



# SR 21 ACCESS MANAGEMENT STUDY

Prepared For:



Prepared By:



In Partnership With:



# Acknowledgements

## SR 21 Access Management Study

### Project Fundings Partners



### Prepared By



### In Partnership With



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## 1 EXECUTIVE SUMMARY

State Route 21 (SR 21) is a northwest-southeast major thoroughfare that parallels the Savannah Port and provides direct access to Interstate 95 (I-95) to the north and Interstate 516 (I-516) to the south. The limits of this study are SR 21 from SR 25/Burnsed Boulevard to Grange Road, the majority of which is in Garden City, Georgia as shown in Figure 1-1. SR 21 (a.k.a. Augusta Road) is characterized by the presence of freight, low density retail and fast-food restaurants, Mercer Middle and Grove High Schools on the west side of the corridor, and industrial developments on the northern end of the corridor.

Over recent years, Garden City has seen considerable development and redevelopment. Most notably for SR 21 within the study area, the Savannah Chatham County Public School System is constructing a new K-12 campus at the intersection of SR 21 and Pricilla D. Thomas Way, which is the current site of Groves High School. SR 21, a 7-lane thoroughfare, is inundated with access points and driveways to individual parcels, at times 2-3 driveways per parcel. Additionally, SR 21, within the study area, has experienced higher than average vehicular and pedestrian crash rates.

#### *Study Purpose*

With the new school as a catalyst for redevelopment in the area, the purpose of the SR 21 Access Management Study (P.I. No. 0017427) is to analyze existing and future roadway conditions and provide recommendations to address the corridor's operations and safety, multimodal improvements, streetscape elements, and economic development. Access management goals include reducing traffic delay and congestion, promoting properly designed access and circulation systems for development, providing property owners and customers with safe access to roadways, and pedestrian and bicycle travel.

#### *Study Process*

The study process included collection and analysis of existing data, identification and analysis of future corridor specific needs, and recommending improvements. To accomplish these tasks, stakeholders and public meetings were conducted to identify specific needs along the corridor and to fine-tune the recommendations in a way that best serves the residents and business owners along SR 21.



**Image 1-1: SR 21 looking North towards Smith Avenue**



**Figure 1-1: Study Limits along SR 21**

## 1.1 EXISTING CONDITIONS AND NEEDS ASSESSMENT

Typical sections and right-of-way (ROW) width vary along SR 21. The existing between Minus Avenue and Smith Avenue is shown in Figure 1-2. Some sections have curb and gutter, some have shoulders and ditches, some have shoulders that extend into contiguous parking lots.

### *Sidewalks*

There are no sidewalks on the northern segment of SR 21, between Grange Road and Smith Avenue. The sidewalks provided south of Smith Avenue vary in width. On the west side of SR 21 the sidewalk width expands to as much as 8-10 feet. The sidewalk east of SR 21 varies between 4-6 feet. The overall condition of the sidewalks along the corridor is in fair to poor condition; with segments crumbling, overgrown with vegetation and no ADA ramps.

### *Traffic Operations*

Under 2021 existing conditions, all the signalized intersections are operating above **LOS D** standard except for the intersection of SR 21 and GA 307, which is operating at **LOS E**. Several of the side streets along SR 21 experience excessive delay, potentially caused by the amount of through traffic on SR 21 as well as the number of lanes turning vehicles must traverse to make a left turn. Also, traffic flow is periodically interrupted during the day as railcars cross at the railroad crossing that traverses SR 21, north of Brampton Road.

### *Safety*

For all segments along SR 21, the crash rate is higher than the statewide average for principal arterials as shown in Figure 1-3. The total crashes along the 3.2 mile stretch of SR 21 between 2016 and 2020 resulted in a total economic cost of over \$22,195,000, approximately \$4,450,000 per year. Additionally, a Road Safety Audit (RSA) was conducted along the corridor with representatives from the project advisory group to help identify safety issues or concerns.

### *Access*

The SR 21 corridor, particularly between Minus Avenue and Smith Avenue, has clusters of driveways near other driveways and/or intersections, which can make it either difficult or confusing for vehicles to make their desired turning movement at the driveways. Figure 1-4 shows an example of the driveway density along the corridor north of Priscilla D Thomas Way. According to the National Cooperative Highway Research Program's (NCHRP) Report Impacts of Access Management Techniques, driveway density and crash rates show a strong correlation, which is evident for the crash rates and driveway density along SR 21.

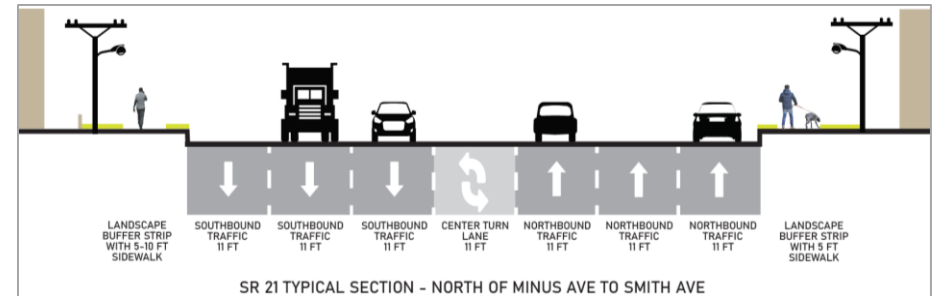


Figure 1-2: Existing Typical Section on SR 21 (Smith Ave to Minus Ave)

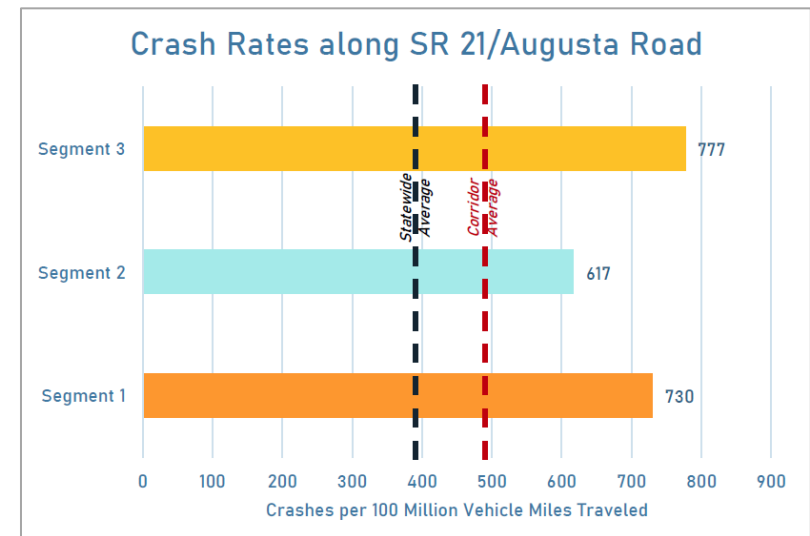


Figure 1-3: Crash Rates along SR 21



Figure 1-4: Driveway Density on SR 21 North of Priscilla D Thomas Way

## 1.2 PUBLIC ENGAGEMENT

The SR 21 Access Management Study was sponsored by Garden City. A project advisory group (PAG) guided the study's progress and was made up of constituents who have an interest in the long-term success of the corridor. The PAG included representatives from:

- Bike-Walk Savannah
- Chatham Area Transit (CAT)
- Chatham County
- City of Garden City
- Coastal Region Metropolitan Planning Organization (CORE MPO)
- Georgia Department of Transportation (GDOT)
- Georgia Ports Authority (GPA)
- Savannah Chamber of Commerce
- Savannah Economic Development Authority (SEDA)
- Savannah/Hilton Head International Airport
- Savannah-Chatham County Public School System (SCCPSS)

The study team developed the recommendations outlined in the study through extensive input from the public. Input was gathered through a series of outreach events and public meetings. Through the engagement process, the following goals were developed as a framework for the recommendations for the corridor:

- Promote safety and efficiency for all travel modes given current and projected future demand.
- Reduce crash experience along corridor.
- Improve bike/pedestrian infrastructure.
- Improve access and connectivity to alternate modes of travel such as transit, biking, and walking.
- Improve traffic operations at key intersections.
- Promote economic development.

## 1.3 PLANNED PROJECTS

There are multiple planned and/or ongoing transportation investments that potentially impact the SR 21 corridor. These include investments to roadway, operations, air cargo, rail, and port assets. The study team endorses the need for these projects for improvements to capacity and connectivity within the existing roadway network. A summary of the planned and programmed improvements in the area is shown in Table 1-1.

**Table 1-1: Programmed/Planned Transportation Improvements**

Project Name	Source
Brampton Road Connector from SR 21/SR 25 to SR 21 Spur	GDOT
SR 21 at Priscilla D Thomas Way Signalization	GDOT
I-16 at I-95 Improvement Projects	GDOT
Savannah Harbor Expansion Project	GPA
Mason Mega Rail Project	GPA
Savannah-Hilton Head International Airport Air Cargo Facility Project	Savannah-Hilton Head International Airport

## 1.4 RECOMMENDATIONS

Existing issues and concerns were identified through the public involvement process as well as a technical evaluation of existing transportation conditions and projected needs along the corridor. Concerns expressed by members of the public included congestion, safety, pedestrian and bicycle accommodations, heavy truck traffic, and queuing at the railroad crossing caused by frequent ingress and egress of railcars to the port.

Based on this study's Existing Conditions and Needs Assessment analysis, highlighted in Section 4 of this report, and the goals developed during the public engagement process, recommendations were developed that address the overall corridor, key intersections, streetscape elements, and economic development.

The current cross-section for SR 21 between Smith Avenue and Minus Avenue, the longest section of the study corridor, is shown in Figure 1-2. The roadway is seven lanes with three travel lanes in each direction and a center turn lane. There are sidewalks along both sides of the roadway, which are any substandard condition for most sections.

The proposed cross-section for the corridor, shown in Figure 1-5, was developed to utilize the existing right-of-way and pavement section as efficiently as possible to accommodate all travel modes and to minimize implementation costs. The proposed cross-section maintains three travel lanes in each direction but also provides a center median with turn lanes at major roadways to provide access to adjacent developments. Along both sides of the road, 12-foot multi-use paths are recommended to accommodate both pedestrians and bicyclists.

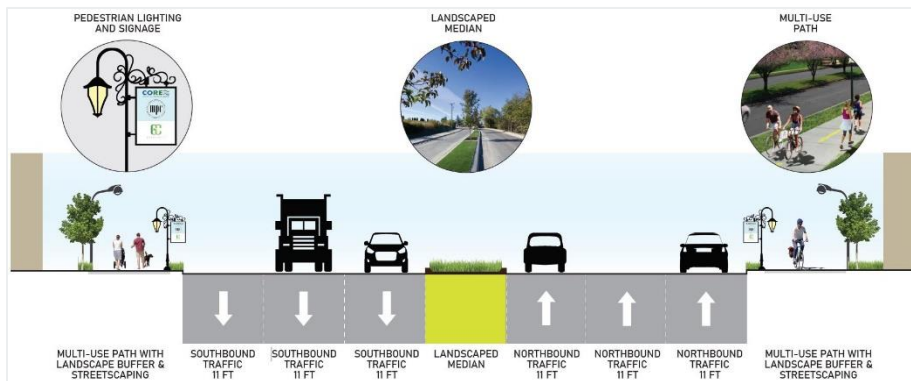


Figure 1-5: Proposed Typical Section on SR 21 (Smith Ave to Minus Ave)

The detailed list of recommendations and planning level cost estimates are included in Section 6 of this report. A map of the proposed improvements along the corridor is shown in Figure 1-6. The proposed improvements aid in improving traffic flow and safety for vehicular traffic while concurrently improving access to alternative modes of travel including walking, biking, and transit. On average, the proposed recommendations could yield a \$1,700,000 reduction in crash costs per year and \$300 worth of fuel savings per year per road user.

Recommended improvements were classified as short-, medium-, or long-term depending on implementation timeframe. The implementation plan defines a path forward in terms of project phasing based on a prioritized timeline. The timeline was established based on project cost, likely ease of implementation and ability to satisfy project goals. The timeline is an estimate and individual projects may be accelerated by increased focus and availability of funding. The implementation of the recommendations outlined in this report will require strong partnerships among the various stakeholders, both public and private, with interests along the corridor.

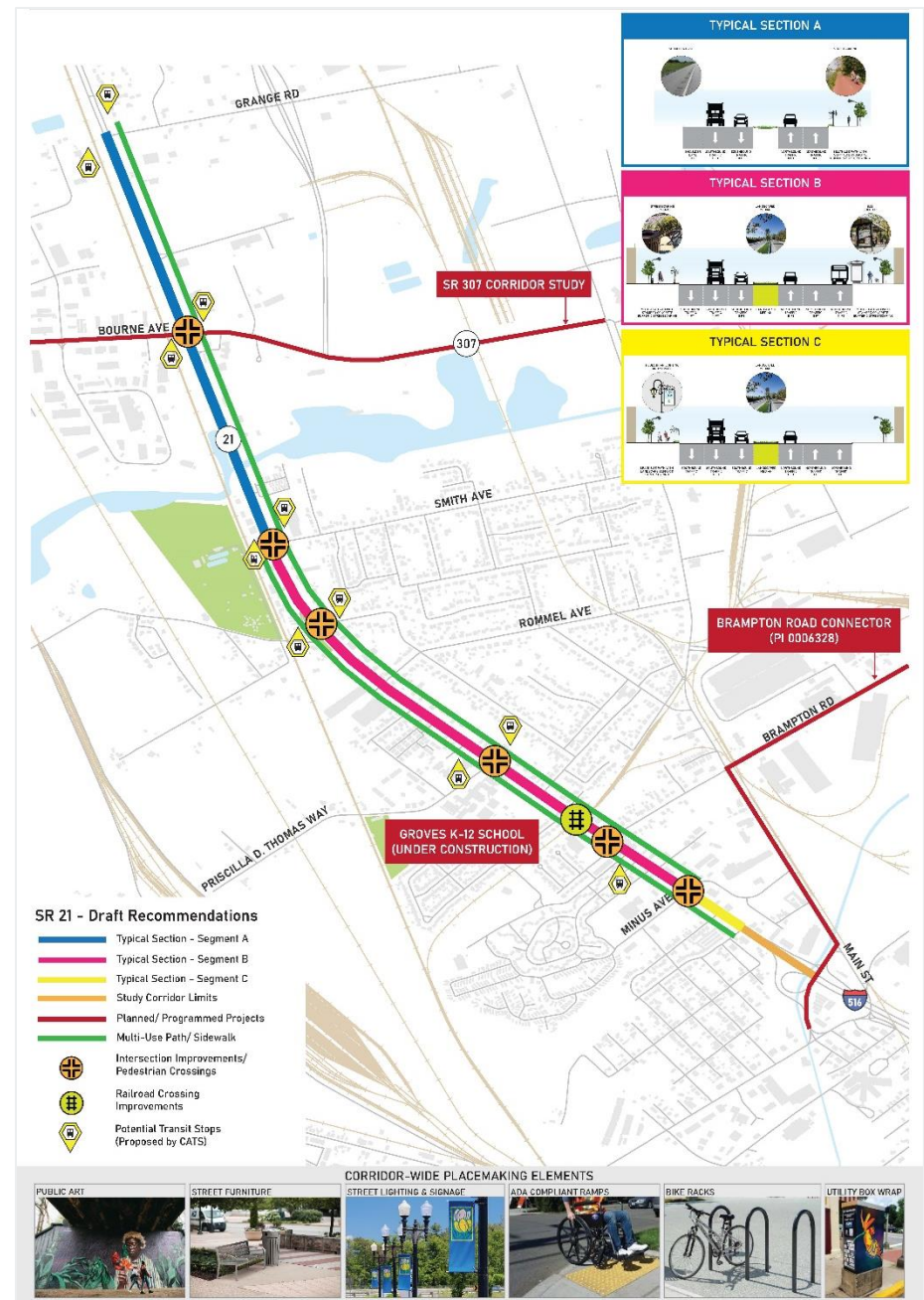


Figure 1-6: Map of SR 21 Final Recommendations

## 2 INTRODUCTION

### 2.1 STUDY BACKGROUND

SR 21 (a.k.a. Augusta Road) is a northwest-southeast major thoroughfare that parallels the Savannah Port and provides direct access to Interstate 95 (I-95) to the north and Interstate 516 (I-516) to the south. The study limits extend from SR 25/Burnsed Boulevard to Grange Road, the majority of the study corridor is in Garden City, Georgia.

Over recent years, Garden City has seen considerable development and redevelopment. Most notably for SR 21, the Savannah Chatham County Public School System is constructing a new K-12 campus at the intersection of SR 21 and Pricilla D. Thomas Way, consolidating the school campuses of Gould Elementary, Mercer Middle, and Groves High. Currently, SR 21, a 7-lane thoroughfare, is inundated with access points and driveways to individual parcels, at times 2-3 driveways per parcel. Over the years, SR 21 within the study area has experienced higher than average vehicular and pedestrian crash rates (number of crashes over a 5-year time) as compared to the state average.

### 2.2 STUDY PURPOSE

With the new school as a catalyst for redevelopment of the area, the purpose of the SR 21 Access Management Study (P.I. No. 0017427) is to analyze existing and future roadway conditions and provide recommendations to address the corridor's operations and safety, multimodal improvements, streetscape elements, and economic development.

