

Final Report

BlueOval City Transit Study

prepared for

Tennessee Department of Transportation

prepared by

Cambridge Systematics, Inc.

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date

October 2023

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1.0 Introduction

The Tennessee Department of Transportation (TDOT) initiated this study to identify and evaluate the feasibility of various transit options to provide employee access to the future BlueOval City in Haywood County, Tennessee. The new facility will host a variety of manufacturing plants, a Ford Stamping & Assembly plant producing Ford's next generation electric truck, a Ford/SK Joint Venture Battery plant as well as other suppliers. The site is located between Memphis and Jackson, Tennessee, approximately 40 and 25 miles respectively from each and lies just north of I-40 and four miles south of Stanton. It was previously known as the Memphis Regional Megasite and the West Tennessee Megasite and is a 4,100-acre certified industrial site. The manufacturing facility is a partnership between the Ford Motor Company and SK Innovations, with joint operations expected to start ramping up in 2024 and become fully operational in 2025. The proposed transit alternatives and assumptions reflect the needs when BlueOval City is fully operational.

With the development of this massive assembly complex, along with additional nearby supporting industries, the area will experience a large influx of employees in addition to freight arrivals and departures. It is expected that the site will employ over 10,000 workers, with continuous shifts and workers present seven days a week. Transit options to access the site will be a great benefit to the large community of potential employees throughout western Tennessee and benefit Ford by expanding their access to talent. Providing options to driving alone to the site will also have significant regional benefits as well, including expanding access to jobs and reducing traffic congestion impacts on the adjacent road system.

1.1 Campus Components

As of Fall 2022, the expected operations at the BlueOval City campus includes four component parts: Vehicle Assembly Plant, Ford Supplier Network Businesses, Battery Assembly Plant, and a new campus of the Tennessee College of Applied Technology (TCAT). These four different centers, along with any other auxiliary businesses, mean the provided transit service needs to accommodate multiple locations with various work shift patterns. More details about these four components are listed below. The total employees and work shift patterns are subject to change and reflect the most recent information corresponding to full operations as of Fall 2022.

Tennessee Electric Vehicle Center

The Tennessee Electric Vehicle Center (TEVC) is Ford's vehicle production facility to assemble Ford's next generation electric truck. The plant will operate seven days per week with two 10-hour shifts of approximately 1,600 hourly employees in each shift.

Supplier Network Businesses

Four supplier companies will be co-located at BlueOval City to provide key components to the vehicle assembly plant, working similar shifts to Ford. Together, the suppliers will employ approximately 1,000 hourly workers per shift.

BOSK Battery Assembly Plant

The battery packs critical to these new electric trucks will be assembled at the BlueOval SK Battery facility which will also operate seven days per week employing approximately 1,000 hourly workers in two daily shifts.

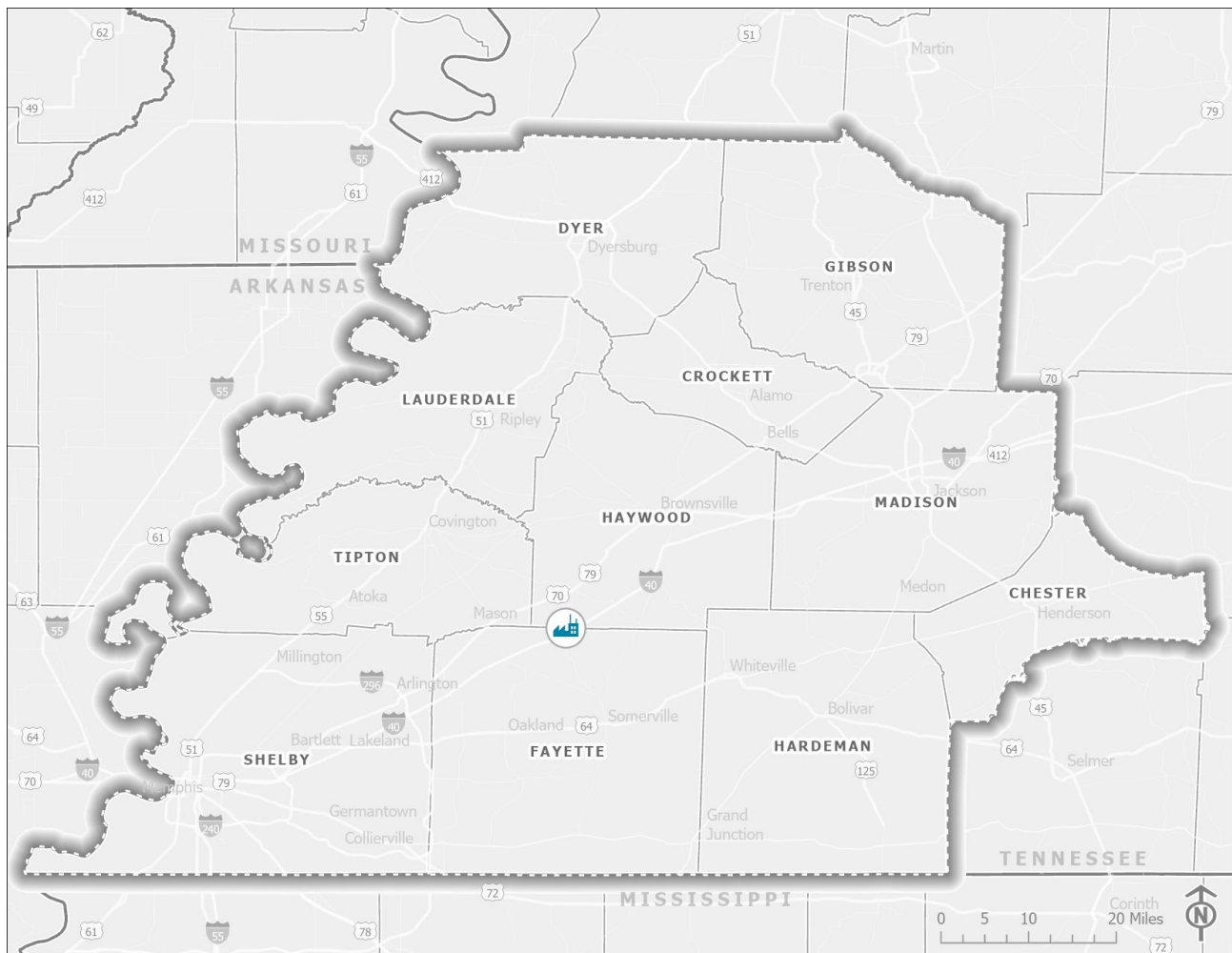
Tennessee College of Applied Technology (TCAT)

A new campus of the Tennessee College of Applied Technology is under construction at BlueOval City to provide training for workers at this facility, as well as for nearby communities. Approximately 150 students are anticipated in two daily classes. Minimal staff will be less likely to use transit and will not significantly impact ridership estimates.

1.2 Study Area

The study area for this transit study includes 11 counties in Western Tennessee, as shown in Figure 1.1. BlueOval City is located near the center of this area, with the proposed transit solutions and alternatives focused on providing transit to BlueOval Cities within the study area.

Figure 1.1 Study Area for BlueOval City Transit Study



1.3 Study Purpose, Goals, and Objectives

The primary purpose of this study is to investigate the feasibility of various transit options for BlueOval City employees in the 11-county study area and increase access to BlueOval City jobs for residents throughout

the region. This was completed by engaging with local stakeholders, assessing current conditions, define and evaluation a set of alternatives, calculate preliminary costs, and develop implementation plans.

The four goals, listed in Figure 1.2, focus on this purpose and aim to ensure the success of the transit service. These goals emphasize that the transit service should be a feasible travel option while supporting existing communities and other economic development goals, while addressing the future transit needs of BlueOval City. These goals were used to evaluate the different proposed alternatives (see Section 4.4).

