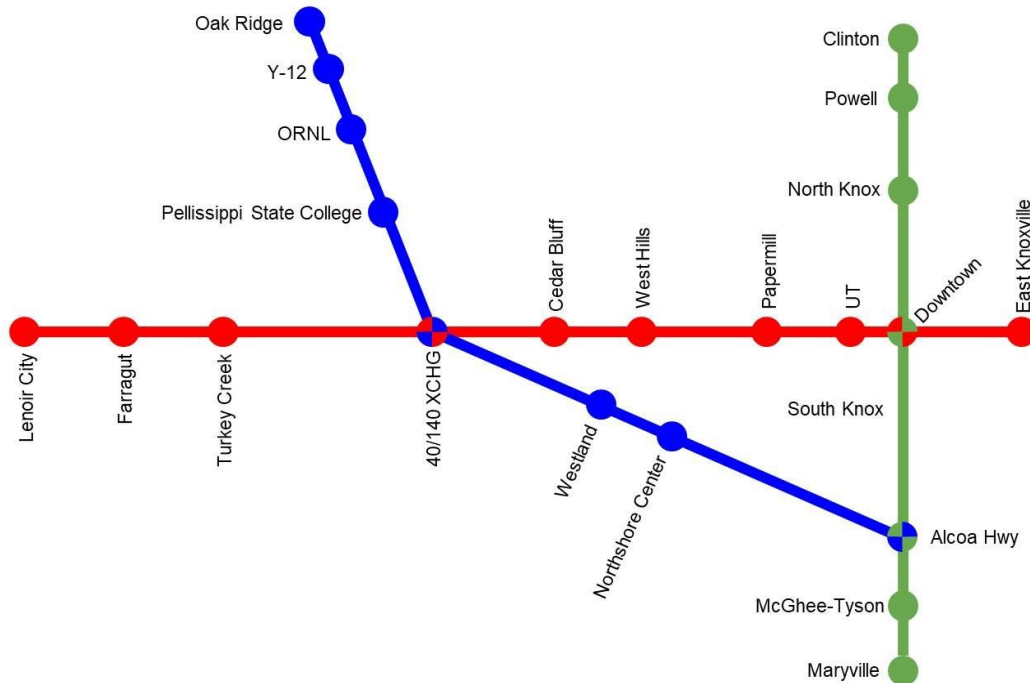
### *BRT System Concept*

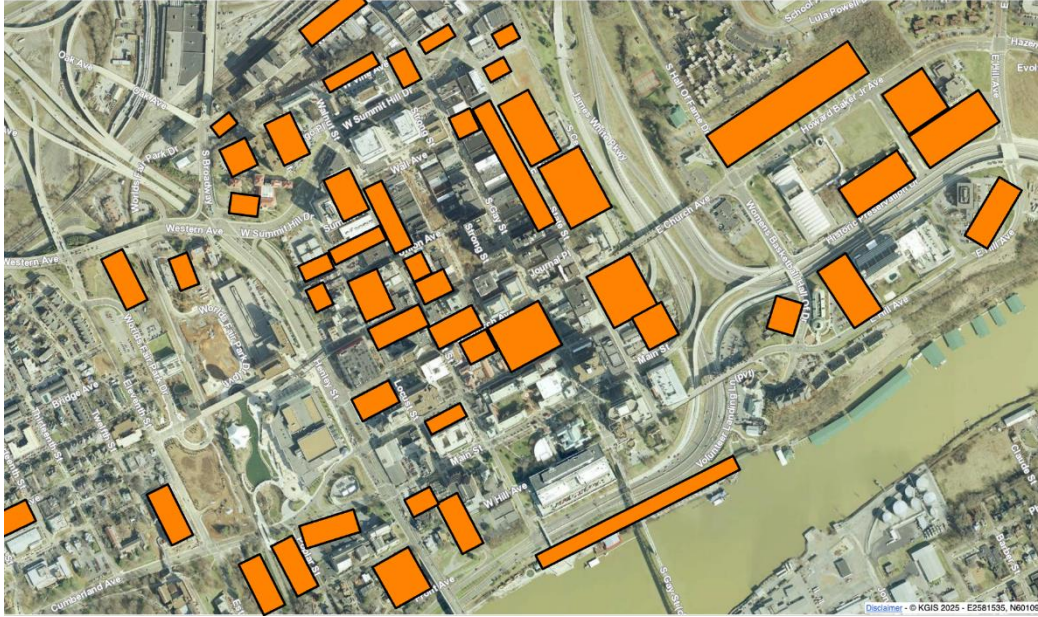
A BRT system can remove thousands of peak-hour car trips, avoid endless lane widening, support denser mixed-use growth and connect jobs without requiring downtown parking expansion. We outline here an ambitious, but realistic concept for a high-capacity BRT system for the Knoxville / Knox County region focused on the overloaded I-40/I-75 corridor. The design assumes:

- Knoxville continues growing primarily westward toward Farragut and Loudon County
- KAT's "Reimagined" network becomes the feeder network for rapid transit

The core concept is a three-line regional BRT spine (see Figure 4) utilizing anticipated choice lanes and park and ride lots. Additional required infrastructure includes three transfer stations. Frequent all-day service would be needed, with service frequency varying by time of day and express limited-stop commuter runs as appropriate. This system would be functionally equivalent to light rail (albeit with less maximum capacity) but with bus-level flexibility and cost. It should be noted that there is an interesting proposal to implement the section of the "Green Line" south of downtown Knoxville directly as light rail, using the existing, lightly-used freight rail branch line that connects the heart of Knoxville to Maryville and Alcoa, and 18 cars that have already been purchased.

We estimate daily ridership in this initial phase could exceed 25,000 people. Anticipation of such a system would induce transit-oriented redevelopment at station nodes, and the existence of such a system would make it feasible to free up some of the staggering amount of valuable downtown real estate currently devoted to parking (Figure 5).





### Long-term Vision

A successful BRT will generate demand for more. In the future, we envision an expanded BRT, reaching out to major radiating arterials, including Alcoa Highway, Chapman Highway, Clinton Highway, Oak Ridge Highway/Western Avenue. A light rail can handle many more passengers than a BRT, and would be a natural successor as demand increases since it could reuse park and ride lots and associated station infrastructure. A future transition to a light rail system could be relatively straightforward - if the current upgrades are designed with that possibility in mind.

### **Conclusions**

Knoxville-area rush-hour traffic is often miserable. Assuming the average commuter earns \$30/hr and loses an hour a week due to congestion, the time wasted in congestion costs us the equivalent of more than \$300 million dollars a year, never mind the associated frustration.

TDOT will soon make decisions about upgrades to address this problem, but major upgrades will take many years to implement. We have provided recommendations for ways to provide immediate relief (little or no construction required) and hope TDOT will creatively explore these and similar options.

Additional vehicle capacity is almost certainly required. But our ability to increase capacity is severely limited, and it is crucial that we shift our transportation focus from moving vehicles to moving people. Given the cost and timescale for major construction projects, we must carefully consider how decisions today will affect our ability to address problems in the future. Towards this end, we have also provided recommendations that harness the anticipated new capacity to start the transition to a multimodal transportation system better able to accommodate anticipated future growth in the region.

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