The Federal Highway Administration (FHWA) defines Access Management as the "proactive management of vehicular access points to land parcels adjacent to all manner of roadways. Good access management promotes safe and efficient use of the transportation network. Access management goals include reducing traffic delay and congestion, promoting properly designed access and circulation systems for development, providing property owners and customers with safe access to roadways and fostering safe pedestrian and bicycle travel."

### 2.3 STUDY GOALS

Through the public engagement process, the following goals were developed as a framework for the recommendations for the corridor:

1. Promote safety and efficiency for all travel modes given current and projected future demand.
2. Reduce crash rates along corridor.
3. Improve bike/pedestrian infrastructure.
4. Improve access and connectivity to alternate modes of travel such as transit, biking, and walking.
5. Improve traffic operations at key intersections.
6. Promote economic development.

### 2.4 STUDY PROCESS AND TIMELINE

Significant portions of the SR 21 Access Management Study involved collecting and analyzing existing relevant data along the corridor including identifying land use types, environmental resources, traffic operations, crash data, and other physical characteristics of the study area.

To ensure that the specific needs of the community were incorporated into the study recommendations, a project advisory group (PAG) was formed to guide the technical and administrative aspects of the study. To obtain the community's input on critical issues and needs along SR 21, and to obtain feedback on the initial set of improvement alternatives, two virtual public meetings were conducted. Comments from the public meetings and project advisory group were incorporated into the final recommended improvements.

The implementation plan for SR 21 improvements was recommended to be either short-, medium-, or long-term. Heavily congested or high crash density areas were prioritized for short-term improvements, while less critical sections of road were recommended for medium to long-term improvements. The prioritized list of improvements was developed based on a technical analysis and input from the public involvement process. The PAG provided essential guidance and review oversight. The study team used guidance from these various groups to identify and evaluate appropriate access management and mobility tools that best fit the public's issues and desires. Figure 2-1 illustrates the study's general schedule.

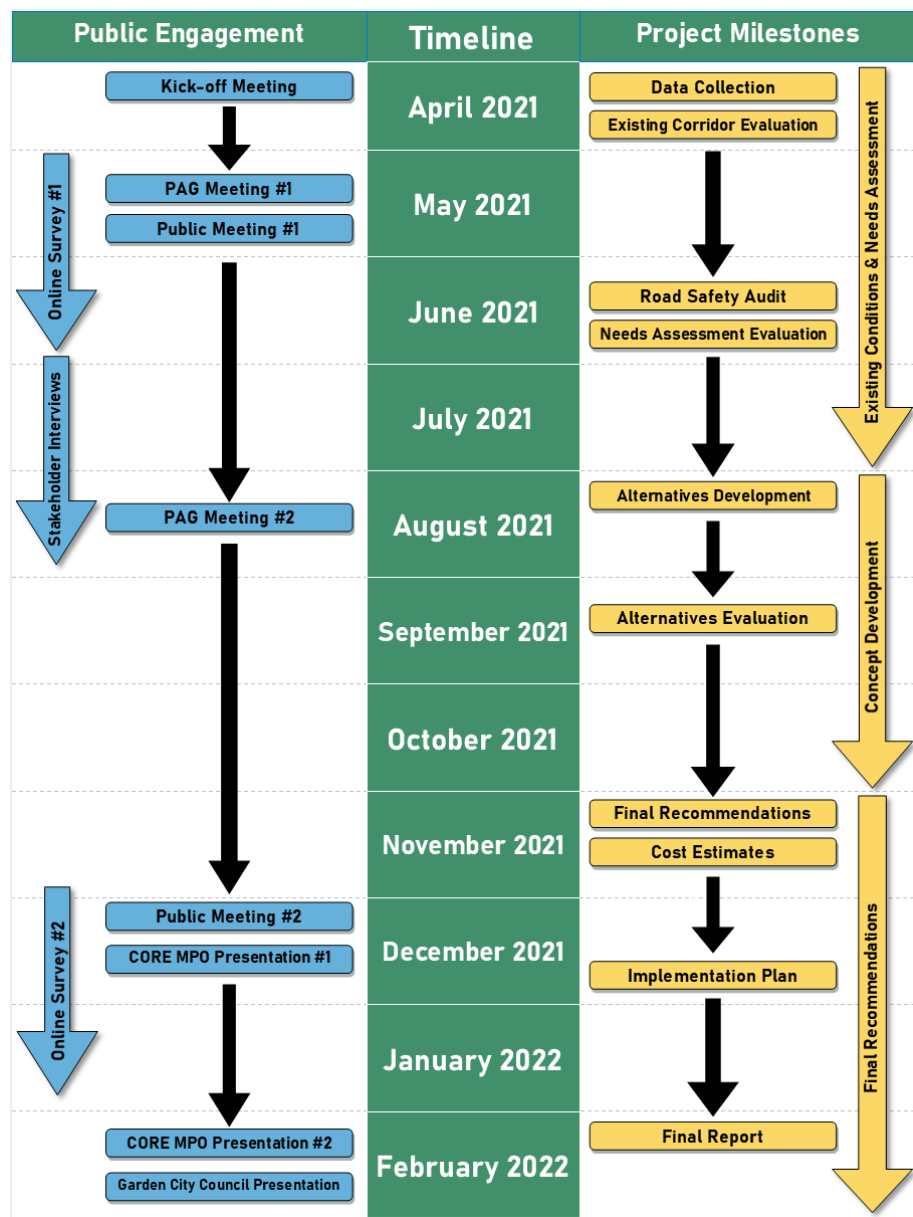


Figure 2-1: SR 21 Access Management Study Project Timeline

## 2.5 PROJECT TEAM

The Coastal Region Metropolitan Planning Organization (CORE MPO) were awarded discretionary PL funds by GDOT for the SR 21 Access Management Study (P.I. No. 0017427) and partnered with Garden City to fund the study.

Table 2-1: SR 21 Access Management Study Consultant Team

Consultant Team		
Prime	Croy Engineering	
Sub-Consultants	Symbioscity	Transport Studio
	Cambridge Systematics	Marr Traffic

### 3 PUBLIC INVOLVEMENT

#### 3.1 PUBLIC PARTICIPATION PLAN

Meaningful engagement of the community is critical to ensure that residents, businesses, community leaders, and other stakeholders have an opportunity to actively participate in the process and support the final project recommendations.

The project was structured in two phases for community engagement to (1) inform the development of the study and (2) present proposed recommendations for feedback. For each phase, the project team hosted a meeting with the Project Advisory Group (PAG), a public meeting, and an online survey. All meetings, including the PAG and public meetings, were held via Zoom due to the ongoing pandemic and to maximize convenience for attendees.

The SR 21 Access Management Study adhered to the requirements and recommendations outlined in the CORE MPO's Public Participation Plan. The goals of public participation for the SR 21 Access Management Corridor Study are to:

1. Raise the level of awareness of how interested residents and other interested parties can become involved in the Study.
2. Ensure that those interested in the Study have adequate, appropriate, and meaningful opportunities to participate.
3. Utilize the Project Advisory Group to reach interested parties in the community and within the planning area.

#### 3.2 PROJECT ADVISORY GROUP (PAG)

A Project Advisory Group (PAG) was established to provide critical input and feedback regarding the development of the study. This group served as ambassadors for the project by sharing information with their constituent groups and encouraging members of the community to actively participate in the planning process. The PAG consisted of key stakeholders, such as agencies, local government partners, the school district, business owners, operators and tenants, and relevant community organizations. The PAG included representatives from:

- Bike-Walk Savannah
- Chatham Area Transit (CAT)
- Chatham County
- City of Garden City

- Coastal Region Metropolitan Planning Organization (CORE MPO)
- Georgia Department of Transportation (GDOT)
- Georgia Ports Authority (GPA)
- Savannah Chamber of Commerce
- Savannah Economic Development Authority (SEDA)
- Savannah/Hilton Head International Airport
- Savannah-Chatham County Public School System (SCCPSS)

The project team held two workshop-style meetings with the PAG. The goal of each of the two meetings are shown below:

- Meeting 1: Develop Study Goals; Corridor Vision; Identify Needs and Opportunities – **May 13, 2021, at 10 AM**
- Meeting 2: Seek Feedback on Draft Recommendations and Concepts for Corridor – **August 26, 2021, at 2 PM**

The PAG meetings were held virtually via video conferencing as shown in Figure 3-1. The project team managed meeting logistics, invitations to PAG members, and developed meeting summaries. In addition to the PAG meetings, conversations and/or interviews were held with key stakeholders over the course of the study to provide feedback and guidance as alternatives were evaluated for the study.

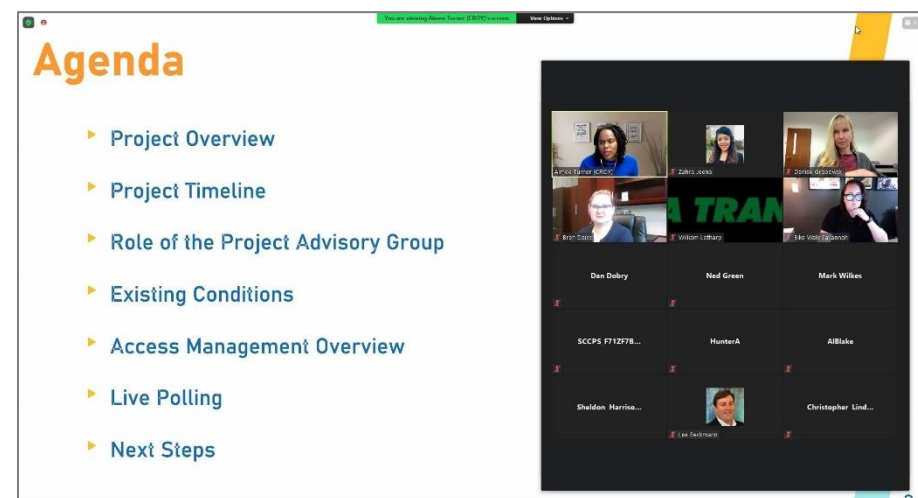


Figure 3-1: Project Advisory Group Meeting via Video Conferencing

### 3.3 PUBLIC MEETINGS

Public Meetings/Virtual Public Forums provide valuable opportunities for members of the community to participate in the study process by providing feedback at critical times during the development of the plan. It was important to reach out to members of the public that actively use the study corridor as a connecting transportation route. Meeting notices were also provided for key stakeholders to post on their websites.

The project team held two public meetings during the study process. The goal of each of the two meetings are shown below:

- Meeting 1: Introduce the project scope and timeline, and focused on the development of study goals (**May 25, 2021, at 6 PM**)
- Meeting 2: Present draft concepts and recommendations for the SR 21 corridor – **December 9, 2021, at 6 PM**

The public meetings were held virtually via video conferencing. The project team managed meeting logistics, invitations to PAG members and general public, and developed meeting summaries.

### 3.4 OUTREACH METHODS AND TOOLS

Owing to the COVID-19 pandemic, citizens were provided multiple platforms and avenues to engage virtually in the development of the study, including online surveys, website updates, virtual public forums, and social media posts. These efforts formed the basis of the public engagement effort, which used a combination of tools to capture citizen views without using traditional public open house meetings due to pandemic restrictions.

#### 3.4.1 PROJECT SPECIFIC WEBPAGE

A project webpage was hosted on the MPC/CORE MPO website (<https://www.thempc.org/Core/SR21Access>). Information for the project webpage was provided by the project team and updated by MPC staff. This website provided a central resource for the community and stakeholders to learn about upcoming meetings, view project resources and presentations, and participate in online surveys.

### 3.4.2 EMAIL BLASTS

Email blasts were distributed throughout the study process to inform citizens of the virtual public forums and provide information to the survey links. Email blast updates included information on the plan status, dates and information on upcoming virtual public forums and alerts to take the online surveys.

### 3.4.3 PRESS RELEASES/NEWS COVERAGE

Press releases were advertised on the CORE MPO and the Garden City webpages, respectively. Additional, WTOC-TV (WTOC 11), a Savannah news station, ran a news story as well as a supplemental article on their webpage detailing the first public meeting and providing links to the study's webpage and online survey. An image from the local news story is shown in Figure 3-2. Savannah Morning News also posted an article on the study following the second public meeting as shown in Figure 3-3.

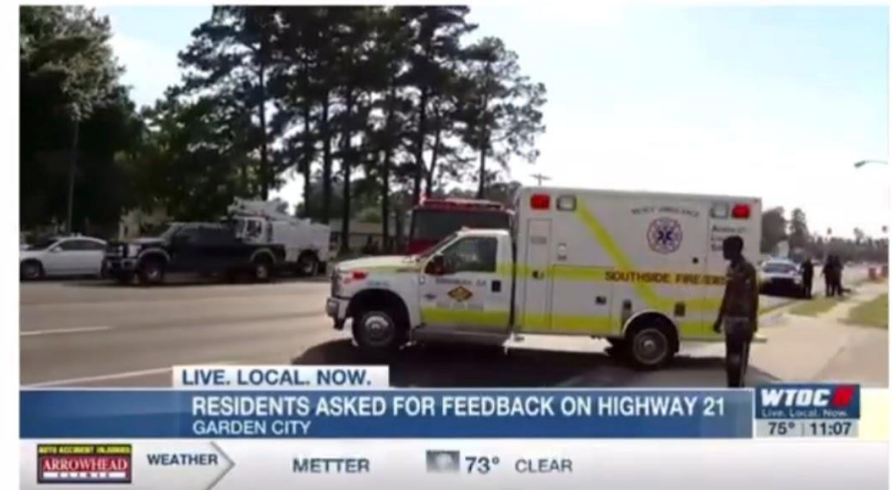


Figure 3-2: WTOC News Coverage – May 25, 2021

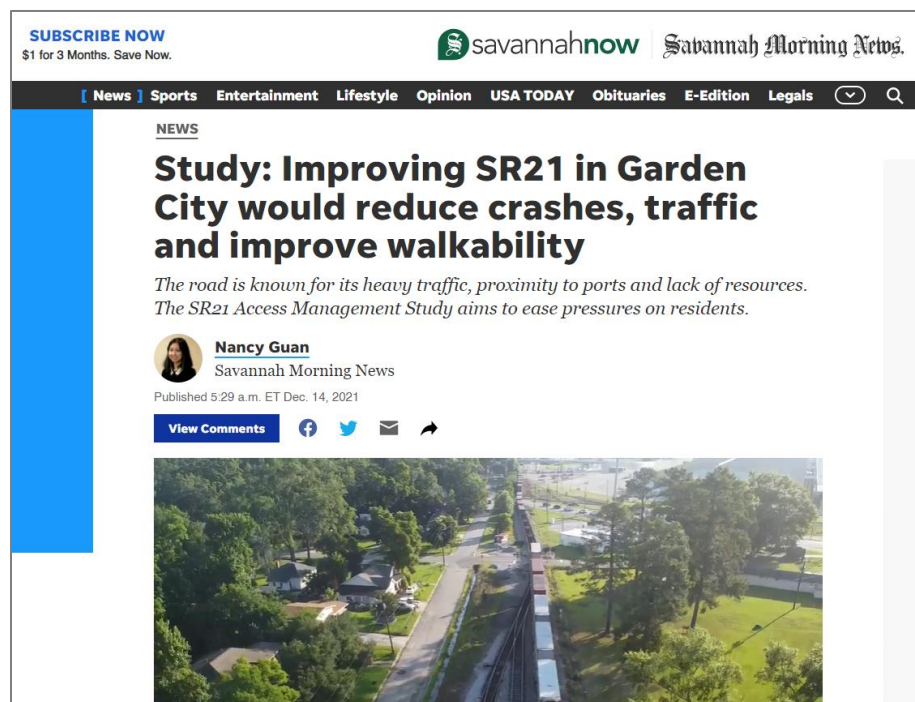


Figure 3-3: Savannah Morning News Article– December 14, 2021

### 3.4.4 SOCIAL MEDIA

CORE MPO, Garden City, CAT, and Bike Walk Savannah posted information on their respective Facebook and Twitter pages to inform the community of upcoming events, access to the online survey, and plan updates during the planning process. Figure 3-4 represents examples of the various social media posts.