Figure 1.2 Study Goals



To make transit a viable option, particularly for shift-based workers, the transit alternatives must:

- Deliver employees to their work site approximately 30 minutes before the start of their work shift;
- Collect them at their work site within a reasonable time after their work shift ends (also 30 minutes) and return them to their place of their trip origin (e.g., pick-up location or home);
- Provide a safe, attractive, and reliable in-vehicle experience;
- Provide a travel time that is comparable to driving themselves to work; and
- Be cost-competitive to other transportation alternatives such as driving themselves.

BlueOval City is a very extensive operation that operates 24 hours per day, seven days a week, and throughout the year, with several shift start and end times. Therefore, the transit services planned must correlate to work shifts to the extent possible. This can include plans for additional capacity to provide a higher level of service.

2.0 Existing Conditions and Outreach

As a beginning stage of this project, the study team gathered information on the existing transportation conditions, insights on anticipated impacts, and concerns about the facility. This information provided a baseline of understanding how commuters currently travel in the study area, existing socioeconomic characteristics, and viewpoints of providing transit service to the site. More information on the existing conditions and engagement is provided in *Technical Memorandum 1: Outreach, Prior Plans, and Existing Conditions*.

2.1 Outreach

To begin to understand the opportunities and limitations of providing transit service to BlueOval City, a robust mix of stakeholder outreach was conducted. Organizations interviewed included transit agencies, metropolitan and rural planning organizations, economic development agencies, and local stakeholders. Outreach also received information and feedback at stakeholder outreach meetings, which included additional government representatives, mayors, and other key regional voices.

In general, common themes heard among interviews included:

- **The willingness to work with all the stakeholders in the region to develop a transit solution.** Many of the stakeholders understood the regional impact of BlueOval City and the need for a regional solution. Some of the suggestions included co-branded transit service, inter-agency transit hubs, shared park-and-ride locations, and more.
- **The need to balance existing transit service and new service to BlueOval City.** This was especially true for rural parts of the region, which would require many more resources including funding, drivers, vehicles, employees, and more.
- **The desire to understand the parameters of service to BlueOval City.** Some of the frequent questions included what are the shifts going to look like, where are people going to live, and what will commercial truck activity around the site look like.

2.2 Existing Conditions

The existing conditions and trends in Western Tennessee provide an understanding of who lives in the region and the current transportation options and usage. This analysis focuses on demographics, socioeconomics, work trip flows, and transportation options in the region.

2.2.1 Population and Employment

Among the counties in West Tennessee, Shelby County has the highest concentration of population (Table 2.1). The Memphis Metropolitan Area covers the majority area of this county, and because Memphis is a commercial and cultural hub in the region, most of the population is concentrated there. Jackson City in Madison County is the second most-populated area in the region. The area surrounding BlueOval City is sparsely populated (less than one person per acre) and is situated midway between these two populated areas.

The region had slow population growth over the last decade (between 2010 and 2020). Tennessee had a population increase of 8.6 percent during that time, whereas the population in the study area grew by only 0.7 percent.

Table 2.1 Population Change, 2010 to 2020

County	2010 Population	2010 Share of Regional Total	2020 Population	2020 Share of Regional Total	Change between 2010 and 2020
Shelby County	922,696	70.4%	929,744	70.5%	0.8%
Madison County	97,378	7.4%	98,823	7.5%	1.5%
Tipton County	59,689	4.6%	60,970	4.6%	2.1%
Gibson County	49,015	3.7%	50,429	3.8%	2.9%
Dyer County	38,174	2.9%	36,801	2.8%	-3.6%
Fayette County	37,458	2.9%	41,990	3.2%	12.1%
Lauderdale County	27,745	2.1%	25,620	1.9%	-7.7%
Hardeman County	27,655	2.1%	25,462	1.9%	-7.9%
Haywood County	19,010	1.5%	17,864	1.4%	-6.0%
Chester County	16,793	1.3%	17,341	1.3%	3.3%
Crockett County	14,524	1.1%	13,911	1.1%	-4.2%
Study Area Total	1,310,137	100.0%	1,318,955	100.0%	0.7%
Tennessee	6,234,968		6,772,268		8.6%

Source: U.S. Census Bureau, Decennial Census

Employment is similarly distributed, with Shelby County containing the majority of the employed population in the region (72 percent) which is slightly higher than the population share (70 percent) in the region (Table 2.2). Note, all employment figures in this section include full-time, year-round civilian employed population 16 years and over.

Table 2.2 Employment by County, 2019

County	Employment	% Share of Regional Employment Total	% Share of Regional Population Total
Shelby County	316,955	72.2%	70.4%
Madison County	32,162	7.3%	7.4%
Tipton County	21,199	4.8%	4.6%
Gibson County	14,759	3.4%	3.7%
Fayette County	13,399	3.1%	2.9%
Dyer County	11,852	2.7%	2.9%
Lauderdale County	7,048	1.6%	2.1%
Hardeman County	6,145	1.4%	2.1%
Haywood County	5,625	1.3%	1.5%
Chester County	5,171	1.2%	1.3%

County	Employment	% Share of Regional Employment Total	% Share of Regional Population Total
Crockett County	4,645	1.1%	1.1%
Regional Total	438,960	100.0%	100.0%

Source: American Community Survey, 5-Year Estimates, 2015-2019.

For traveling to work, the majority of employees drive alone (Table 2.3). This is true for every county, with 80 to 90 percent of workers driving alone to work. The next most popular means of traveling is carpooling, representing approximately nine percent of all employees in the region. On average, approximately seven percent of workers travel by another means, half of which is working from home and the remaining through other alternative or active transportation options. Public transportation isn't widely used, with one percent of Shelby County workers using transit, followed by 0.6 percent of Madison County residents.

Table 2.3 Means of Transportation to Work, 2019

County	Drove alone	Carpooled	Transit	Walked	Biked	Teleworked	Other
Shelby County	83.7%	9.4%	1.0%	1.2%	0.1%	3.3%	1.2%
Madison County	83.3%	8.6%	0.6%	1.1%	0.1%	3.1%	3.3%
Tipton County	87.9%	7.9%	0.0%	0.6%	0.0%	2.2%	1.4%
Gibson County	85.8%	7.9%	0.0%	1.2%	0.5%	3.0%	1.7%
Fayette County	86.8%	6.9%	0.1%	0.4%	0.0%	4.6%	1.2%
Dyer County	87.4%	7.8%	0.0%	1.0%	0.0%	2.6%	1.2%
Lauderdale County	87.6%	7.4%	0.4%	1.4%	0.1%	1.2%	1.9%
Hardeman County	86.3%	8.4%	0.7%	0.8%	0.0%	3.2%	0.7%
Haywood County	88.0%	7.5%	0.0%	1.1%	0.2%	1.5%	1.7%
Chester County	84.7%	7.6%	0.1%	1.6%	0.0%	4.9%	1.1%
Crockett County	89.4%	7.4%	0.0%	0.9%	0.0%	2.0%	0.2%
Study Area Total	84.3%	9.0%	0.8%	1.1%	0.1%	3.2%	1.4%
Tennessee	83.1%	8.9%	0.7%	1.3%	0.1%	4.7%	1.1%

Source: American Community Survey, 5-Year Estimates, 2015-2019.