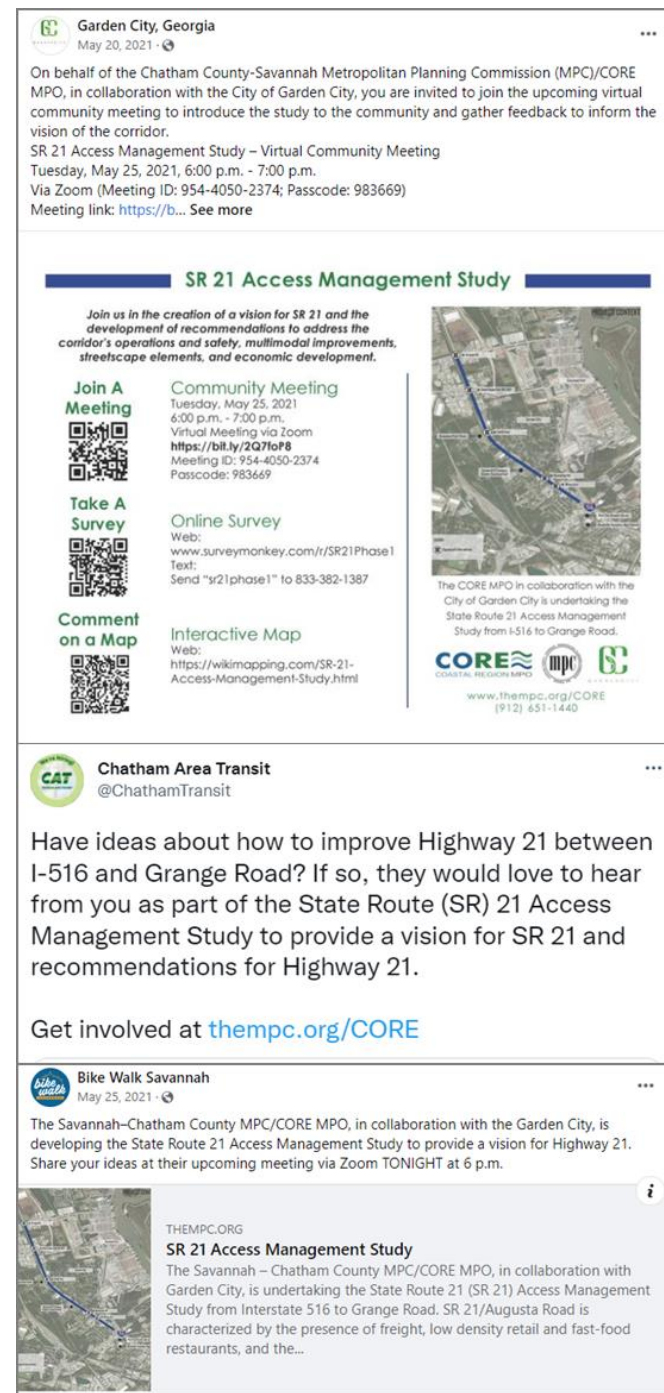


Figure 3-4: Social Media Posts regarding SR 21 Study

## 3.5 ONLINE SURVEYS

Online surveys are a resource tool that can be distributed to the public and stakeholders allowing the study team to gather more feedback by residents and businesses affected by the study who were not able to attend public meetings.

The first online survey was live from mid-May 2021 through the end of June 2021. The goal of the first survey was to gather input regarding challenges and need improvements along corridor. Figure 3-5, Figure 3-6, and Figure 3-7 summarize some of the key findings from the first round of public engagement.

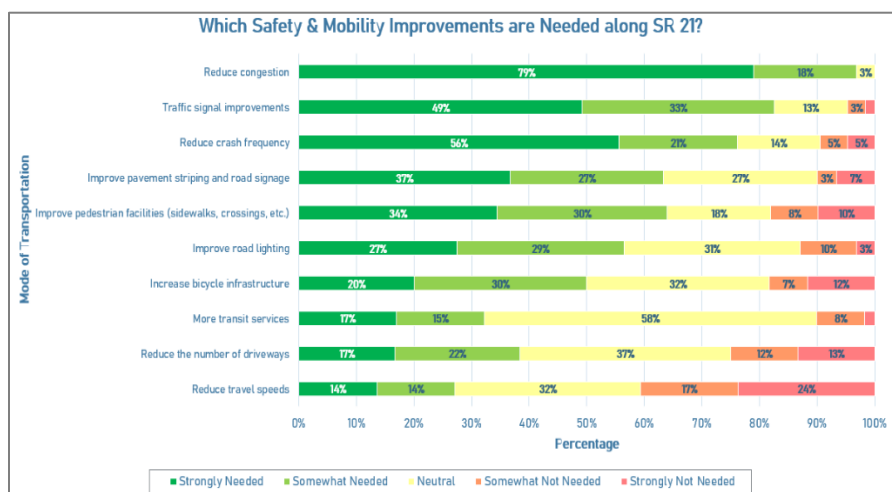


Figure 3-5: Survey Results - Safety & Mobility Improvements Needed



Figure 3-6: Survey Results - Challenges/Concerns

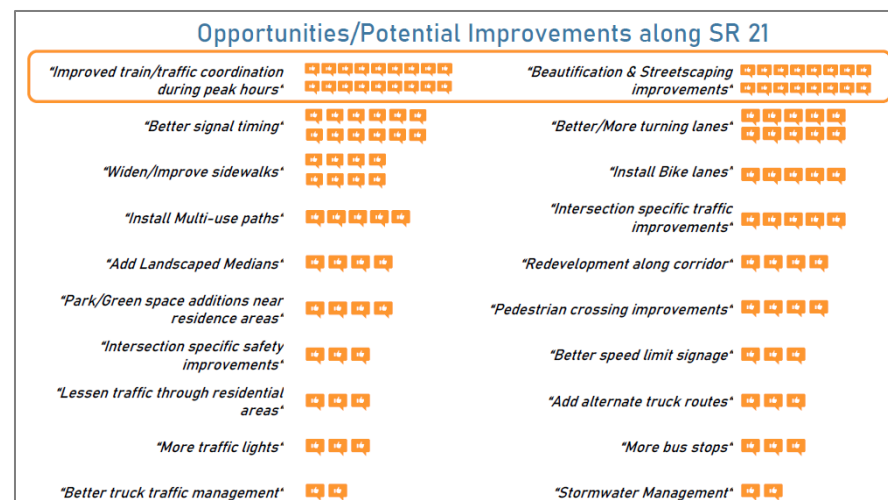


Figure 3-7: Survey Results - Opportunities/Potential Improvements

The second online survey was live from early December 2021 through mid-January 2022. The goal of the second survey was to gather input regarding the proposed recommendations for improvement along the corridor. Figure 3-8 highlights the survey findings for the recommended improvements.

## Summary of Opinion of Recommended Improvements

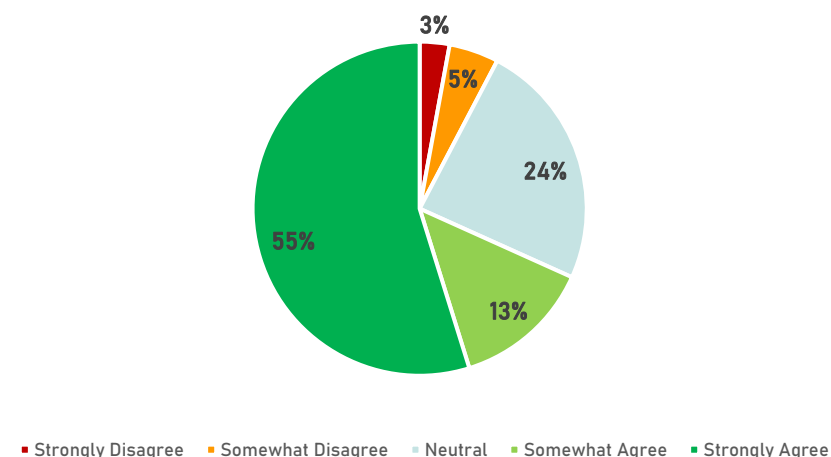


Figure 3-8: Survey Results - Opinion of Recommended Improvements

## 4 EXISTING CONDITIONS AND NEEDS ASSESSMENT

### 4.1 LAND USE AND ECONOMIC ENVIRONMENT

#### 4.1.1 EXISTING LAND USE

The SR 21 study area sits northwest of the City of Savannah and is primarily in the incorporated area of Garden City from SR25/Burnsed Boulevard to GA 307. North of GA 307, SR 21 is in unincorporated Chatham County. The area's land use opportunities and challenges are representative of Garden City as a whole, as described in the City's 2016 Urban Redevelopment Plan:

*Established in 1939 as a bedroom community to the City of Savannah, Garden City has experienced a significant shift from residential and light commercial development to industrial development. The changing dynamic in development has led to disinvestment in some of the older neighborhoods within the City, encroachment of industrial land uses proximate to residential areas, declining pockets of commercial and retail businesses, and deterioration of structures. As a result, some areas of the City are experiencing higher vacancy rates, declining property values, and general property neglect.*

Figure 4-1 shows existing land use classifications based on tax assessor parcel data. SR 21 provides access to significant industrial land uses in Chatham County and serves as an alternate route to the Georgia Ports Authority Port of Savannah. Attracted by the proximity to the airport, Gulfstream Aerospace, and the port, industrial supply and machinery companies as well as warehousing/trucking and logistics companies are located on the corridor's northern segment. Commercial uses concentrated on the southern segment include gas stations, franchise and independent fast-food restaurants, auto repair shops, banks, small shopping centers, pawn shops, and hotels.

There are two public schools in the study area, Mercer Middle School and Groves High School. The Groves High School site includes administrative buildings, a gym, and stadium. Groves High School is currently being redeveloped into a new K-12 campus, with a capacity of 2,400 students and will include a stadium seating 2,500 people. The new Groves K-12 complex will be a regional destination for school age students especially during events at the facilities, likely promoting redevelopment on SR 21.

Beyond the commercial strip lining SR 21, there are single family neighborhoods, with scattered multifamily residential uses. The neighborhoods south of Smith Avenue were established as early as the 1930s. Residential development has been low density, with lots zoned as R-1. Figure 4.1 shows the existing land use in the study area.

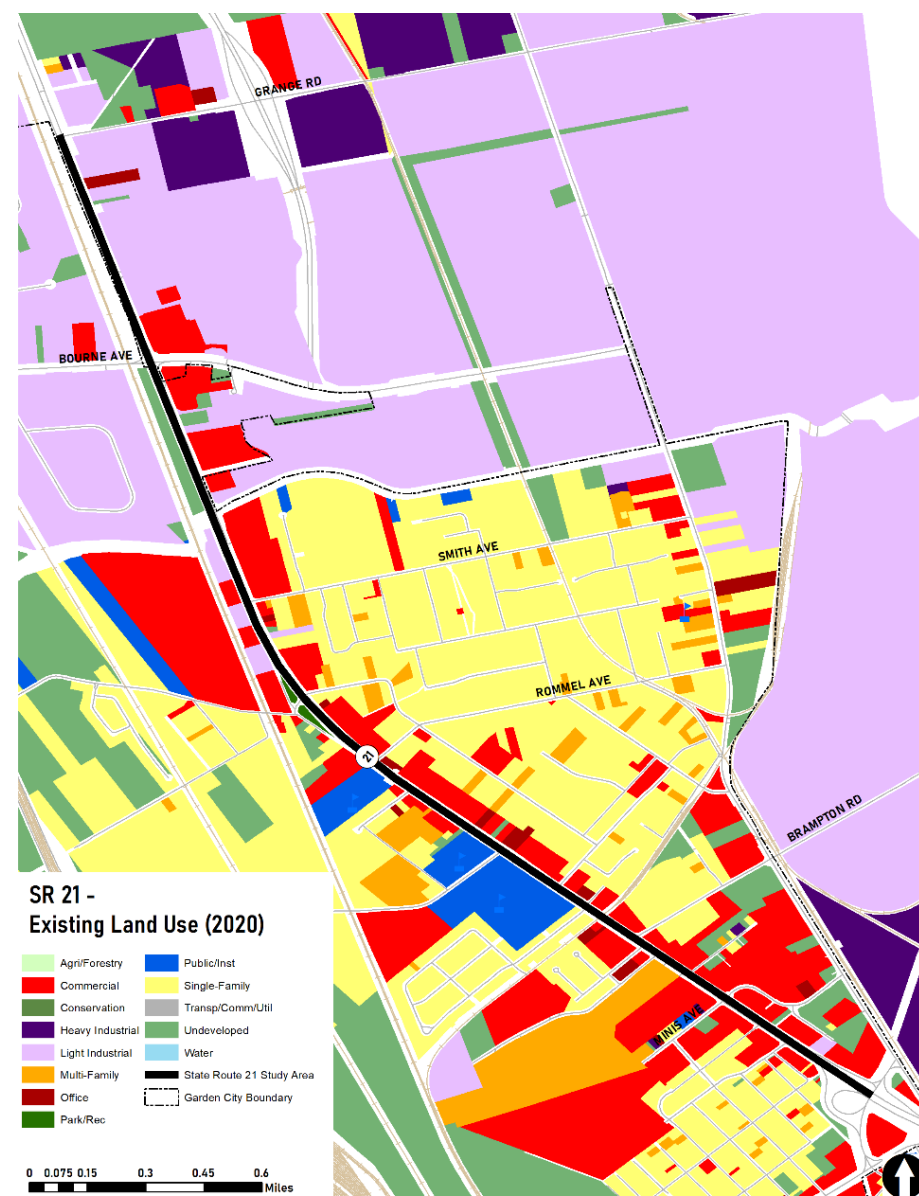


Figure 4-1: Existing Land Use in Study Area

## 4.2 EMPLOYMENT

Job centers are important destinations for travelers to, and through, the corridor. Figure 4-2 shows all jobs in Garden City in 2018 (the most recent data available) by Census Block as reported by the Longitudinal Employer-Household Dynamics (LEHD) program. Several locations have more than 100 jobs, indicating a need for workforce access.

Figure 4-3 shows the jobs paying low monthly wages in the study area. Each dot represents the number of jobs in the lowest and next lowest wage category reported, equivalent to less than \$15,000 annually (in yellow) and between \$15,000 and \$40,000 annually (in red). People who work low-wage jobs are more likely to rely on public transportation, shared rides, or biking or walking to work.

Figure 4-4 indicates commute patterns for those workers employed within 1 mile of the SR 21 study area by Census tract. The map represents 2018 data; a similar pattern was observed in 2016 and 2017. Across Garden City, only 4% of employees who work in the City also live in the City. This pattern is reflected along SR 21, where just over 2% of workers live within 1 mile of the corridor; most area workers live to the north in Effingham or Port Wentworth, or to the south in suburban areas in Savannah and unincorporated Chatham County. Primarily middle-aged higher income earners are commuting from Effingham, southwest Chatham, and Bryan Counties. Low wage workers are primarily traveling from Port Wentworth, northwest Savannah, and unincorporated Chatham County.

Employment within 1 mile of the corridor (by Census tract) is primarily goods-producing and relatively high wage. However, as Figure 4-3 shows, along SR 21, low wage jobs are predominant in the commercial corridor.