2.2.2 Work Trip Flows

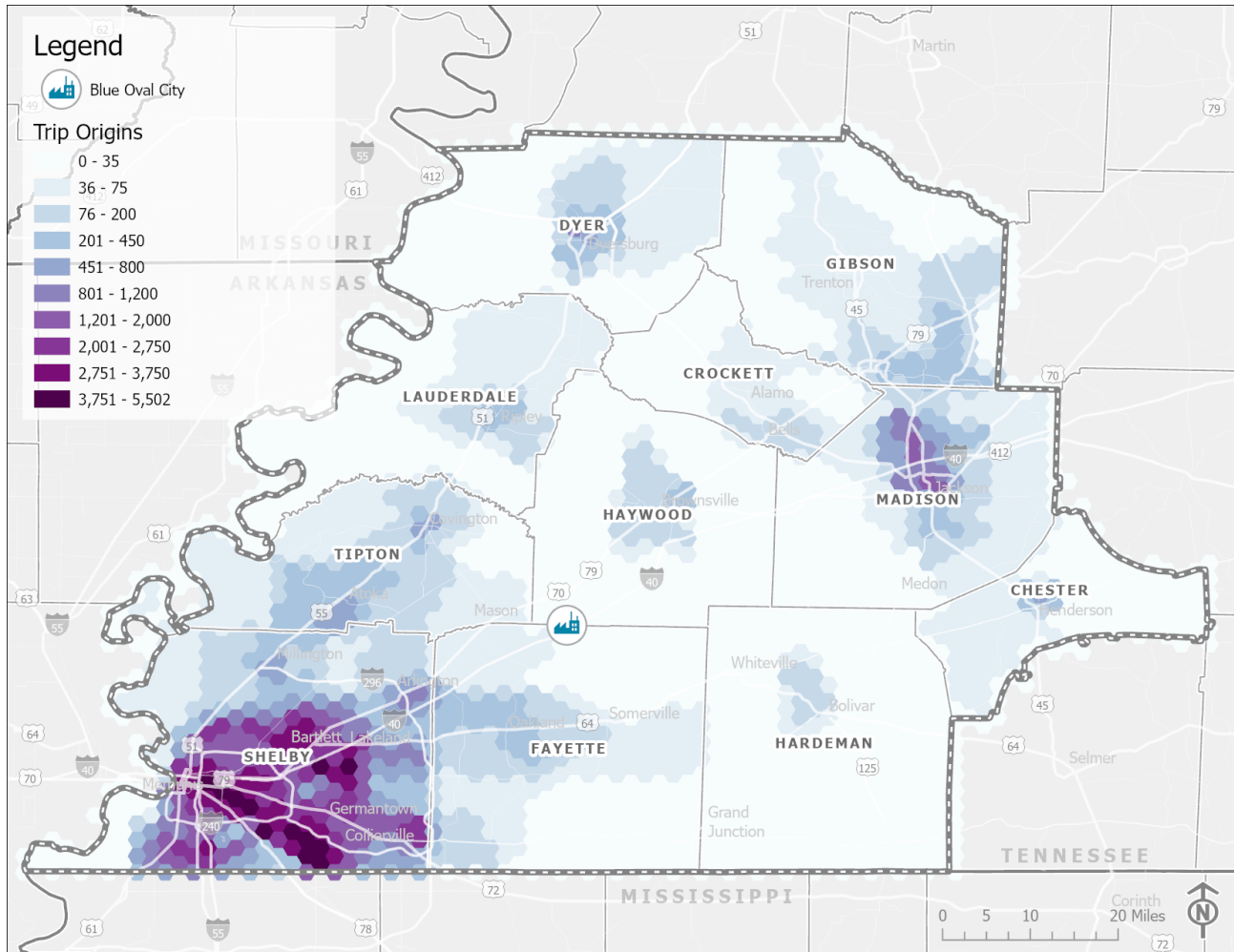
Regional work travel flows describe how residents move throughout the region, from their home to their place of work. The majority of the regional trips start in Shelby County (Table 2.4 and Figure 2.1). The distribution of trip origins by county aligns with the share of the population, which is logical since trips often start at home. Otherwise, trips originate in the largest cities in each county, such as Ripley in Lauderdale County, and follow along major roadways, such as US 55 and US 64.

Table 2.4 Trip Origin Distributions by County, 2019

County	Total Origin Trips	Percentage of Total Region
Shelby County	391,519	78.8%
Madison County	45,748	9.2%
Tipton County	9,287	1.9%
Gibson County	10,506	2.1%
Fayette County	7,354	1.5%
Dyer County	11,247	2.3%
Lauderdale County	5,606	1.1%
Hardeman County	5,130	1.0%
Haywood County	4,173	0.8%
Chester County	3,140	0.6%
Crockett County	3,234	0.7%
Total	496,944	100.0%

Source: U.S. Census, Longitudinal Employer-Household Dynamics (LEHD)

Figure 2.1 Trips Origins (2019)

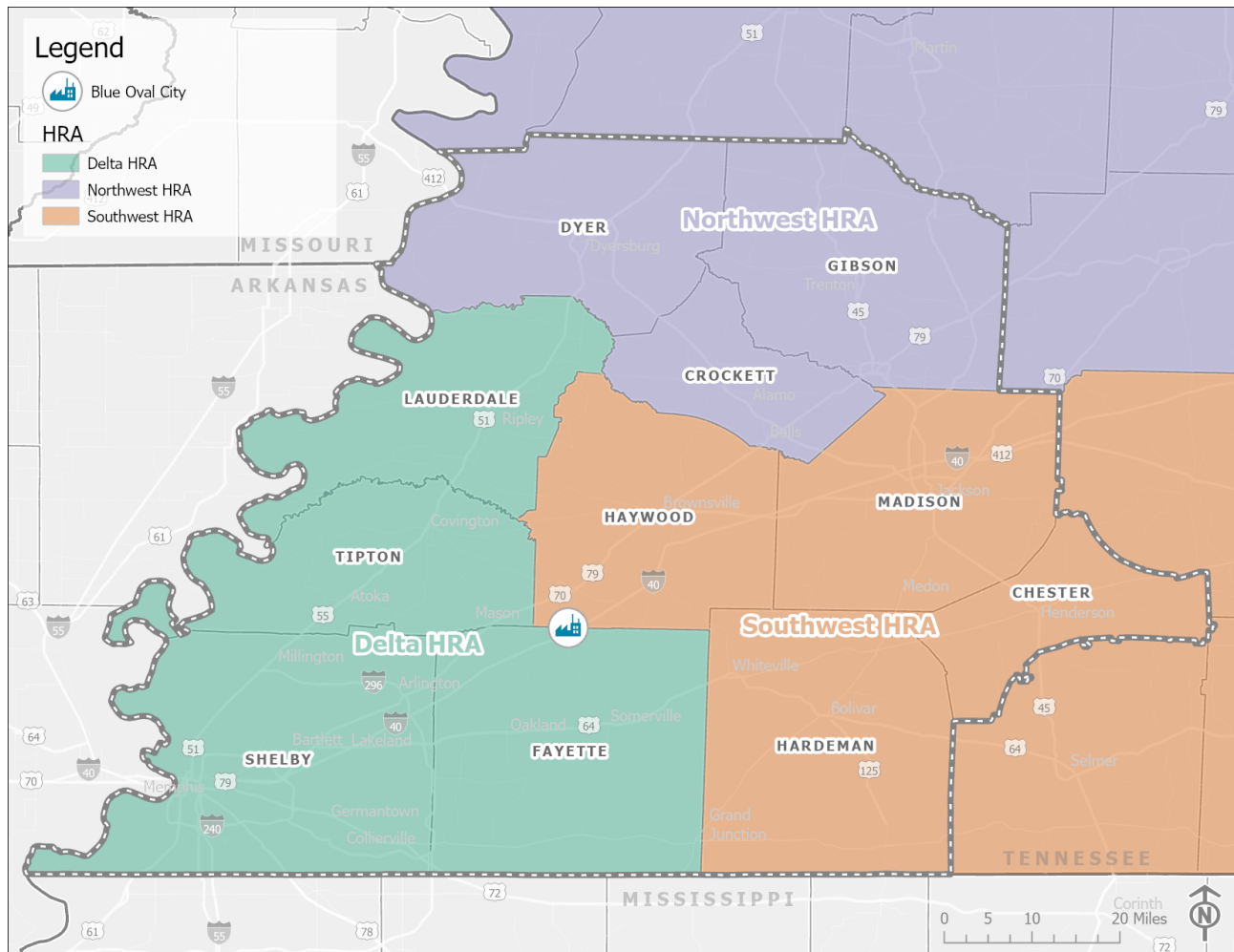


Source: U.S. Census, Longitudinal Employer-Household Dynamics (LEHD)

2.2.3 Public Transportation

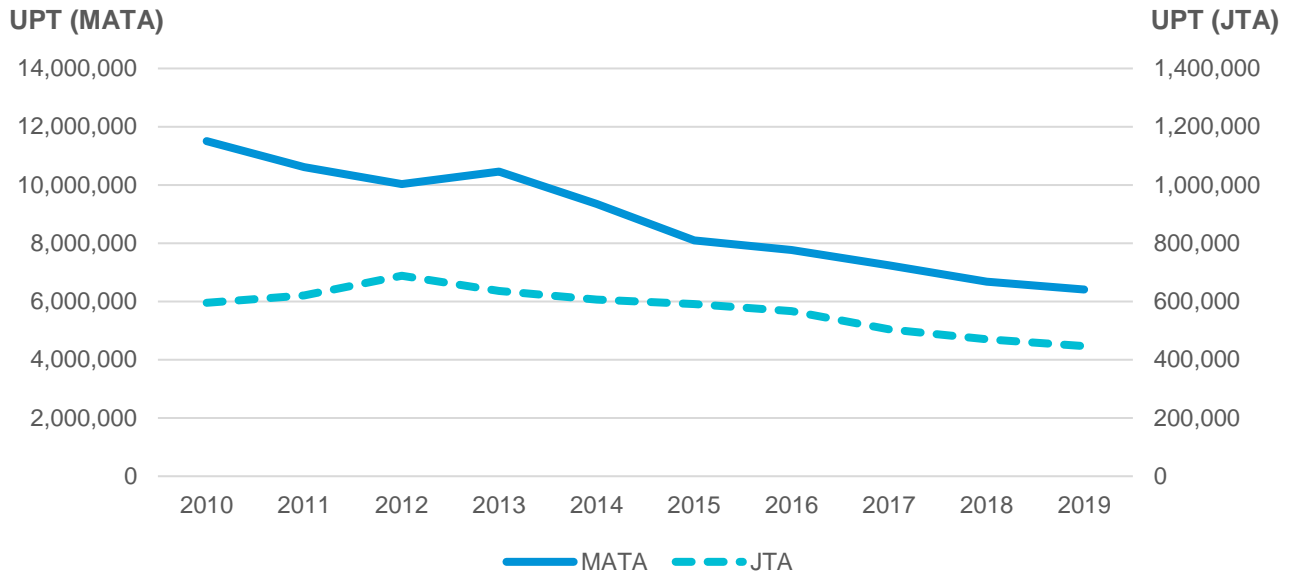
Public transportation, including fixed-route and demand response services, is provided within the urbanized areas by the Memphis Area Transit Authority (MATA) and by the Jackson Transit Authority (JTA). The rural counties are served by human resource agencies (HRAs) including Delta, Northwest (NWHRA), and Southwest (SWHRA) Human Resource Agencies which each serve multiple counties, as shown in Figure 2.2.

Figure 2.2 Human Resource Agencies



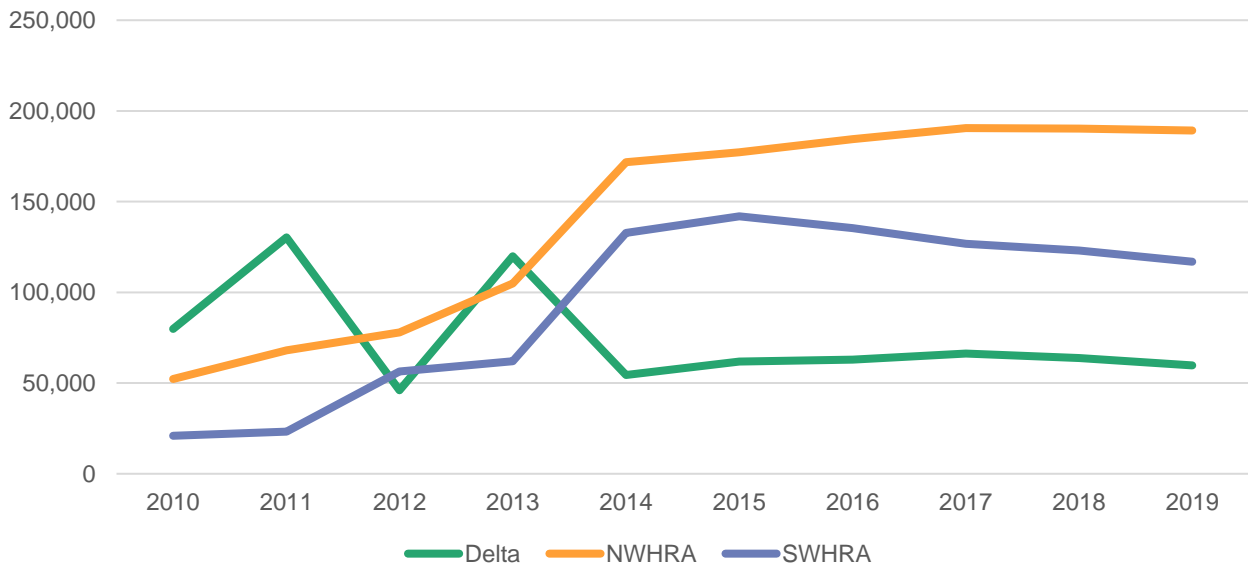
The trends in public transportation service provided and trips taken over the past 10 years are generally not positive. The data displayed in the subsequent graphs reflects transit service prior to the impacts from the COVID-19 pandemic, from 2010 to 2019. MATA and JTA served roughly 44 and 25 percent fewer passengers over this period, respectively (Figure 2.3). During the same time period, the rural HRA providers experienced an increase but have been fairly even since 2014 (Figure 2.4). For demand-response (DR) trips, the picture was somewhat more positive (Figure 2.5). NWHRA and SWHRA have over tripled the number of passengers in 2019 when compared to 2010. Delta HRA served 25 percent fewer demand response passengers over this period, while MATA and JTA served significantly more passengers.

Figure 2.3 Unlinked Passenger Trips (UPT), All Modes, Urban Providers, 2010 to 2019



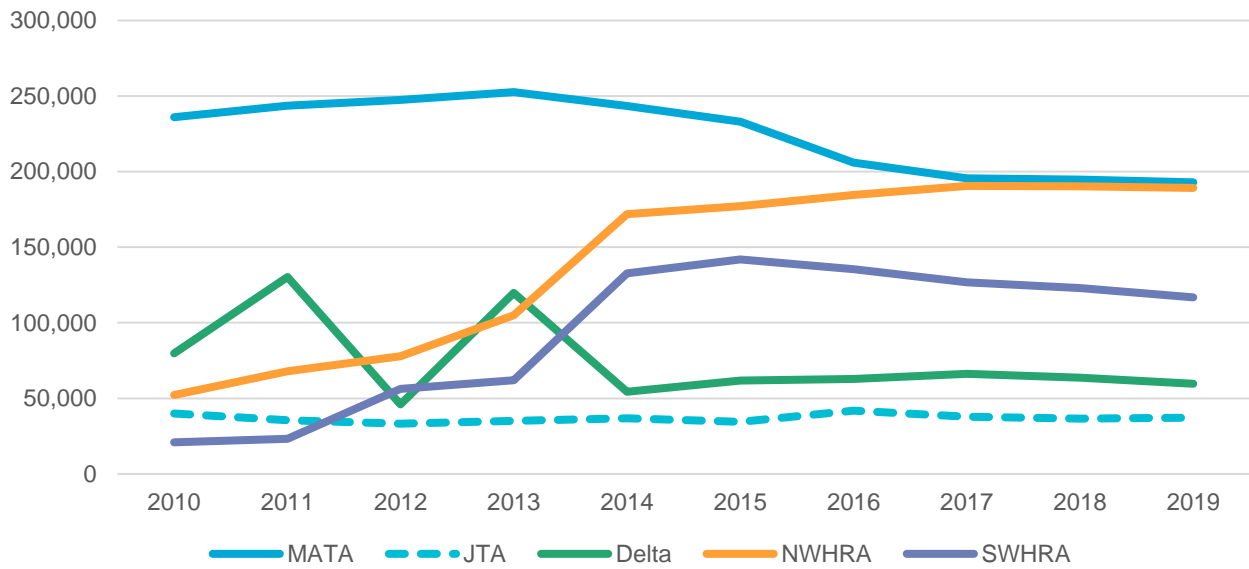
Source: National Transit Database

Figure 2.4 Unlinked Passenger Trips (UPT), Rural Providers, 2010 to 2019



Source: National Transit Database

Figure 2.5 Demand Response Unlinked Passenger Trips (UPT), All Providers, 2010 to 2019