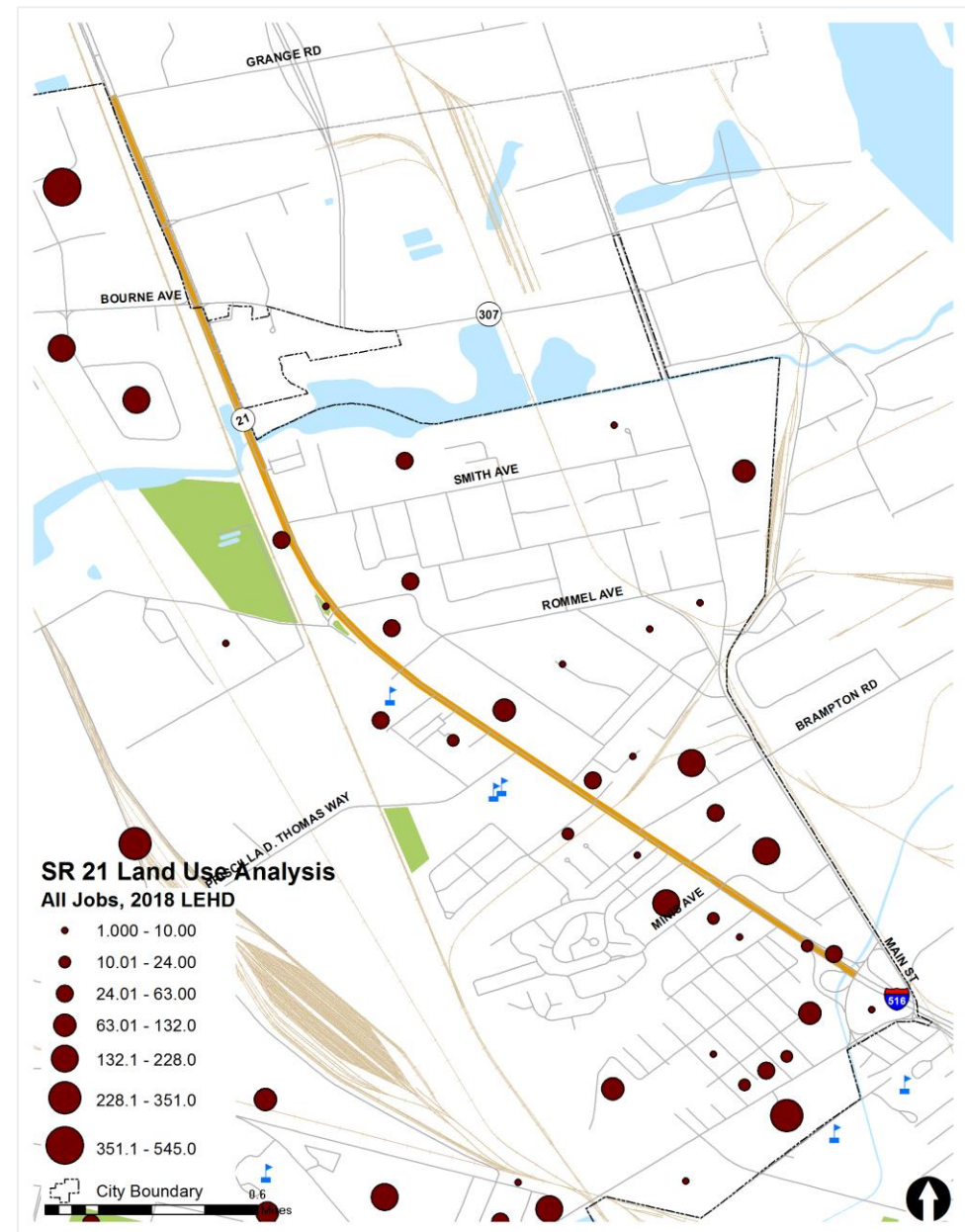


Figure 4-2: Jobs by Census Block, 2018

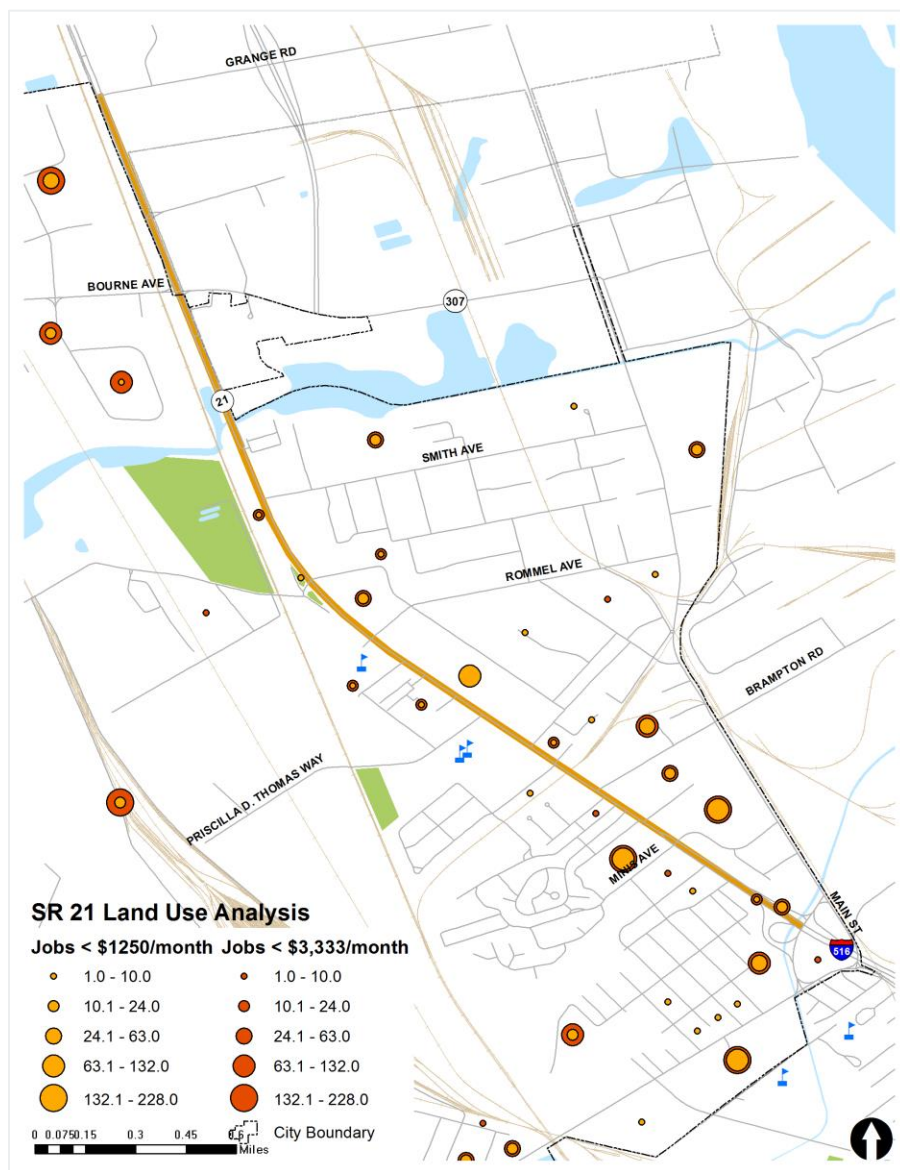


Figure 4-3: Jobs Paying Low Wages by Census Block, 2018

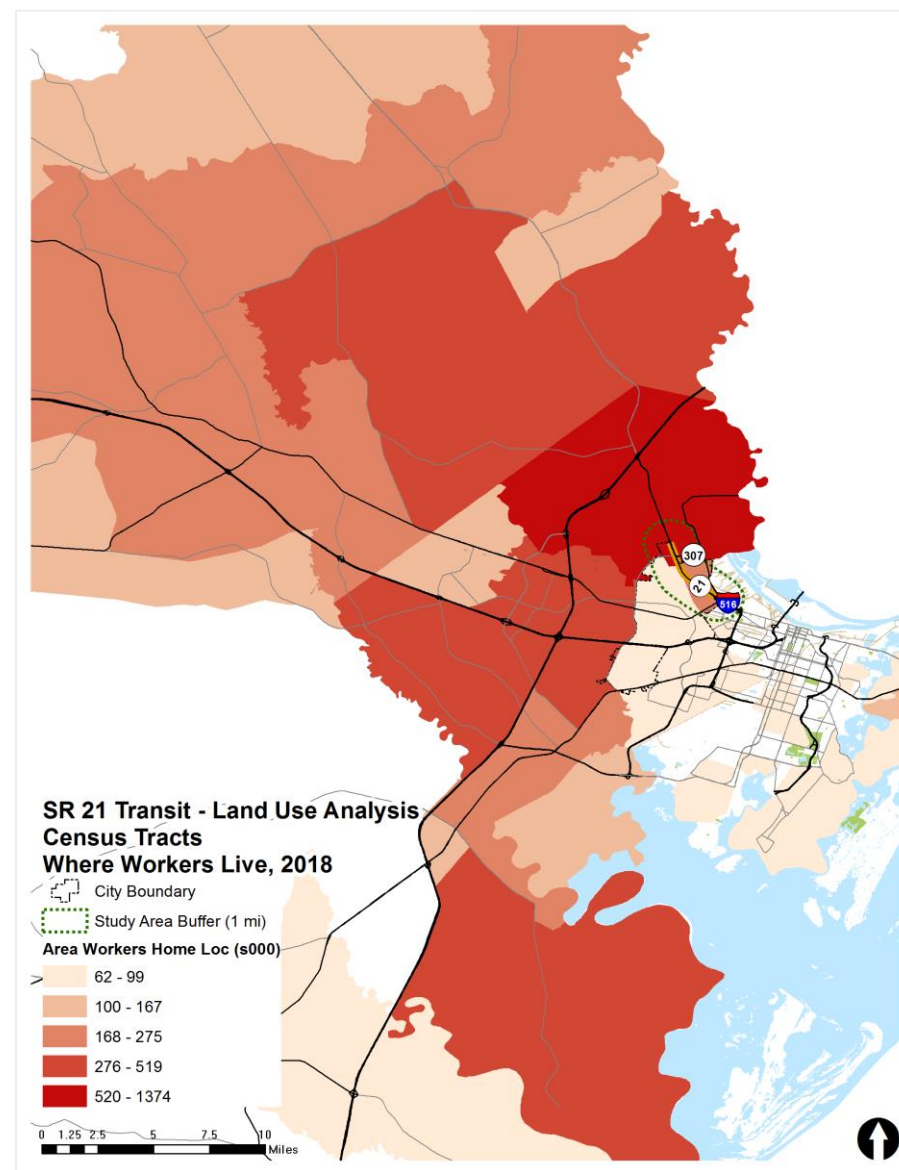


Figure 4-4: "Where Study Area Workers Live", 2018

### 4.3 FUTURE LAND USE

Major manufacturing, warehousing, and trucking uses in the area surrounding the SR 21 corridor will continue to impact its land use and transportation. The Port of Savannah is home to the largest single-terminal container facility of its kind in North America and is the 3rd fastest growing port in the nation. With the ongoing Savannah Harbor Expansion Project (SHEP), the port's Garden City Terminal will accommodate larger container vessels with fewer weight and tidal restrictions. SHEP is projected to be completed this year.

The Georgia Ports Authority (GPA) is expediting plans to add more than 1.4 million twenty-foot equivalent units (TEUs) in annual capacity at Savannah because it now expects to handle 6 to 7.5 million TEU a year by 2023. Just 20 years ago, the port handled 851,000 TEU annually. (Szakonyi, 2021) GPA expects to report an 18 percent year-over-year increase in container volumes to 5.2 million TEU for its fiscal year ending in June 2021. That equates to approximately 800,000 TEU more than the same period a year ago, with 500,000 TEU alone flowing through Savannah in March. Both rail and truck traffic are expected to grow because of this expansion.

The Savannah Economic Development Authority (SEDA) reports high demand for industrial sites near the airport, port, and Gulfstream Aerospace, located to the northwest of the corridor. Figure 4-5 shows generalized future land use from Comprehensive Plans in the area. As the corridor redevelops, commercial destinations on SR 21 will increase the need for workforce transportation to and from the study area. Other trips for shopping and services are also likely to increase. The new Groves High School complex at Priscilla D. Thomas Way will both increase traffic before and after school and increase traffic for special events at the stadium.

Garden City has a need for affordable housing as noted in the Comprehensive Plan and Urban Redevelopment Plan. Increasing density and diversity of housing types, and encouraging mixed use, will promote walking and biking trips. If density is encouraged as housing redevelops, there will be a viable market for the retail services that residents and workers are requesting.

Workers will also increasingly commute through the study area on their way to Savannah from residential areas to the north. For example, projected residential growth in Effingham County (170% from 2020 to 2040 according to the Georgia Governor's Office of Planning and Budget) will likely increase commute traffic on SR 21 in the future.

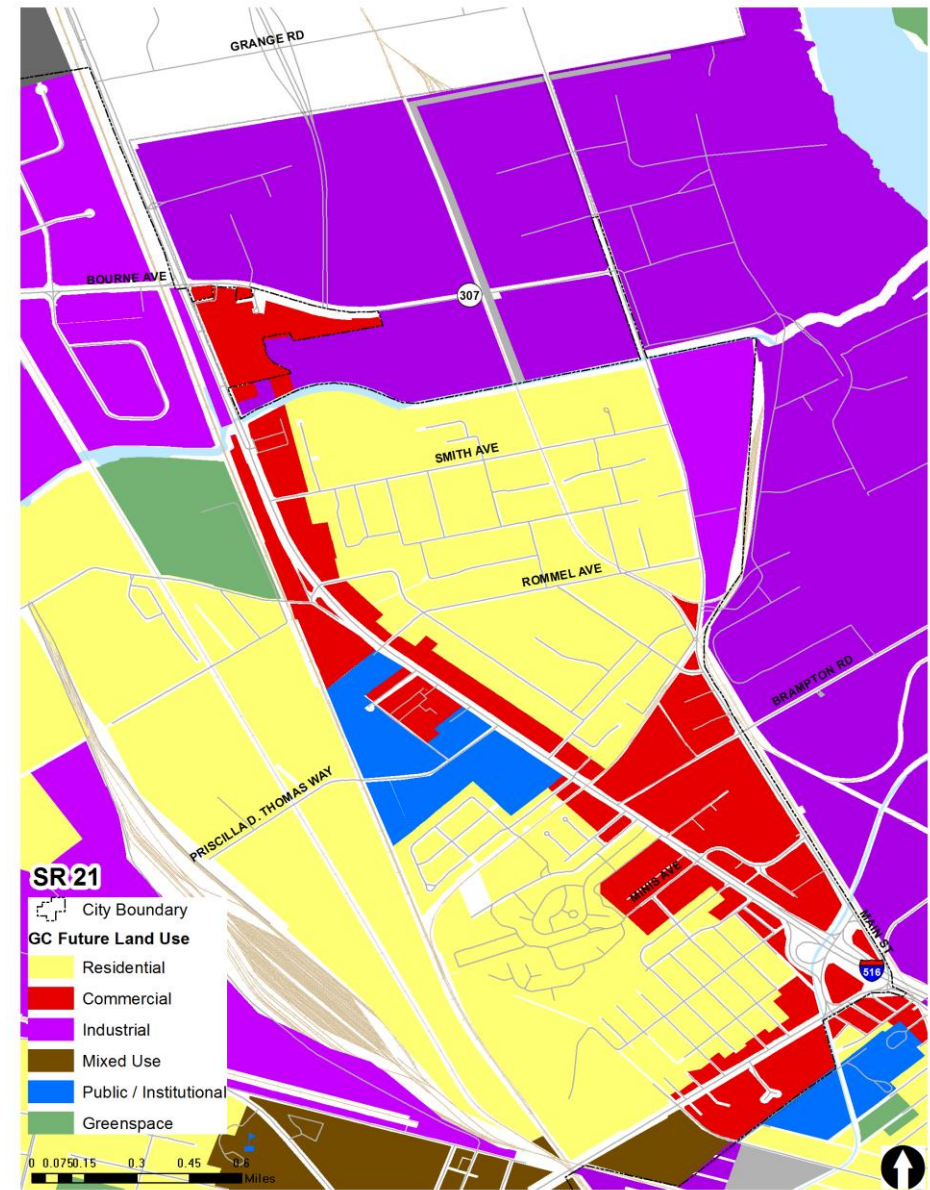


Figure 4-5: Future Land Use in the Study Area

#### 4.4 ZONING

Figure 4-6 shows generalized zoning in the study area. Zoning along the corridor reflects preservation of historically residential areas south of Smith Avenue and in the West Highway 21 residential redevelopment areas. However, there are several parcels zoned industrial that are shown as residential in the Future Land Use map. There is an opportunity to rezone some parcels to be consistent with the community's vision for the corridor.

There are currently no overlay districts or other land use policies in the corridor other than base zoning districts shown below. Residential zoning is primarily low-density single family, with limited opportunity for increased density or housing types such as duplexes, garage apartments, or carriage houses. Limited housing density reduces affordability and limits the efficiency of alternative modes of transportation. Without the density to support restaurants, pharmacies, and other services, local businesses have no viable market. Without a sufficient market for public transportation, scattered stops serve fewer passengers. Image 4-1 and 4-2 shows various land uses along the corridor.



Image 4-1: Commercial Land Uses Fronting SR 21



Image 4-2: Single Family Homes on Oglesby Avenue West of SR 21

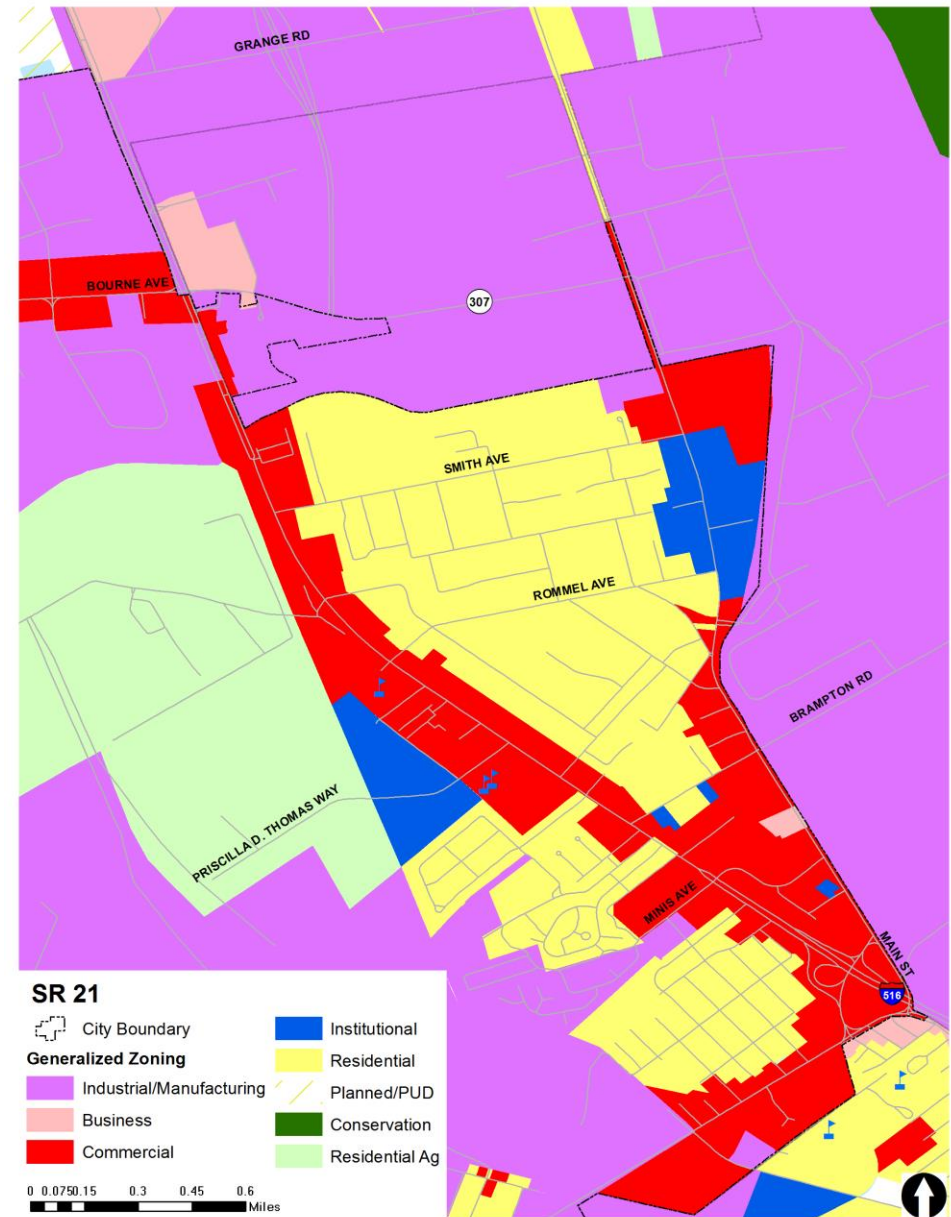


Figure 4-6: Zoning in Study Area

#### 4.5 ECONOMIC ENVIRONMENT

Regional population and economic growth are expected to place increasing demand on SR 21 and the arterial network overall. Growth in tourism, port throughput, light and heavy industry, and supporting sectors will all impact the corridor. As travel volumes increase due to commuters, freight, and the new school complex, transportation infrastructure should balance the needs of all road users to promote desired economic growth. Congestion, and a lack of workforce mobility overall, limit the attractiveness of the corridor to investors and employers.