Source: National Transit Database

3.0 Transit Service Alternatives

These different project alternatives were developed to respond to the identified public transportation needs, opportunities, and project goals and objectives addressed through the project advisory committee (PAC) along with public and stakeholder input. These alternatives were designed to provide a mix of solutions that could be compared against each other to identify a preferred solution while meeting project goals in a balanced way. More information on the three alternatives and their development is provided in *Technical Memorandum 2: Alternatives Development*.

3.1 Alternatives Development

Alternatives were developed based on various factors, such as existing transit conditions, anticipated transit usage, and anticipated origins and number of BlueOval City employees.

3.1.1 Work Shift Patterns

The different facilities in BlueOval City have varying start times and number of employees, based on process efficiency for each facility. For the purposes of designing a transit system to provide employee access to BlueOval City facility, the provided shift patterns were mapped into a daily and weekly pattern, with shift start times starting midnight Monday morning and continuing through the week.

Since BlueOval City includes 24-hour facilities, shift times range from 6:00 AM to 7:30 PM. On an average weekday, the morning and evening shifts are generally split, with approximately 45 percent starting at 6:30 AM and an additional 45 percent starting at 6:30 PM or 7:30 PM. The most common end times are concentrated around 5:00 PM, 6:30 PM, 6:00 AM, and 6:30 AM.

These figures were used to estimate the number of transit vehicles, and vehicle type, required to provide service, and the cost to acquire and operating these vehicles. Please note, due to the needs of the operations, the shift times and total employees are subject to change and fluctuate in the future. Timely communication of these changes will help ensure the transit service meets the commuting needs of employees.

3.1.2 Service Design

The overall transit plan assumes providing service for employees throughout 11 counties in West Tennessee to specific shift starts at a single site, BlueOval City. Two transit design elements are key to estimating demand for this service:

- **Geographic Distribution of Trip Origins:** The anticipated origin of those employees from the 11-county region. In other words, where these employees live. The existing (2019) trip origins in the study area is shown in Table 2.4 in Section 2.0, and indicates a little over 73 percent of trips in the region originate in Shelby County with the second highest origins in Madison County, representing seven percent of total trip origins. This leaves the remaining nine counties representing just under 20 percent of trip origins in the region. A similar distribution can be assumed for estimating the home origin pattern of those who will work at BlueOval City.

- **Transit Mode Share:** The proportion of employees that are anticipated to use transit regularly, also known as transit mode share. Based on the US Census, across the country, approximately five percent of workers commute via transit. However, that includes large cities with a far higher transit mode share, such as New York City. For Shelby County, only one percent of employees commute via transit. When the rest of the 11-county region is included, the transit mode share for employees is 0.4 percent. However, these numbers reflect transit service in the United States, which is generally at a lower frequency and lower coverage area compared to countries in Europe and Asia. For example, in Germany, there is a much higher level of transit service provided to the large factories of Mercedes-Benz and Volkswagen, with estimates at roughly one-third of employees commuting via transit.¹ Recognizing that the Tennessee Department of Transportation, other regional transportation agencies, and Ford have started this study to plan an effective and attractive transit option for employees, it is assumed that up to 10 percent of BlueOval City workers could opt to use transit to commute to work. **Therefore, a 10 percent mode share is used to estimate specific service information, such as number of vehicles and ridership.** Please note, this estimate may change depending on various factors, such as the availability of parking at BlueOval City, expectation of workers, changes in shift times, development patterns, among other reasons.

3.1.3 Modes and Technologies

Choosing an appropriate transit technology for the study area depends upon the project's goals, mobility needs, alignment options, and stakeholder input. Additionally, the existing transportation infrastructure as well as potential new infrastructure investments can impact the appropriate transit technology. For this analysis, the mode and technology options considered included:

- **Passenger Rail:** Intercity heavy rail, must be operationally compatible with freight rail
- **Express Bus Coach:** Over-the-road coach buses with high level of comfort, amenities, and safety
- **Transit Bus:** City transit buses with low floor and easy accessibility while currently used by MATA and JTA
- **Community Bus:** Cutaway buses approximately 25 feet in length and widely used by existing rural and urban transit systems in the region
- **Vanpool:** Minivans used by a group of employees coming from the same area and working similar shift times

3.1.4 Alignments

Alignments are defined by the paths vehicles follow between origins and destinations. BlueOval City is the obvious destination for the alternatives considered. For this study, the origins are comprised of anywhere in the 11-county region. This includes Memphis, Jackson, and the counties, which are grouped by the Human Resource Agency (HRA) service areas which currently provide rural transit services.

- **Rail Alignment:** This alignment would follow the existing CSX line, passing through north Memphis and Stanton, four miles north of BlueOval City. Continuing to the east, the line passes through Brownsville

¹ <https://group.mercedes-benz.com/company/magazine/mobility/corporate-mobility-management-commuters.html>

and Humboldt. This means the line to Jackson would require connecting through Milan and the West Tennessee Railroad, 70 miles compared to about 40 miles direct. Currently, the link from BlueOval City to Jackson is too indirect to be considered a viable alternative to a road connection. If passenger rail would connect Memphis directly to BlueOval City, it is assumed that the rail link would follow the new rail spur to a new terminal station at BlueOval City, adjacent to the freight terminal. Alternatively, a shuttle service between BlueOval City and the nearest station (possibly Stanton) would be provided.

- **Bus Alignment:** Express buses and/or transit buses would primarily use I-40 to connect from pick-up locations in Memphis and Jackson to BlueOval City. Other bus connections provided by the HRAs, likely utilizing smaller cutaway buses, would connect employees in rural locations to BlueOval City or other pick-up sites. These routes would use existing local roadways and highways, including I-40.
- **Vanpool Alignment:** Vanpools are the most flexible technology in terms of route alignment: they would follow the most direct roads that connect members of the pool to BlueOval City, including local roads, highways, and freeways.

3.2 Alternatives Overview

Three transit service alternatives were developed and evaluated based on information collected and analyzed at the beginning of the feasibility study. Each alternative is comprised of a combination of transportation options based on the anticipated number of employees at the site, existing transit services, and predicted capacity needs. Illustrative diagrams of each alternative are included in Figure 3.1, Figure 3.2, and Figure 3.3.

- **Alternative 1: Passenger Rail** provides the highest level of service and requires the greatest investment. It includes passenger rail from Memphis to BlueOval City, express bus from Jackson, and supporting community buses and regional vanpools from the 11-county area.
- **Alternative 2: Express Bus** relies primarily on express bus services, requiring a lower level of investment than Alternative 1. It includes express bus from both Memphis and Jackson to BlueOval City as well as supporting community buses and regional vanpools from the 11-county area.
- **Alternative 3: Local Bus** attempts to provide similar levels of access to BlueOval City at a lower level of investment. It includes transit bus service from Memphis and Jackson to BlueOval City and supporting community buses and regional vanpools from the 11-county area.