To encourage reinvestment, areas within and near the study area have been designated as economic incentive zones by Garden City and the City of Savannah. SR 21 south of Pipemaker's Canal is designated a Commercial Redevelopment Area in Garden City's Comprehensive Plan (adopted 2017) as shown in Figure 4-7.

Prior to the Comprehensive Plan, Garden City adopted an Urban Redevelopment Plan (URP) in 2016 to provide the City with tools to encourage improvement within the study corridor. The URP is designed to promote public and private partnerships to encourage redevelopment and revitalization. As described in the previous section, the City developed the URP to encourage compatible development and redevelopment of blighted and/or underdeveloped areas. Figure 4-8 shows urban redevelopment areas and economic incentive zones designated by Savannah and Garden City.

The relative value of land in the study area confirms that several parcels have high potential for redevelopment, even before the planned school and industrial developments are complete. Figure 4-9 shows several parcels where the 2020 assessed value of improvements is less than 130% of the land's fair market value. In the map, darker parcels have more potential for redevelopment than the lighter-colored parcels. Note that most of the commercial parcels lining SR 21 have a high market value relative to the improvements (or buildings) located there. These parcels would tend to redevelop while achieving a return for investors. Redevelopment at this scale represents an unprecedented opportunity to shape the character of the corridor to reflect the community's vision.

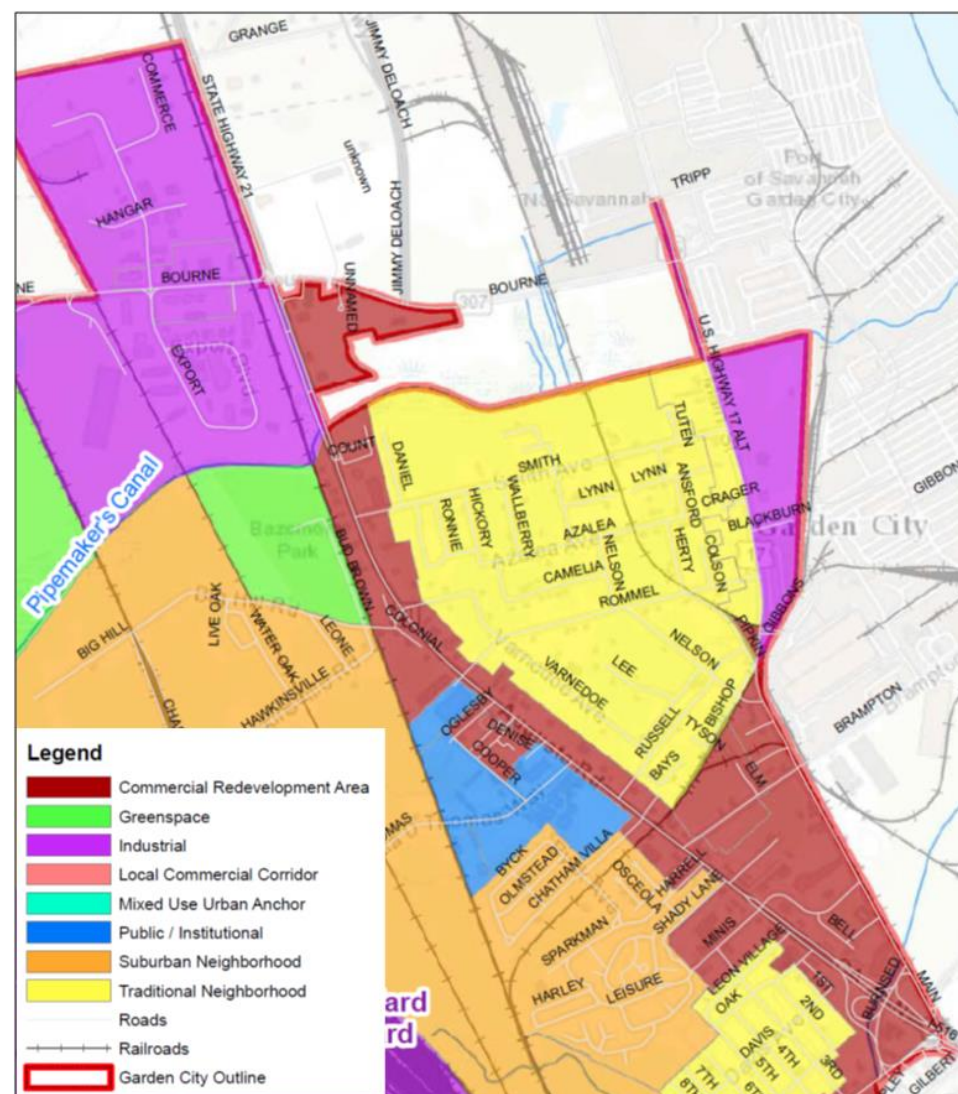


Figure 4-7: Future Land Use Map, Garden City Comprehensive Plan (2016)

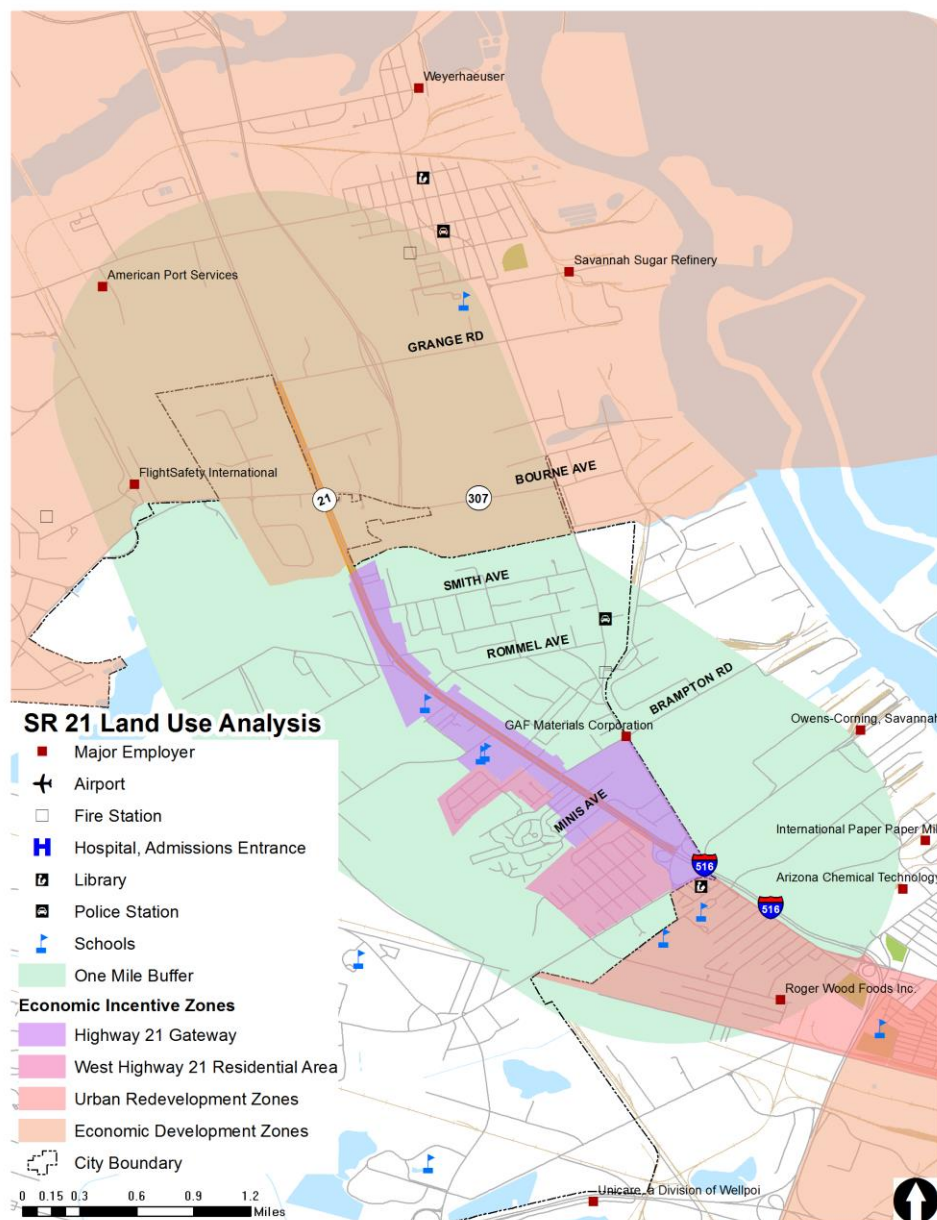


Figure 4-8: Designated Economic Incentive Zones

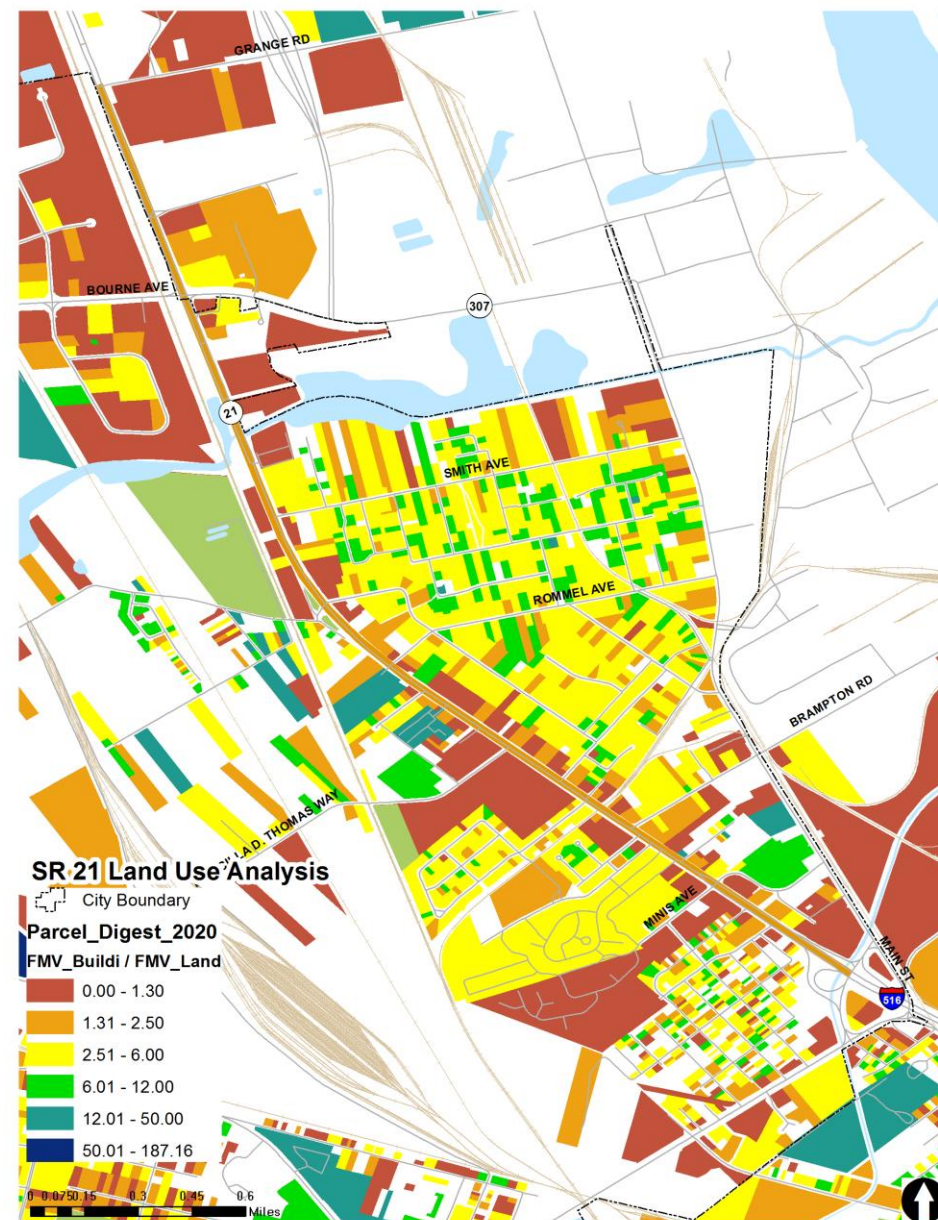


Figure 4-9: Redevelopment Potential based on Value of Improvements (2020 Fair Market Value)

#### 4.6 DEMOGRAPHICS

Understanding the demographic character of the corridor is an important factor in identifying the key stakeholders and the influence on their travel demands. This information along with other components was used when developing alternative transportation improvements.

For this analysis, Center for Disease Control's (CDC's) Social Vulnerability Index (SVI) was used. SVI indicates the relative vulnerability of every U.S. Census tract. Census tracts are subdivisions of counties for which the Census collects statistical data. The census is conducted once every 10 years to provide an official population count. Census 2020 data is estimated to be available after September 30, 2021. SVI ranks the tracts on 15 social factors, including unemployment, minority status, and disability, and further groups them into four related themes. Thus, each tract receives a ranking for each Census variable and for each of the four themes, as well as an overall ranking. SVI provides specific socially and spatially relevant information to help planners better prepare communities to respond to emergency events.

Figure 4-10 represents the overall vulnerability index and its associated themes and categories.

OVERALL VULNERABILITY	SOCIOECONOMIC STATUS	Below Poverty
		Unemployed
		Income
		No High School Diploma
	HOUSEHOLD COMPOSITION & DISABILITY	Aged 65 or Older
		Aged 17 or Younger
		Civilian with a Disability
		Single-Parent Households
	MINORITY STATUS & LANGUAGE	Minority
		Speaks English "Less than Well"
	HOUSING TYPE & TRANSPORTATION	Multi-Unit Structures
		Mobile Homes
		Crowding
		No Vehicle
		Group Quarters

Figure 4-10: Vulnerability Index Themes

The most recent estimates were the 2018 estimates, which were based off the 2018 American Community Survey (ACS) – 5-year estimates data. ACS is conducted every year and provides the most current information about the social and economic needs of the community. All data presented are estimates and do have a margin of error value associated with it.

The two census tracts that abut the SR 21, tract 106.1 and 107, were analyzed. The census tracts are mapped in Figure 4-11. The population encompassing the analysis zone around the SR 21 corridor is approximately 3,922 (Tract 106.1) and 25,257 (Tract 107) respectively. Tract rankings are based on percentiles, percentile ranking values range from 0 to 1, with higher values indicating greater vulnerability. Census tract 106.01 has higher vulnerability than tract 107. The estimates for each tract are displayed in Table 4-1.



Figure 4-11: SR 21 Census Tracts

Table 4-1: 2018 Demographic Estimates (ACS 2014-2018)

CATEGORIES	1BCensus Tract 106.01	2BCensus Tract 107
Population Estimate	3,922	25,257
Households Estimate	1,514	8,861
Housing Units Estimate	1,732	9,416
Percentile Ranking for Socioeconomic Theme	0.5572	0.1973
Percentage of Persons Below Poverty Estimate	16.96%	2.55%
Percentage of Unemployed Civilian (Age 16+) Estimate	3.54%	3.60%
Per Capita Income Estimate	\$20,088	\$37,522
Percentage of Persons (Age 25+) With No High School Diploma Estimate	6.91%	4.36%
Percentile Ranking for Household Composition Theme	0.9703	0.17
Percentage of Persons Aged 65 And Older Estimate	19.91%	6.61%
Percentage of Persons Aged 17 And Younger Estimate	7.50%	3.96%
Percentage of Civilian Noninstitutionalized Population with A Disability Estimate	17.31%	10.68%
Percentage of Single Parent Household with Children Under 18 Estimate	18.23%	8.58%
Percentile Ranking for Minority Status/Language Theme	0.5693	0.5606
Percentage of Minority (All Persons Except White, Non - Hispanic) Estimate	62.65%	45.23%
Percentage of Persons (Age 5+) Who Speak English "Less Than Well" Estimate	0.51%	0.89%
Percentile Ranking for Housing Type / Transportation Theme	0.4867	0.6747
Percentage of Housing in Structures With 10 Or More Units Estimate	2.31%	22.39%
Percentage of Mobile Homes Estimate	10.05%	2.96%
At Household Level (Occupied Housing Units), More People Than Rooms Percentage Estimate	0.58%	1.26%
Households with No Vehicle Available Percentage Estimate	8.92%	0.11%
Persons in Group Quarters Percentage Estimate	0	7.46%
Overall Tract Summary Ranking	0.6935	0.3573

## 4.7 ROADWAY FACILITIES

### 4.7.1 ROADWAY CHARACTERISTICS

The study limits for the SR 21 Access Management Study extend from Grange Road to the I-516 ramp, approximately 3.2 miles in length. Per the Georgia Department of Transportation (GDOT) road classification map, SR 21 is classified as a principal arterial. Within in the study limits, the roadway has a speed limit of 45 miles per hour (mph). SR 21 serves as a local main street as well as a regional arterial, providing access from the Savannah Hilton Head International Airport (with uncongested travel times comparable to the interstate) and from suburban communities to the north into downtown Savannah.