Figure 3.1 Alternative 1: Passenger Rail

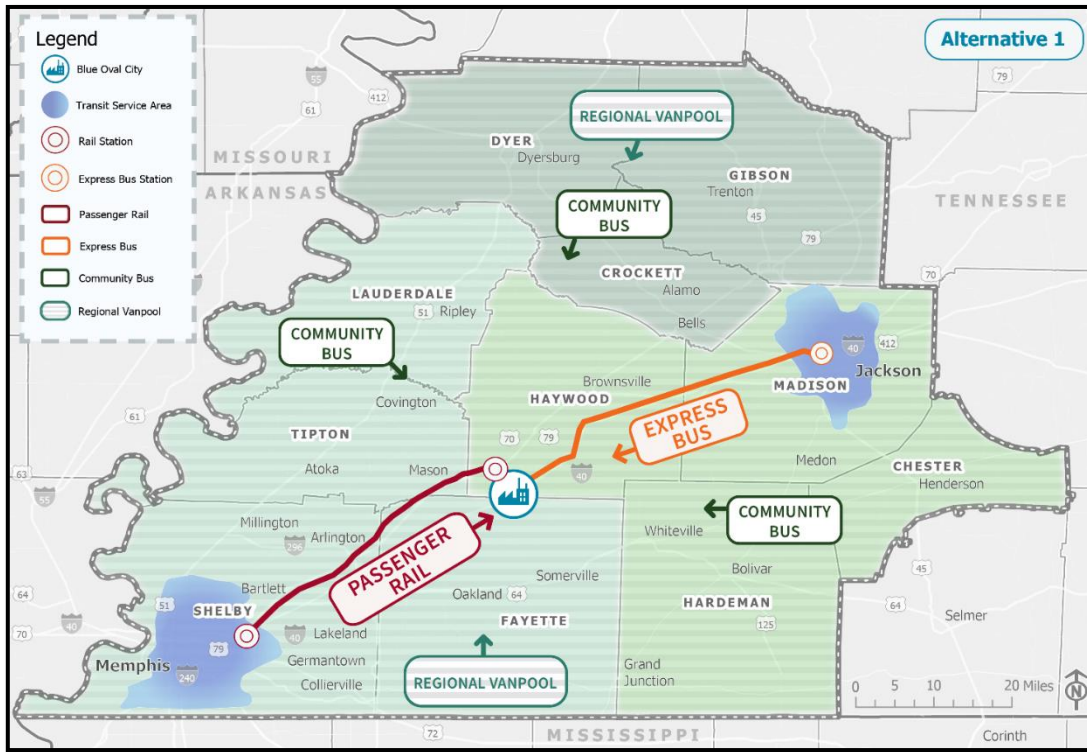


Figure 3.2 Alternative 2: Express Bus

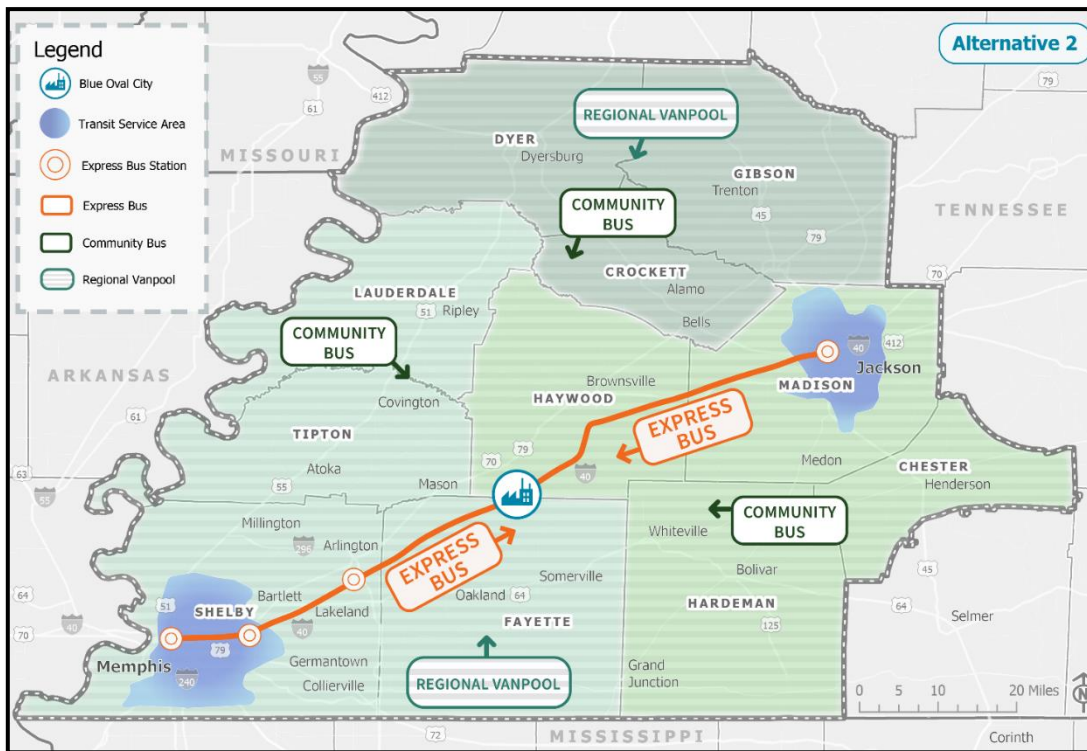
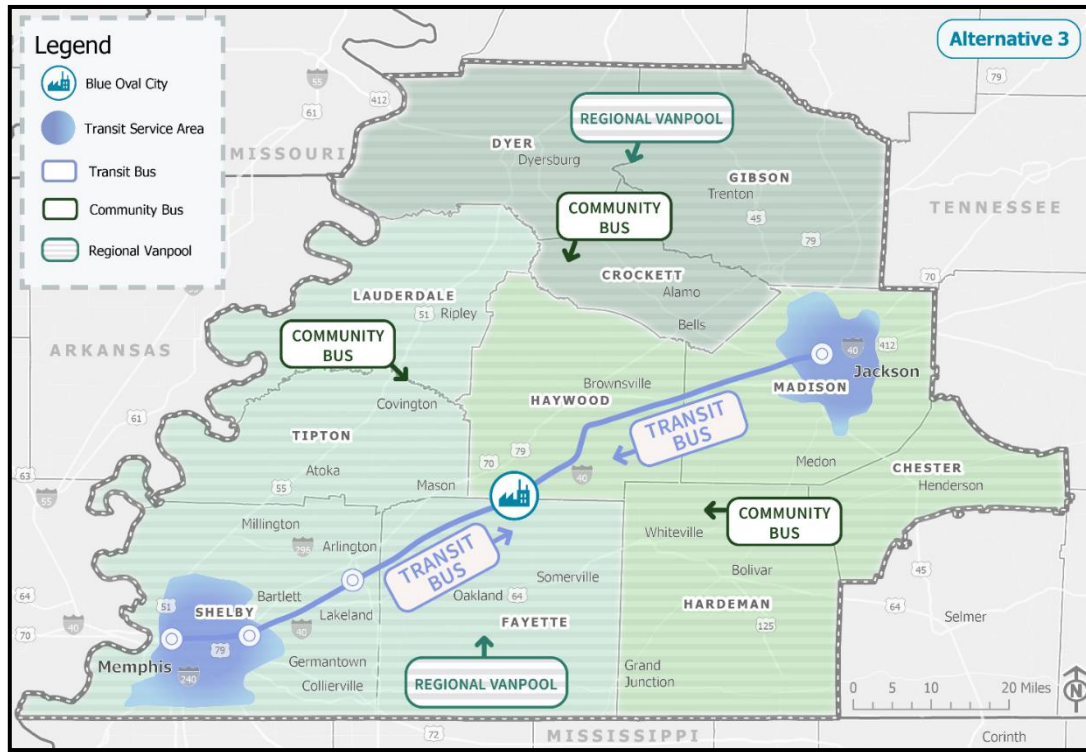


Figure 3.3 Alternative 3: Local Bus



4.0 Alternatives Evaluation and Summary

Each alternative has various merits and drawbacks in providing service to BlueOval City. Evaluating these against each other, and conducting other analyses, will assist in selecting a preferred alternative. This analysis includes estimates such as ridership, anticipated cost, and impacts to the economic, as well as qualitative measures in how well each satisfies the defined project goals (see Section 1.3).

4.1 Ridership Estimate

The costs and impacts of the BlueOval City transit service are dependent on the expected ridership. More detailed information on the development of ridership estimates are provided in *Technical Memorandum 3: Cost and Ridership Estimates*.

Ridership estimates were developed based on three study components:

- Geographic distribution of BlueOval City workers;
- Estimates for workers' mode choice; and
- Preliminary service scheduling to accommodate proposed work shifts.

The geographic distribution assumptions determined the scope of service from various regions, which influenced modal expectations and vehicle counts. Mode choice of commuters is highly variable and difficult to project as there are many influencing factors including fare burden, travel time savings, comfort, and general household automobile access. The estimate for modal splits for workers further helps determine the expected scope of transit service across each mode and region.

The preliminary service schedule is built to accommodate the proposed shift schedule and worker count based on arrival times of shift groups. Estimated worker counts could continue to adjust as BlueOval City commences operation. The ridership estimates therefore should be understood as preliminary and subject to change based on actual conditions. Table 4.1 displays the weekly ridership estimate for all three alternatives is 6,916, split differently by mode under alternative 1, but the same under Alternatives 2 and 3.

Table 4.1 Weekly Ridership Estimates by Mode

Mode	Alternative 1 Passenger Rail	Alternative 2 Express Bus	Alternative 3 Local Bus
Passenger Rail	5,680	-	-
Coach Bus	490	6,170	6,170
Small Bus	440	440	440
Vanpool	306	306	306
Total	6,916	6,916	6,916

Source: Cambridge Systematics, Inc.

These estimates equate to an annual ridership of over 345,000 trips across all modes and service providers.

4.2 Cost Estimate

Costs to provide transit to BlueOval City are composed of upfront capital expenses for infrastructure and vehicles as well as recurring operating and maintenance costs. Both costs were estimated based on the number of vehicles that would be needed to meet expected ridership demand. A review of existing costs for comparable transit services in peer agencies informed the cost estimates for the alternatives. More detailed information on the development of these cost estimates is provided in *Technical Memorandum 3: Cost and Ridership Estimates*.

For capital expenses (Table 4.2), Alternative 1 has a significantly higher estimated capital expense due to the passenger rail infrastructure. Alternatives 2 and 3 have similar vehicle count needs, and vary only slightly based on station expenses and differences in vehicle types. The annual operating and maintenance expense estimates (Table 4.3) remain highest for Alternative 1, with similar expenses for Alternatives 2 and 3. Please note that these costs are planning level estimates and are subject to variance with ranges for error.

Table 4.2 One-Time Capital Expenses for Each Alternative

Mode	Component	Alternative 1 Passenger Rail	Alternative 2 Express Bus	Alternative 3 Local Bus
Passenger Rail	Locomotive	\$74,500,000		
	Passenger Car	\$78,500,000		
	Stations	\$34,500,000		
	Maintenance/Storage Facility	\$48,000,000	-	-
	Guideway Rehabilitation	\$49,000,000		
	Track Access	\$90,000,000		
Bus	Coach/Transit Bus Vehicle	\$2,280,000	\$5,130,000	\$6,930,000
	Stations	\$900,000	\$900,000	\$225,000
Community Bus	Vehicles	\$420,000	\$420,000	\$420,000
Vanpool	Vehicles	\$550,000	\$550,000	\$550,000
Total		\$468,586,000	\$7,000,000	\$8,125,000

Source: Cambridge Systematics, Inc.

Table 4.3 Annual Operating and Maintenance Costs for Each Alternative

Mode	Alternative 1 Passenger Rail	Alternative 2 Express Bus	Alternative 3 Local Bus
Passenger Rail	\$4,212,400	-	-
Coach/Transit Bus	\$244,400	\$2,034,800	\$1,849,600
Community Bus	\$233,800	\$233,800	\$233,800
Vanpool	\$298,900	\$298,900	\$298,900
Total	\$4,989,500	\$2,567,500	\$2,382,300

Source: Cambridge Systematics, Inc.

4.3 Economic Benefits

For estimating the economic benefits, two different analyses were conducted: a benefit-cost analysis (BCA) and an economic impact analysis (EIA). More detailed information on the development and results of the BCA and EIA estimates are provided in *Technical Memorandum 4: Evaluation of Alternatives*.

The BCA was conducted with the benefit-cost methodology recommended by the U.S. DOT BCA Guidance.² The key methodological components include comparing a “No Build” base scenario to a “Build” scenario, assessing project benefits over the 30 years of operations after project completion, estimating capital and O&M costs, and discounting project benefits and costs using a seven percent real discount rate.

The BCA ratio, defined as the ratio of total discounted benefits to total discounted costs, resulted in 0.23 for Alternative 1, 3.76 for Alternative 2, and 3.94 for Alternative 3 (Table 4.4). The costs far outweigh the benefits of Alternative 1: Passenger Rail and, in this case, it is not a recommended alternative. Alternatives 2 and 3 would generate significant benefits, with almost \$4.00 dollars in benefits for every \$1.00 in costs.

Table 4.4 Benefit-Cost Analysis Summary (2021\$)

Alternative	Total Discounted Costs	Total Discounted Benefits	BCR = Benefits / Costs
Alternative 1: Passenger Rail	\$401,154,438	\$91,405,327	0.23
Alternative 2: Express Bus	\$26,518,207	\$99,730,995	3.76
Alternative 3: Local Bus	\$25,344,357	\$99,730,995	3.94

Source: Cambridge Systematics, Inc.

An EIA estimates the impact on employment (number of job-years supported), earnings (compensation of employees), and Gross Domestic Product (GDP). The causes for this impact reflect the one-time capital investments and the annual O&M expenses and household savings for each alternative. The summary of the EIA (Table 4.5) results in Alternative 1 with the highest direct, indirect, and induced employment. On the other hand, Alternatives 2 and 3 are estimated to have the most expansive impact on GDP per dollar invested in capital expenditures. Alternative 1 is the most expansive project in terms of GDP derived from operating expenditures and household savings.

Table 4.5 Economic Impact Analysis Summary

EIA Category	Sub-Categories	Alternative 1 Passenger Rail	Alternative 2 Express Bus	Alternative 3 Local Bus
Direct Employment	Full Time	74	21	21
	Part Time	4	6	3
	Total	78	27	24
Indirect & Induced Employment	One-Time	1,290	52	57
	Annual	122	98	86
	Total	1,412	150	143

² <https://www.transportation.gov/sites/dot.gov/files/2023-01/Benefit%20Cost%20Analysis%20Guidance%202023%20Update.pdf>

EIA Category	Sub-Categories	Alternative 1 Passenger Rail	Alternative 2 Express Bus	Alternative 3 Local Bus
Total New Employment		1,490	177	167
One-Time Capital Expenses	GDP per \$ Investment	\$0.50	\$0.79	\$0.75
	Earnings per \$ Investment	\$0.27	\$0.38	\$0.35
Annual Operational Expenses + Household Savings	GDP per \$ Investment	\$0.78	\$0.74	\$0.74
	Earnings per \$ Investment	\$0.37	\$0.36	\$0.35

Source: Cambridge Systematics, Inc.

4.4 Qualitative Measures and Evaluation

Each alternative was assessed against the evaluation measures and received a performance score for each goal. The scale represents five different values ranging from ‘does not meet requirements for criterion’ which represents the lowest score to “meets and/or exceeds all requirements of criterion” which represents the highest score. More detailed information on reasons and assumptions for each goal area and evaluation are provided in *Technical Memorandum 4: Evaluation of Alternatives*.