From the SR 21 merge with Interstate 516 to Minus Avenue, SR 21 has 3-lanes in each direction with a landscaped median. Heading north, from Minus Avenue to Smith Avenue, SR 21 has 3-lanes in each direction with a two-way- center left-turn lane. Approximately 850 feet north of Smith Avenue, SR 21 typical sections become two-lanes in each direction with a center landscaped median as it approaches GA 307/Dean Forest Road-Bourne Avenue. Curb and gutter are present for most of the 3-lane section up to Smith Avenue, after which, curb and gutter is only present fronting parcels' access points to SR 21.

Freight trucks are a significant recognizable percentage of traffic along SR 21, particularly north of Smith Avenue approaching SR 307. Throughout the length of the corridor, the presence and width of sidewalks vary with no pedestrian facilities north of Smith Avenue, which is discussed in the multimodal section of this report. Image 4-3 to Image 4-6 show photos of the roadway facilities along SR 21.



Image 4-3: SR 21 Looking North at Minus Avenue



Image 4-4: SR 21 Looking South towards Railroad Crossing



Image 4-5: SR 21 Looking South towards Rommel Avenue



Image 4-6: SR 21 Looking Southbound South of GA 307

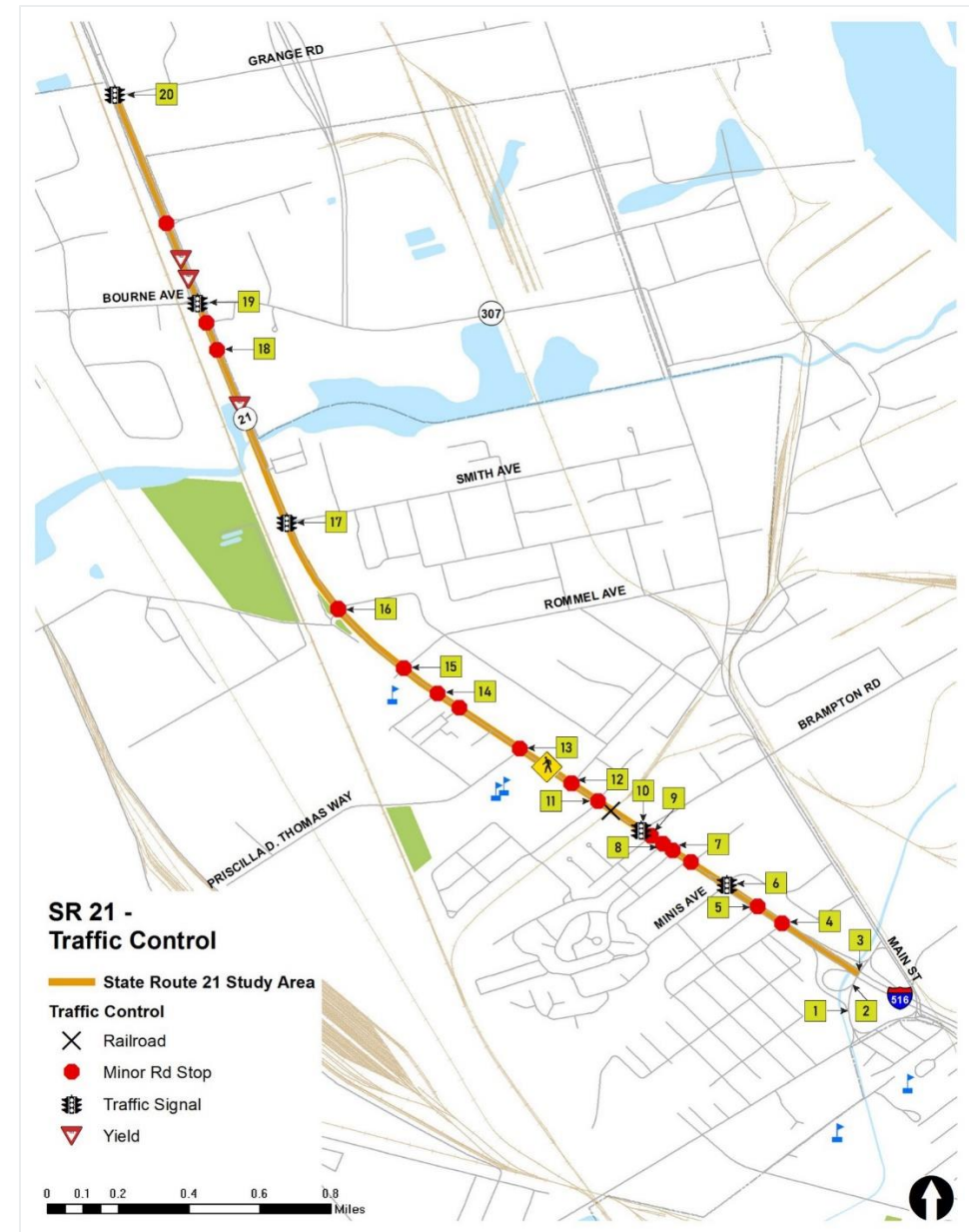
### 4.7.2 INTERSECTIONS

There are a total of 24 intersections within the limits of this operational study of which 20 were identified as significant for analysis. There are five signalized intersections along the corridor, all other unsignalized intersection are side-street stop controlled (SSSC). There is one railroad crossing that traverses SR 21 just north of Brampton Road. There is also a railroad crossing on the west leg of SR 307 at the SR 21 intersection, approximately 175 feet west of the eastbound approach stop bar. The installation of a new traffic signal has been approved by GDOT to be located at SR 21 and Priscilla D Thomas Way and will be constructed as part of the new Groves K-12 School campus project.

Figure 4-12 shows the roadway intersections' traffic control devices within the study area. For the operational analysis, Table 4-2 shows a list of all the intersections that were identified as study intersections to be included in the traffic simulation model. Image 4-7 to 4-9 shows images of intersections along the corridor.

**Table 4-2: Study Intersections for SR 21 Access Management Study**

#	Intersection	Traffic Control
1	SR 25/Burnsed Blvd at SR 21 SB Off-Ramp	SSSC
2	SR 21 at I-516 EB On Ramp	SSSC
3	SR 25/Burnsed Blvd at SR 21 NB On-Ramp/I-516 WB Off-Ramp	SSSC
4	SR 21 at Oak Street	SSSC
5	SR 21 at Leon Village Drive	SSSC
6	SR 21 at Minus Avenue	Signalized
7	SR 21 at Prince Preston Drive	SSSC
8	SR 21 at Sparkman Drive	SSSC
9	SR 21 at Duke Street	SSSC
10	SR 21 at Brampton Road	Signalized
11	SR 21 at Chatham Villa Drive/Bazemore Avenue	SSSC
12	SR 21 at Russel Avenue	SSSC
13	SR 21 at Priscilla D Thomas Way/Private Driveway	SSSC
14	SR 21 at Oglesby /Private Driveway	SSSC
15	SR 21 at Rommel Avenue	SSSC
16	SR 21 at Big Hill Road/Varnedoe Avenue	SSSC
17	SR 21 at Smith Avenue	Signalized
18	SR 21 at Carey Hilliard's/BP Gas Station Driveway	SSSC
19	SR 21 at Dean Forest Road-Bourne Avenue (GA 307)	Signalized
20	SR 21 at Grange Road	Signalized



**Figure 4-12: Traffic Control on SR 21**



**Image 4-7: SR 21 and Brampton Road Intersection**



**Image 4-8: Railroad Crossing on SR 21 North of Brampton Road**



**Image 4-9: SR 21 and Priscilla D Thomas Way Intersection**

## 4.8 MULTI-MODAL INFRASTRUCTURE

### 4.8.1 EXISTING TRANSIT FACILITIES

The SR 21 corridor public transit service is traditional fixed route bus service with inbound and outbound stops. Figure 4-13 shows existing service provided by Chatham Area Transit (CAT). While service hours were adjusted due to the pandemic, route and stop locations have remained consistent since 2019, except for one experimental stop that was piloted and then removed from service. Monday to Saturday service is roughly from 5am until 10pm; Sunday service is from 10am until 7pm.

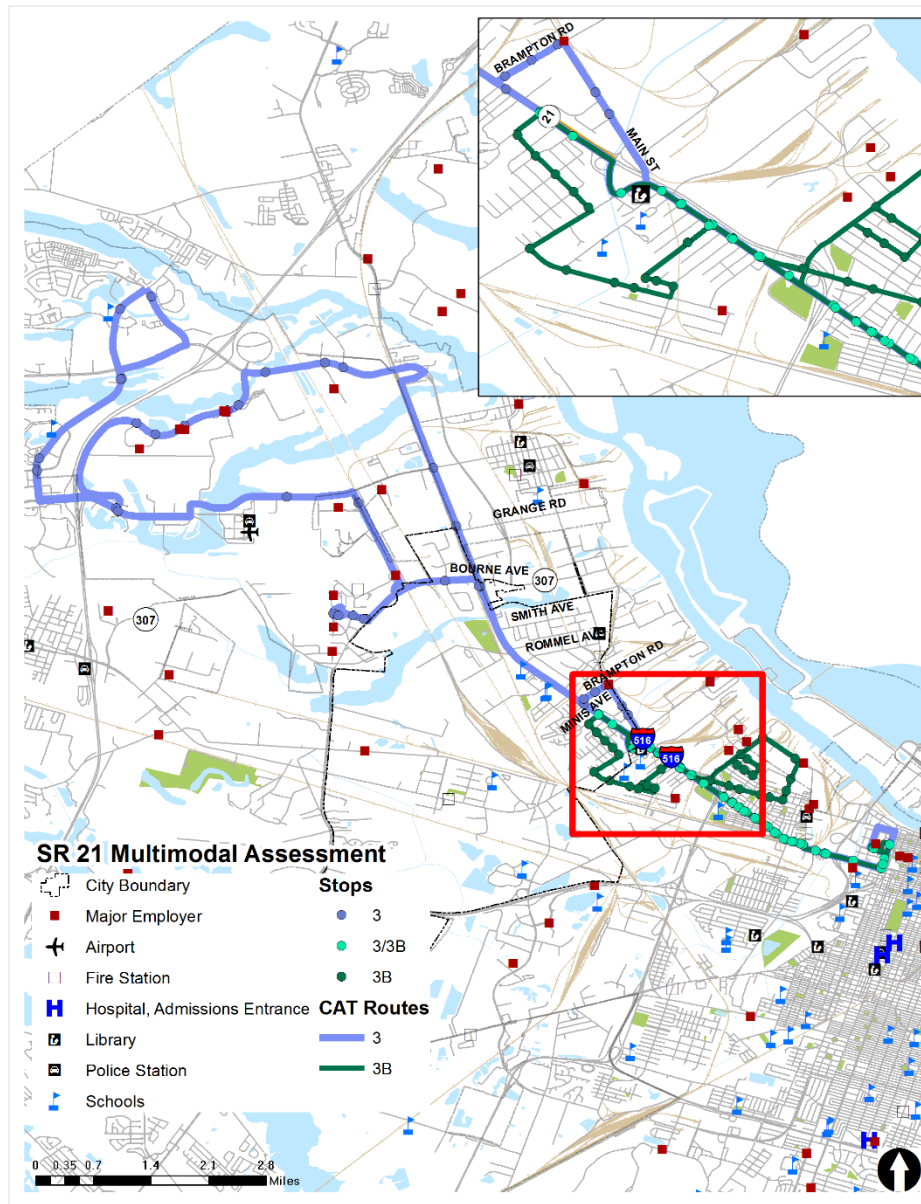
Route 3 and 3B serve SR 21. Route 3 travels up the SR 21 to major industrial /warehousing/distribution employers surrounding the interstate and airport. Route 3B connects the Hudson Hill and West Savannah neighborhoods with Woodville Tomkins High School, a grocery store, and other services. Route 3 and Route 3B both follow SR 21/Augusta /W Bay Street south from the study area into downtown Savannah at the Joe Murray Rivers Intermodal Transit Center. Image 4-10 and 4-11 shows the CAT route bus stops.



**Image 4-10: CAT Route 3 Bus Stop on SR 21 North of Grange Road**



**Image 4-11: CAT Route 3 Bus Stop on SR 21 at Prince Preston Drive**



**Figure 4-13: Public Transit Routes Serving Study Area**

Table 4-3 shows average ridership reported by CAT's Trapeze automatic passenger counting system both pre-pandemic and during adjusted service. All stops have experienced reduced ridership during the pandemic.

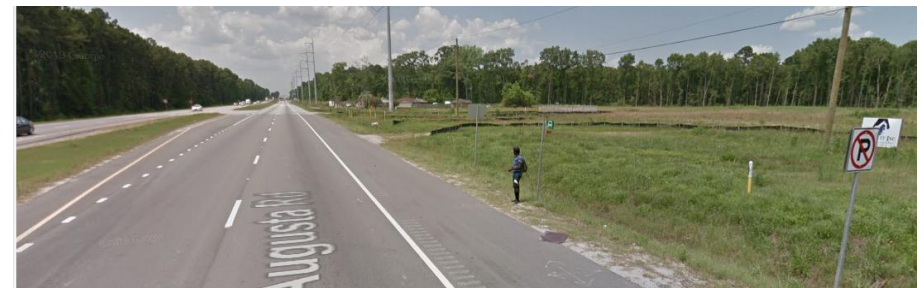
**Table 4-3: Transit Ridership in the Study Area**

Stop Name	March 2021 AVG Weekday Boardings and Alighting	July 2019 AVG Weekday Boardings and Alighting	% Change
3rd & Minus WB	76	90	-16%
Carolan & Bay SB	35	45	-23%
Tuten & Rankin NB	1	1	-18%
JMR Transit Center*	2,319	4,160	-44%
W Bay & Albion EB	3	8	-65%
W Bay & Albion WB	3	7	-51%
Augusta & Brampton	29	78	-63%
Benton & Highlands	16	37	-57%
Brampton & Main WB	5	12	-62%
Davidson & Hwy 307 SB	3	3	0%
Gulfstream & Gulfstream Rd E	0	0	0%
Jimmy Deloach & Hwy 21 WB	0	2	-83%

\* Ridership for multiple routes at Intermodal Center

#### 4.8.2 PUBLIC TRANSIT NEEDS ASSESSMENT

As aforementioned in the existing conditions analysis, the lack of bus stops on SR 21 within the study area is noteworthy, missing the schools, commercial areas, and housing on the corridor. Chatham Area Transit is in discussion with Garden City to expand transit service, including adding stops at commercial destinations and employers. Longer term goals include service to additional employers and the City Hall mixed use district south of the study area. While fixed route service is available on segments of SR 21, the current pedestrian and bicycle infrastructure does not promote safe or comfortable travel. Most transit stops are not accessible by sidewalks or ADA ramps. Additionally, the existing bus stops lack facilities such as seating, protection from sun and rain, trash receptacles, and lighting. Image 4-12 shows the need for transit shelters and sidewalks.



**Image 4-12: Transit User at Bus Stop on SR 21 North of Grange Road**

### 4.8.3 EXISTING PEDESTRIAN FACILITIES

There are no sidewalks on the northern segment of SR 21, between Grange Road and Smith Avenue. The sidewalks provided south of Smith Avenue vary in width. On the west side of SR 21 the sidewalk width expands to as much as 8-10 feet. The sidewalk width on the east side of SR 21 varies between 4-6 feet. Additionally, where sidewalks are present, the buffer between sidewalk and roadway varies in width. The overall condition of the sidewalks along the corridor is poor; with segments crumbling and overgrown with vegetation.

There are several driveways along SR 21 resulting in curb cuts of sidewalks, some even run flush with the sidewalk. When present, pedestrian ramps at intersections and driveways do not meet ADA compliance, such as accessible design or detector pads. The frequency of pedestrian and vehicular traffic conflict points, coupled with the condition of the sidewalk and lack of buffer from the roadway, creates a less than desirable and safe pedestrian experience.

One pedestrian bridge extends over SR 21 near Mercer Middle School north of Priscilla D Thomas Way, which based on observations is an older structure with overgrown vegetation at its entry points. Last year, a pedestrian HAWK signal was installed just south of Priscilla D Thomas Way where the new Groves K-12 Campus is under construction. Aside from these two crossings, pedestrians can cross SR 21 at crosswalks at the signalized intersections of Smith Avenue, Brampton Road and Minus Avenue. During field observations, several pedestrians were observed crossing SR 21 at undesignated pedestrian crossing locations. Given the 7-lanes of travel a pedestrian must traverse to get to the other side of SR 21, many pedestrians would cross halfway to the center two-way-left-turn lane until they felt that they had an acceptable gap to cross the rest of the way.

Image 4-13 to Image 4-18 show examples of the pedestrian facilities along SR 21, including pedestrian ramp examples along the corridor. Figure 4-14 shows a map of pedestrian infrastructure on the corridor. The map does not show curb cuts for driveways, which significantly reduce separation between pedestrians and auto traffic, as previously discussed.



Image 4-13: Sidewalk on Westside of SR 21 Fronting Groves High School



Image 4-14: Sidewalk on SR 21 with Overgrown Vegetation



Image 4-15: SR 21 Pedestrian Bridge near Mercer Middle School



Image 4-16: Crumbling Path to Pedestrian Bridge on East Side of SR 21



Image 4-17: ADA Ramps to Crosswalk at SR 21 and Bazemore Avenue



Image 4-18: ADA Ramp to Crosswalk at SR 21 and Minus Avenue

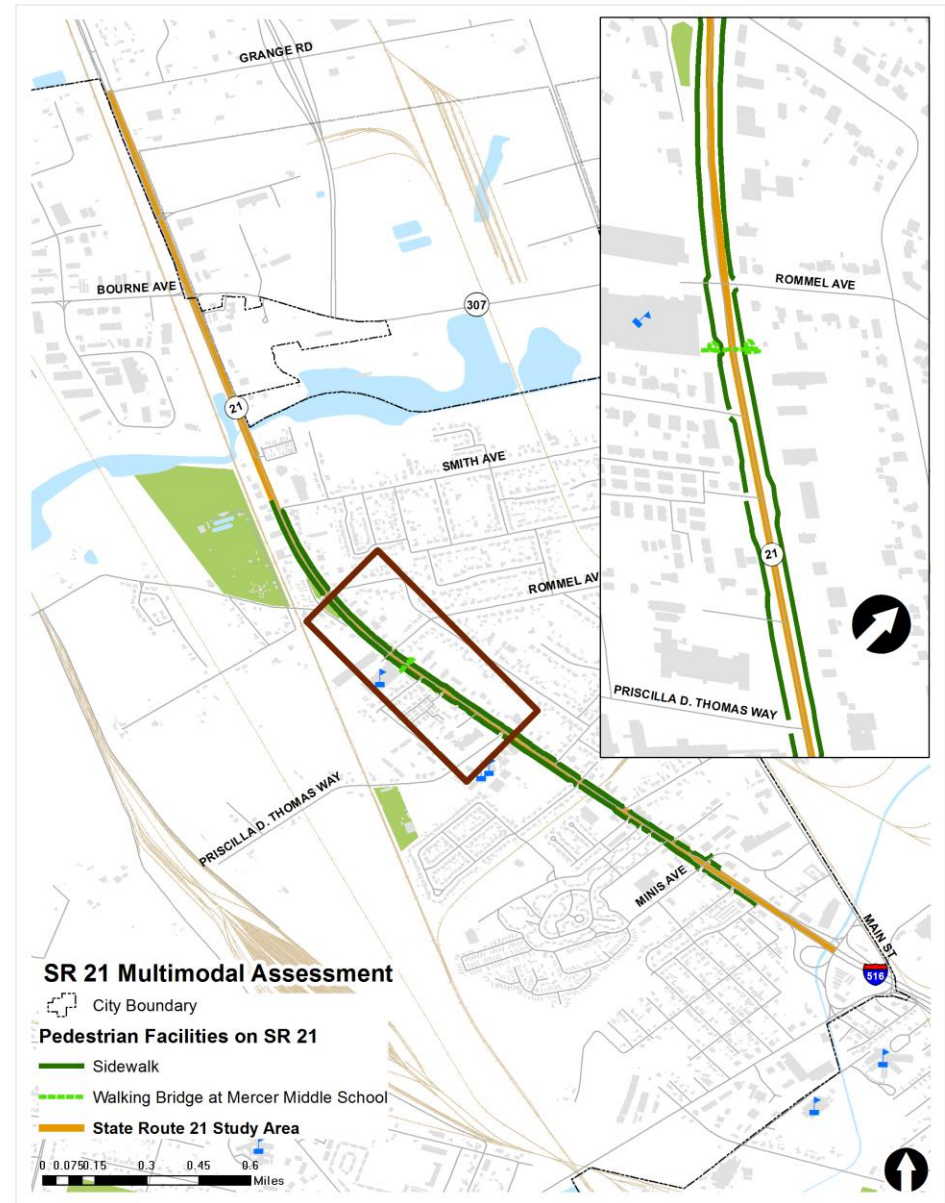


Figure 4-14: Pedestrian Infrastructure on SR 21

#### 4.8.4 EXISTING BICYCLE FACILITIES

A biking designation along segments of SR 21 corridor is the East Coast Greenway, a 3,000-mile-long walking and biking route stretching from Maine to Florida, designed to connect 15 states and 450 communities. Figure 4-15 depicts the segment of the greenway along the SR 21 corridor. The Greenway traverses Savannah and Garden City and extends north from Smith Avenue, beyond the study limits and makes a right onto Bonnybridge Road. Although a portion of SR 21 within the study area is part of the East Coast Greenway, there are no dedicated bicycle facilities along the corridor. “Share the Road” bike signs indicating that this section are part of a designated bicycle route as shown in Figure 4-15.

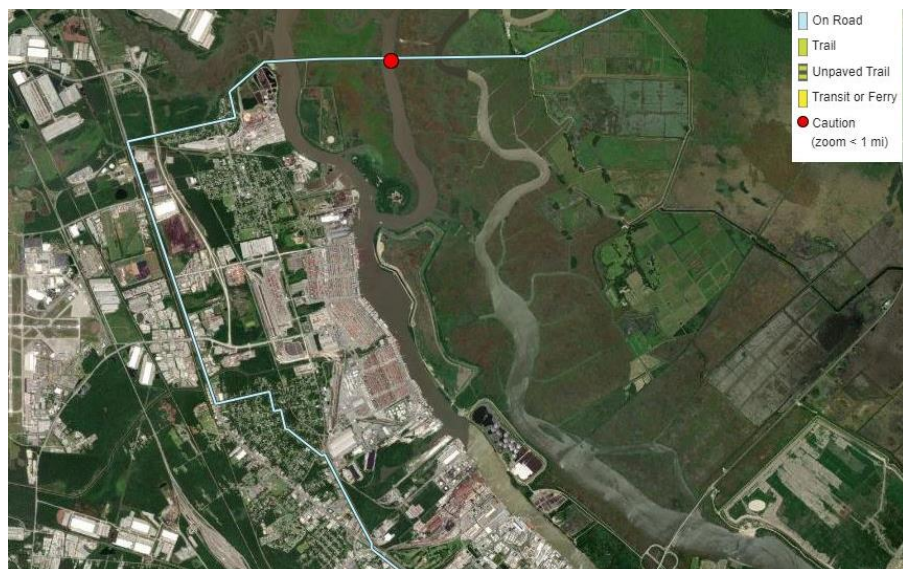


Figure 4-15: East Coast Greenway



Image 4-19: “Share the Road” Sign on SR 21 North of Brampton Road

#### 4.8.4.1 BICYCLE LEVEL OF TRAFFIC STRESS (LTS) ANALYSIS

Bicycle Level of Traffic Stress (LTS) analysis helps to identify streets that are most suitable for bicycling by quantifying the amount of discomfort that people feel bicycling close to traffic. Appropriate pedestrian and bicycle infrastructure elements facilitates safe crossing. An LTS analysis was conducted for the SR 21 corridor. This analysis classifies roadway segments into four categories that range from LTS 1, which identifies segments that are suitable for all ages and abilities to LTS 4, which identifies segments that are most suitable for only the most experienced and confident riders. Figure 4-16 depicts each of the Stress Levels and their corresponding characteristics.



Figure 4-16: Level of Traffic Stress Scale

Table 4-4 shows the evaluation of traffic stress for bicyclists in mixed traffic, such as SR 21. For bikes in mixed traffic, level of traffic stress increases with traffic speed and number of lanes. On multi-lane roads (more than 2-lanes), traffic volume is not a factor. Two additional factors become important on 2-lane roads: stress is lower if average daily traffic (ADT) is 3000 or less and no centerline is marked. (Most quiet, local streets have both characteristics).

**Table 4-4: Level of Traffic Stress Criteria for Mixed Traffic Segments**

POSTED SPEED LIMIT	STREET WIDTH		
	2 – 3 lanes	4 -5 lanes	6 + lanes
Up to 25 mph	LTS 1* or 2*	LTS3	LTS 4
30 mph	LTS 2* or 3*	LTS 4	LTS 4
35+ mph	LTS 4	LTS 4	LTS 4
* Use lower value for streets without marked centerlines and with ADT less than or equal to 3000, use higher value otherwise			

Based on the results of the LTS analysis, potential bicyclists will experience a LTS 4 along the SR 21 corridor. These findings are indicative of the need for bicycle friendly infrastructure improvements along the corridor and at signalized intersections to ease the level of stress for bicyclists.

## 4.8.5 PEDESTRIAN AND BICYCLE FACILITY NEEDS ASSESSMENT

The poor condition and lack of sidewalks along SR 21 presents an opportunity to increase connectivity along the corridor. Since segments of this study area are identified on the East Coast Greenway, there is also the opportunity to improve biking and pedestrian facilities by providing infrastructure such as protected lanes or multi-use trails. To foster safety, there is an opportunity to improve crosswalks by administering ADA compliant ramps and signal infrastructure.

Image 4-20 and Image 4-21 show examples of multimodal infrastructure deficiencies along SR 21.



**Image 4-20: Existing Multi-modal Infrastructure (Missing ADA Ramp at Intersection Crosswalk)**



**Image 4-21: Existing Multi-modal Infrastructure (Crumbling Sidewalk and Lack of ADA Compliance)**

## 4.9 INTERMODAL FREIGHT TRANSPORTATION FACILITIES

There are multiple important multimodal freight assets along, or proximate to, the SR 21 corridor that impact its operations. The most significant among these is the Port of Savannah. This following section takes inventory of the freight generators along the SR 21 corridor, identifies their operations, and discusses how they potentially impact freight patterns and congestion along the corridor.

### 4.9.1 PORT OF SAVANNAH

Savannah is the third largest U.S. container port by total throughput and the second largest on the East Coast, behind New York/New Jersey. In Fiscal Year (FY) 2020, the Port of Savannah handled over 35 million tons of trade. The Port of Savannah is comprised of two terminals: Ocean and Garden City as shown in Table 4-5 and Figure 4-17. As indicated in Table 4-5, the Ocean Terminal primarily handles breakbulk and roll-on/roll-off (RoRo) traffic. It also has on-dock rail access via Norfolk Southern (NS) and CSX Transportation (CSX). The Garden City Terminal handles container traffic and has on-terminal rail intermodal access via the NS and CSX Mason and Chatham intermodal rail yards, respectively. In the study area, SR 21 provides access to the Garden City terminal via SR 21 Connector/Brampton Road, SR 307, and Grange Road.

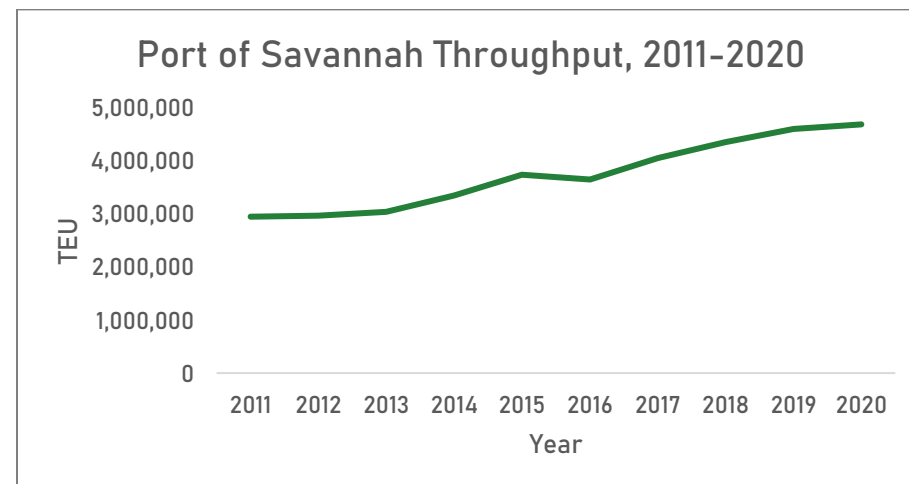
**Table 4-5: Port of Savannah Terminal Information**

	Garden City Terminal	Ocean Terminal
Commodities Handled	Containers, Liquid Bulk	Breakbulk, RoRo, Containers, Heavy Lift, and Project Cargo
Terminal Area	1,345 acres	200.4 acres
Berths	9	5



**Figure 4-17: Port of Savannah Terminals**

Throughput, as measured by twenty-foot equivalent units (TEUs), has grown substantially since 2011 as shown in Figure 4-18. TEUs are a measure of cargo volume that indicate the number of containers processed by a port or transported on a ship. This measure is important as containers are transported to and from the Port of Savannah by truck and rail, impacting SR 21 and surrounding corridors. Since 2011, throughput at the Port of Savannah has grown by over 5 percent annually – from about 2.9 million TEUs in 2011 to over 4.6 million in 2020. As about 80 percent of containers moved to and from the Port of Savannah are transported by truck, growth in throughput implies greater truck volumes on SR 21 and other corridors serving the port.



**Figure 4-18: Port of Savannah Throughput, 2011-2020**



**Image 4-22: Port of Savannah**

#### 4.9.2 SAVANNAH-HILTON HEAD INTERNATIONAL AIRPORT

The Savannah-Hilton Head International Airport (SAV) is another important intermodal freight asset that is proximate to the SR 21 corridor. Goods transported by air tend to be of higher value and more time-sensitive than those transported by other freight modes. Most often, goods arriving to or being transported from air cargo facilities are carried by truck. Because of this, corridors such as SR 21 are important for facilitating air cargo operations. Though SAV is located west of SR 21, it shares major corridors including SR 307/Bourne Avenue and Gulfstream Road.

Since 2011, air cargo tonnage at SAV has slightly increased from about 8,400 tons to 8,459 tons in 2020. Federal Express (FedEx), United Parcel Service (UPS), DHL, and Delta Airlines operate cargo service out of SAV. In total, there is about 138,000 square feet of air cargo warehouse space at SAV. This includes an approximately 80,000-square foot general cargo building open to all carriers as well as an approximately 58,000-square foot air cargo facility dedicated to a single tenant. Both facilities are along Bob Harmon Road which is accessed by SR 307/Dean Forest Road, a key corridor that intersects the study area.



Image 4-23: Savannah-Hilton Head International Airport (SAV)

#### 4.9.3 FREIGHT-INTENSIVE LAND USES

Though not explicitly an intermodal freight transportation facility, the numerous warehouses and distribution centers proximate to SR 21 are also an important consideration. The Georgia Statewide Freight and Logistics Action Plan included a survey of motor carriers serving the port that determined their origins and destinations. The results indicated that 63 percent of trucks had trip origins within Chatham County with many of those trip origins occurring within a few miles radius of the Port of Savannah. This demonstrates that many truck trips from the Port of Savannah are shorter-distance truck trips to/from the warehouse areas nearby to the port.

#### 4.9.4 FREIGHT AND INTERMODAL NEEDS ASSESSMENT

Goods movement is influenced by the intersection of technology innovation and transportation. This is true not only for private sector investments in tools to better manage supply chains, but also public sector investments in traffic management operational tools and strategies. Applied to freight transportation needs and issues, technology advancements can be used to support future growth in freight volume and flow; improve freight mobility across all modes in terms of safety, efficiency, and reliability; and foster increased economic growth through reduced transportation cost and enhanced productivity. The trend of applying operational/management technologies to freight transportation challenges will continue to persist as alternative improvements, such as large-scale capacity enhancements, can be costly and take much longer to implement.

There are multiple transportation technologies, primarily in the area of intelligent transportation systems (ITS), that may be applied to freight mobility. These include smart roadside and virtual weigh-in-motion (WIM) applications that allow for wireless roadside inspections, automated electronic clearance at roadside check facilities, and automated commercial vehicle safety inspections at roadside check locations. Examples of ITS technologies that are relevant to the SR 21 corridor and could be deployed to support access management improvements are detailed on the following pages.