Overall, when considering how well each alternative addresses the four identified goal areas, Alternative 2 has a slight edge. The express, coach buses are considered more comfortable than local buses, while still being a relative lower cost, especially compared to Alternative 1. Alternative 2 is also assumed to have very limited number of stops while still offering direct routes to the destination.

Table 4.6 Project Evaluation Results

Goal Areas	Project Objectives	Alternative 1 Passenger Rail	Alternative 2 Express Bus	Alternative 3 Local Bus
Connect	<i>Provide feasible commute alternatives to driving for employees</i>			
Thrive	<i>Support existing rural and urban communities</i>			
Develop	<i>Support local and regional economic development goals</i>			
Sustain	<i>Develop services sustainable over the long term</i>			

	Meets and/or exceeds all requirements		Marginally meets some requirements
	Meets most requirements		Does not meet requirements
	Meets some requirements		

4.5 Preferred Alternative

Based on the discussed estimates, analyses, and evaluations, Alternatives 2 and 3 are both viable options and acceptable alternatives for providing transit service to BlueOval City. They both offer nearly \$4.00 in benefits for every \$1.00 in costs and address the identified goal areas. Between the two options, Alternative 2: Express Bus would have a slight edge, with coach buses offering comfort and amenities ideal for long-distance commuting.

5.0 Funding and Implementation

There are various possible options for funding transit service, with various Federal grants and formula funds as well as state and local funds. However, not all of these are viable for the proposed BlueOval City transit service due to eligibility requirements. The options outlined below are the capital and O&M funding sources recommended to pursue. Additionally, this section outlines various options to implement transit for BlueOval City, including considerations that would influence funding eligibility and execution. More detailed information on the funding and implementation options are provided in *Technical Memorandum 5: Funding and Implementation*.

5.1 Most Promising Funding Sources

Over 30 Federal, state, and local sources were analyzed for eligibility and estimated award amount. The sources ranged from competitive grants, formula funds, financing options, along with other opportunities. Based on available research, historic funding to Tennessee and peer agencies, and availability of funds, the most promising sources are listed below.

These sources are separated into start-up (Table 5.1 and Table 5.2) and continuous (Table 5.3). Start-up funding options are more readily available and/or are aimed at funding new transit service. The continuous funding sources are options for longer-term operations and could be available on an annual basis. The applicability of any of these will depend on support of local and state government and the organizational structure of service. Additionally, some of these sources are competitive, which offers no guarantee of funding.

Table 5.1 Start-Up Capital Funding Sources

Funding Source	Source Type	Potential Capital Award
Congestion Mitigation and Air Quality (CMAQ) Improvement Program	Federal Grant	\$2,500,000
Tennessee IMPROVE Grant	State Competitive	\$5,000,000

Table 5.2 Start-Up Operating and Maintenance (O&M) Funding Sources

Funding Source	Source Type	Potential O&M Award
Fare Collection and Employer Assistance	Operating Revenue	\$1,000,000 (or ~27% of service)
Congestion Mitigation and Air Quality (CMAQ) Improvement Program	Federal Formula	\$500,000
Areas of Persistent Poverty Program	Federal Competitive	\$100,000
IRA Neighborhood Access and Equity Grant Program	Federal Competitive	\$100,000
State Match for Federal Awards / Assistance	State Formula	10-15% of service costs

Table 5.3 Continuous Funding Sources

Funding Source	Source Type	Potential O&M Award
Fare Collection and Employer Assistance	Operating Revenue	\$1,000,000 (or ~27% of service)
Section 5307 – Urbanized Area Formula Grant	Federal Formula	\$1,000,000
Section 5311 – Formula Grants for Rural Areas	Federal Formula	\$700,000
Areas of Persistent Poverty Program	Federal Competitive	\$100,000
IRA Neighborhood Access and Equity Grant Program	Federal Competitive	\$100,000
State/Local Match for Federal Awards / Assistance	State Formula	10-15% of service costs

5.2 Organizational Framework

The outlined transit service for BlueOval City would primarily be new service, serving the facility with a mixture of fixed-route and demand-response transit. Because the region includes multiple transit agencies, each with defined jurisdictions and operating areas, some creative and new organization will be required to implement Alternative 2: Express Bus. The two most promising avenues include:

- **Regional Transportation Authority (RTA):** Develop a regional transit system, like the RTA of Middle Tennessee, to govern transit for BlueOval City. While it would require state legislative action, it would streamline distribution of service, simplifying funding, having uniform target setting, and reducing the required coordination.
- **Existing Service Operators:** Coordinate BlueOval City service through existing operators: MATA, Jackson Transit Authority, and the three Human Resource Agencies. This would add onto existing service to utilize the established administration, funding opportunities, and resources. Local agreements, such as JPAs, can address responsibilities and coordination.

Another consideration when selecting an organization framework and starting up service relates to obtaining vehicles and operating service. There are two general avenues:

- **Purchased Transportation:** In the absence of funding (especially capital) required to start the service through public transit operators, coordinators can pursue an arrangement to broker service through a private operator.
- **Directly Operated:** If funding and/or vehicles are available, coordinators can own and operate their own vehicles. This is how many public transit operators implement service, including MATA and Jackson Transit Authority.

5.3 Implementation

There are a few service option considerations that could offer either additional funding or flexibility to execute transit service with limited funding while accomplishing the project goals and objectives. This includes the three listed below.

- **Gradual Service Escalation:** Ramp-up service utilizing the funding available at the initiation of service. Aligns with BlueOval City's proposed employee escalation schedule during the first 12 to 18 months of operation.
- **Battery Electric Buses:** Although the primary plan is to use diesel fueled buses, there is significant capital funding assistance available (especially after recent legislation) for low/zero emission vehicles. MATA recently used these grants to acquire electric buses and maintenance facilities and will shortly have a body of experience to help assess feasibility, vehicle performance, feedback, and lessons learned.

6.0 Summary

BlueOval City in Haywood County, Tennessee is a new facility hosting a variety of manufacturing plants. These include a Ford Stamping and Assembly plant producing Ford's next generation electric truck and a Ford /SK Joint Venture Battery Plant, among other suppliers. With this new development and subsequent supporting businesses, the area will experience a large influx of employees, with over 10,000 employees estimated at the site, with continuous shifts seven days a week. This will also create an increase in freight arrivals and departures to support operations and manufacturing of the various assembly complexes and suppliers.

Currently, this area in West Tennessee is rural, with low density and little development. The inclusion of transit options to access this site will greatly benefit the community and future employees at BlueOval City, providing a viable commuting option and expanding access to talent. Additionally, supporting an alternative transportation option will help alleviate the expected drastic increase in roadway congestion.

This transit study focused on viable alternatives for providing public transportation to BlueOval City, considering existing transit service, work trip flows, and demographics. Additionally, the alternatives accounted for specific BlueOval City features, such as anticipated number of employees and shift patterns. These alternatives also included details about the proposed transit technologies, general pick-up locations, and other service designs.

After the development of the alternatives, all three options were evaluated against their anticipated ridership, cost, economic benefit, and impact, and how well they address the project goals. From this evaluation, both Alternative 2: Express Bus and Alternative 3: Local bus were viable options for providing transit to BlueOval City. Between the two, Alternative 2: Express Bus had a slight edge due to the coach bus amenities.

The study also identified funding sources for capital and O&M costs for Alternative 2: Express Bus. This included Federal, state, and local sources with the most promising ones given program requirements and transit service details.

For implementing the service, there are various choices that will be dependent on political resources, available funding, and regional coordination. Some possible options include allowing existing transit operators (MATA, JTA, and the HRAs) to provide transit service from their respective areas or developing a regional RTA. Both have drawbacks and benefits, especially for supporting service in the short- and long-term.