## 4.9.4.1 COMMERCIAL VEHICLE PARKING

This ITS application provides parking information to motor carriers both pre-trip and enroute. It is commonly referred to as a Truck Parking Information Management Systems (TPIMS). Parking availability information is collected from truck parking areas using technologies such as closed-circuit television (CCTV), in-ground sensors, above-ground radar, and side laser scanners. The raw data is processed and supplied to fleet managers, mobile devices used by commercial vehicle operators, to dynamic message signs (DMS) on the roadway, or directly to in-vehicle systems. The Florida DOT's Truck Parking Availability System (TPAS) is an example of this ITS application. As Georgia is taking stronger steps to address freight mobility challenges related to truck parking, SR 21 would be an important corridor to include in an ITS solution. This could be in the form of installing Roadside Units (RSU) and DMS along the corridor to enable communications on truck parking availability with trucks traveling to and from the Port of Savannah. Challenges identified with truck staging through stakeholder engagement (i.e., trucks temporarily parked on roadway shoulders, medians, or other unauthorized locations) exist on SR 21 or nearby corridors, this ITS application would help to alleviate them.



**Image 4-24: Freight Trailer Parked in Parking Lot at SR 307 and SR 21 (SE Corner)**

## 4.9.4.2 FREIGHT-SPECIFIC DYNAMIC ROUTE GUIDANCE

This ITS application provides advanced route planning and guidance that is responsive to current conditions for commercial motor vehicles. It includes technologies that incorporate real-time traffic and roadway conditions, allowing drivers to make re-routing decisions to a more optimal route. Information may be conveyed using various methods such as dynamic message signs, mobile applications, or commercial vehicle fleet managers. The freight-specific dynamic route guidance ITS application can be used to inform drivers about slowdowns, incidents, and weather conditions allowing them to make dynamic routing decisions. An example of this application is the GDOT Georgia Port Authority (GPA) Freight Pilot along SR 307. The project involves installing roadside units (RSU) at signalized intersections along SR 307 near the Port of Savannah to enable freight signal priority and to broadcast information on travel conditions. For instance, trucks would be able to receive an in-cab message alerting them to the presence of train blocking an at-grade crossing and be diverted to an alternate route.

## 4.9.4.3 FREIGHT SIGNAL PRIORITY

This application provides traffic signal priority for freight vehicles with the objectives of reducing delays, increasing travel time reliability, and improving safety at intersections. It includes vehicle-to-infrastructure (V2I) technologies that allow freight vehicle on-board equipment to communicate with traffic signal control equipment for the extension of green phases or other actions to enhance freight mobility and overall transportation safety. An example of this is the ongoing GDOT SR 6 Truck Friendly Lanes project in Douglas and Cobb Counties. The project will integrate roadway geometric and capacity improvements with freight ITS elements to create a truck friendly corridor. The technology elements included dilemma zone protection for trucks and traffic responsive signal timing based on sensing mix of vehicles and adjusting for heavy truck volumes. In conjunction with access management and geometric improvements on SR 21, this ITS application could enhance freight reliability and safety on the corridor.

## 4.10 ACCESS MANAGEMENT

### 4.10.1 ACCESS SPACING

Adequately spaced access points result in separation between traffic maneuvers at each access point, thereby reducing conflicts as drivers, pedestrians, and other road users make decisions and move through the corridor. Reducing conflicts promotes safe and efficient operations of all roads but is essential to major arterials like SR 21. Intersections and driveways should be spaced to allow drivers to slow down to stop or turn and provide space for vehicles waiting to enter each access point. Crash trends show that as the number of driveways along a road increase, so do crash rates. A geospatial assessment of individual segments shows that as much as 40% of the roadside is given over to curb cuts including driveways and intersection openings. That means there are turning and deceleration conflicts occurring along the entire length of the segment. There are also sections of limited curb protecting pedestrians and bus passengers from the heavy trucks and automobiles on the corridor. Table 4-6 shows the portion of roadside with open access by road segment. The commercial corridor between Smith Avenue and Minus Avenue has a very high amount of open access.

**Table 4-6: Portion of Roadside with Open Access (Curb Cuts)**

22BFrom	23BTo	East Side of SR 21	WWest Side of SR 21
Grange Road	Bourne Avenue	21%	0%
Bourne Avenue	Smith Avenue	23%	8%
Smith Avenue	Rommel Avenue	41%	23%
Rommel Avenue	Priscilla D Thomas Way	40%	27%
Priscilla D Thomas Way	Brampton Avenue	39%	6%
Brampton Avenue	Shady Lane	22%	34%
Shady Lane	Minus Avenue	19%	32%
Minus Avenue	Study End	0%	21%

Intersection spacing along SR 21 ranges from 185 to 3,450 feet. This spacing is not ideal because it doesn't accommodate stopping decision sight distance, and on the most severe segment, is not sufficient to accommodate right turning traffic. Figure 4-19 shows the segment from St Joseph Avenue north to Brampton Road. There are four stop-controlled intersections and four driveways for northbound travelers to navigate. Even if the driveways were all closed, the intersection spacing does not allow sufficient distance to react, decelerate, or stop safely.

### 4.10.2 SIGNAL SPACING

There are five existing traffic signals in the study area: Grange Road, Bourne Avenue, Smith Avenue, Brampton Road, and Minus Avenue. A new signal is planned for Priscilla D Thomas Way at the school complex currently being redeveloped. Per Transportation Research Board published guidance, signal spacing on SR 21 should be not less than ¼-mile to allow for efficient traffic progression and improved safety. Table 4-7 shows signal spacing after the new signal is added to Priscilla D Thomas Way. The new signal will not be adequately spaced from Brampton Road to meet TRB guidance. The signal at Minus Avenue is not adequately spaced from Brampton Road. GDOT requires a minimum signal spacing of 1,320 feet in urban areas. Figure 4-12 shows the traffic control at each corridor intersection, including traffic signals.

**Table 4-7: Signal Spacing on SR 21**

Signal Cross Street on SR 21	Distance to Next Signal	Meets TRB 0.5-mile standard	Meets GDOT 0.25-mile standard
Grange Road to SR 307	0.62 mile	Yes	Yes
Bourne Avenue to Smith Avenue	0.65 mile	Yes	Yes
Smith Ave to Priscilla D Thomas Way	0.86 mile	Yes	Yes
Priscilla D Thomas Way to Brampton Road	0.37 mile	No	Yes
Brampton Road to Minus Avenue	0.26 mile	No	Yes



**Figure 4-19: Example of Inadequate Intersection Spacing on SR 21 from St Joseph Ave north to Brampton Road**

### 4.10.3 MEDIAN OPENINGS

There is a median in place from Grange Road south to the road segment between Pipemaker's Canal and Smith Avenue. The median varies from grass to raised concrete approaching intersections. Until the grade separation begins at the south end of the study area, the rest of the corridor has a two-way left turn lane down the center lane. GDOT recommends median opening, or crossover, spacing of 1,320 feet on urban principal arterials, including SR 21, with a minimum specified of 1,000 feet. Table 4-8 shows the average median opening spacing along SR 21. Figure 4-20 shows median treatments, including openings, on the corridor.

**Table 4-8: Average Median Opening Spacing on SR 21**

Cross Street on SR 21	Average median opening spacing	Meets 1,000 ft Recommendation
Grange Road to SR 307	817 ft	No
Bourne Avenue to Smith Avenue	910 ft	No



**Figure 4-20: Median Treatments on SR 21**

#### 4.10.4 DRIVEWAY SPACING

The study team documented current access points on SR 21 including driveways, minor access roads, and intersections. Where there is no median, driveways on either side of the road impact travel in both directions. Figure 4-21 and Figure 4-22 show the minimum spacing standard of 230 ft for 45 mph posted speeds. For analysis purposes, intersections are excluded from the average driveway spacing estimates; even with that exclusion, most segments do not meet the minimum standard. Depending on travel conditions, driveway spacing should accommodate safe maneuvers including turning and stopping from travel lanes. Adequate spacing to accommodate right-turn lanes (RTL) is also included on the charts. As shown below, the current spacing is largely inadequate based on those standards. Orange markers below the line indicate segments that do not meet the minimum standards.

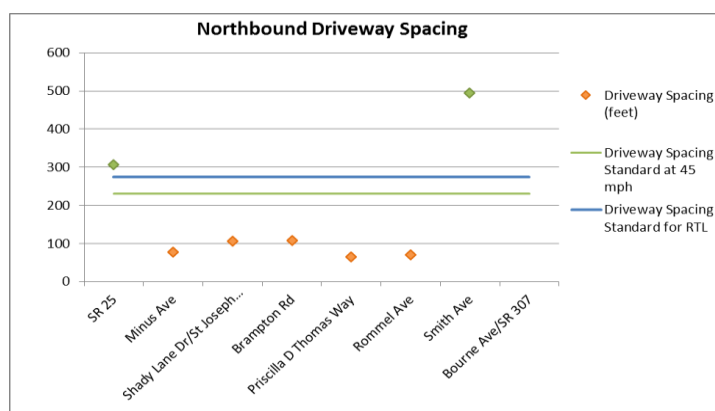


Figure 4-21: Driveway Spacing, Northbound on SR 21



Figure 4-22: Driveway Spacing, Southbound on SR 21

#### 4.10.5 DRIVEWAY DENSITY

Within the study area, frontage along SR 21 is primarily commercial land use. The number of businesses, parcels, and a varying driveway policy has led to a significant number of driveways along the corridor. Figure 4-23 and Table 4-9 show the number of driveways per mile along the corridor between major intersections. The highest driveway density is between Priscilla D Thomas Way and Smith Avenue with a density of 79 driveways per mile. A close second is between Minus Avenue and Brampton Road. Along both these stretches of SR 21, most parcels, even small parcels, have two or more access points.

Table 4-9: Driveway Density along SR 21

	East	West	Total	Length	Density /mile
I-516 to Minus Avenue (West)	0	6	6	0.41	15
Minus Avenue to Brampton Road	8	10	18	0.25	72
Minus Avenue to Priscilla D Thomas Way	17	4	21	0.38	55
Priscilla D Thomas Way to Smith Avenue	45	23	68	0.86	79
Smith Avenue to SR 307	10	7	17	0.65	26
SR 307 to Grange Road	7	0	7	0.63	11

Figure 4-24 shows aerial view driveway density on SR 21 north of Priscilla D Thomas Way. High access point density on arterial roads can cause traffic flow and safety issues. As the number of driveways along a corridor increases, the number of crashes is likely to as well. There is a direct correlation between driveways per mile and crashes along a corridor. Each driveway is a potential conflict point for both vehicle-to-vehicle and vehicle-to-pedestrian interactions, and consequently a high number of closely spaced driveways increases the chance for collision. The Highway Capacity Manual states that free flow speed decreases by 1.5 mph per access point. Therefore, areas with a high number of access points not only decrease safety along a corridor, but also decrease mobility.

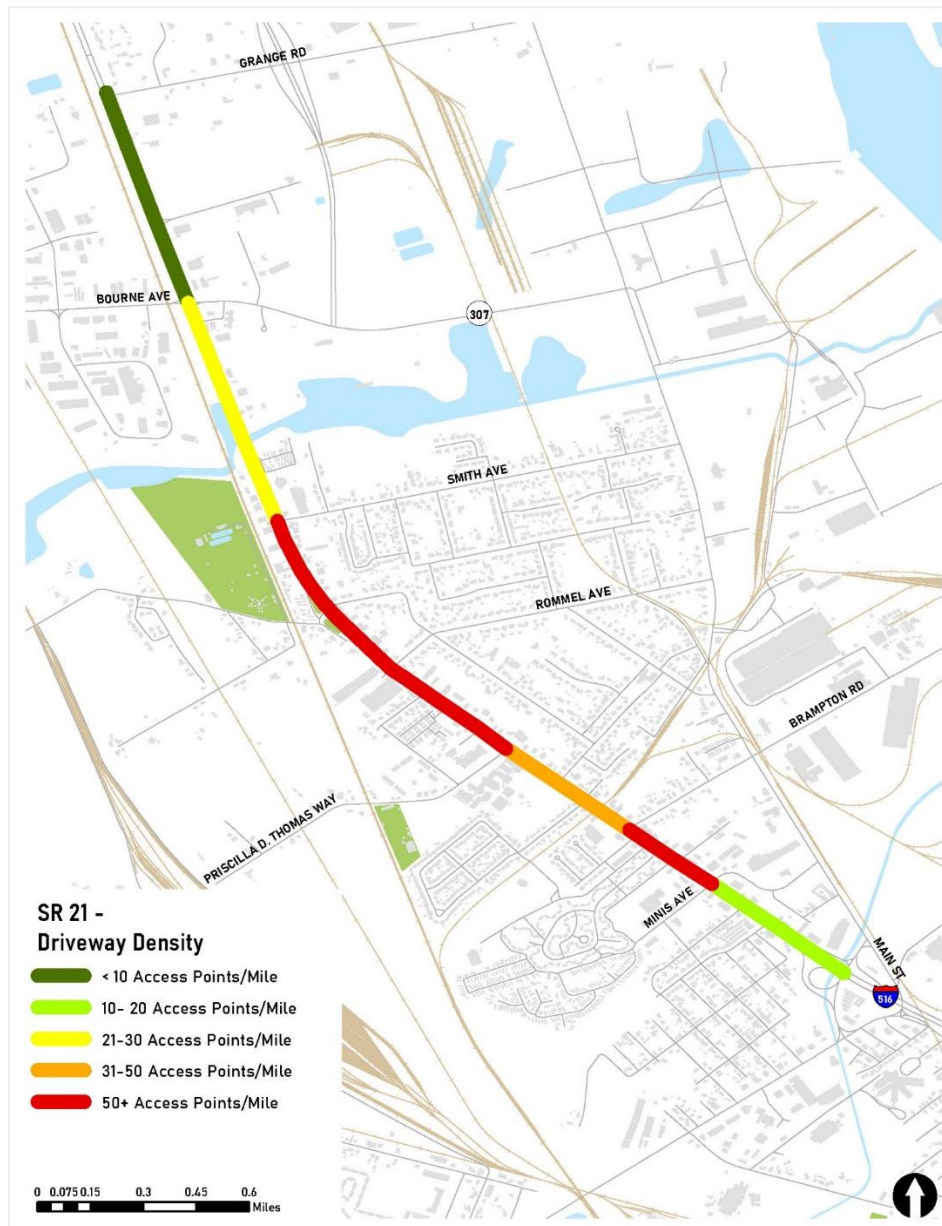


Figure 4-23: Driveway Density on SR 21



Figure 4-24: Driveway Density on SR 21 North of Priscilla D Thomas Way



Image 4-25: Parcel with Two Driveways into Northbound Right Turn Lane at SR 21 and Smith Avenue

## 4.10.6 CURRENT ACCESS MANAGEMENT POLICIES

The Georgia Department of Transportation (GDOT) manages SR 21 and permits access points from the traveled way. GDOT's Regulations for Driveway and Encroachment Control Manual was updated in 2021. This manual sets spacing and design standards, which are reviewed in detail in Section 2.9 Access Management of the manual.

National guidance for access management includes, but is not limited to the following, which are referenced in GDOT Manual:

- Transportation Research Board
  - Access Management Manual,
  - Circular 456: Driveway and Street Intersection Spacing,
  - NCHRP Report 420: Impacts of Access Management Techniques
- Institute of Transportation Engineers
  - Transportation and Land Development
- AASHTO
  - A Policy on Geometric Design of Highways and Streets (The Green Book)

Garden City's development standards are established by local ordinance. Driveway standards are addressed in municipal code Article V, excerpted below.

### *ARTICLE V. - OFFSTREET PARKING AND LOADING FACILITIES Section 90-128. - General Standards*

*(b) Width of driveways intersecting street. Except when a driveway intersects a state or federal highway, the maximum width of a driveway into a parking, loading or service area shall not exceed 35 feet, exclusive of curb return radii, and in such cases a curb return radius shall not exceed ten feet. In the case of a driveway which intersects a state or federal highway, the width of such driveway shall not exceed 50 feet, inclusive of curb return radii.*

*(c) Interior driveways. Interior driveways shall be at least 24 feet wide were used with 90-degree angle parking, at least 18 feet wide were used with 60-degree angle parking and at least 12 feet wide were used with 45-degree angle parking. Where used with parallel parking, or where there is no parking, interior driveways shall be at least 12 feet wide for one-way traffic movement and at least 20 feet wide for two-way traffic movement.*

*(d) Location of curb cuts. At the intersection of all streets, except lanes and alleys, a curb cut shall be set back not less than 25 feet from the intersection of two curb lines, or such lines extended or shall be set back not less than 15 feet from the intersection of two*

*property lines, or such lines extended, whichever is the less restrictive. Between the curb returns for any two driveways serving the same property, there shall be at least 20 feet of curb, except that this distance may be reduced to as little as five feet where it is demonstrated that restricted frontage makes this necessary to provide not more than two adequate driveways for the property.*

There are a range of access management techniques to manage conflicts while promoting safety and efficient travel. Examples of access management include:

- Managing connection and intersection spacing to meet standards for safe operation
- Shared driveways
- Inter-parcel access
- Permitting right turns only (right-in, right-out access)
- Driveway design and throat length

Access management techniques were evaluated and prioritized for future recommendations in the study area.

## 4.11 STREETScape AND AESTHETICS

### 4.11.1 STREETScape

Currently, there is minimal existing streetscape elements along SR 21. SR 21 streetscape resembles that of traditional retail corridors with auto-centric retail developments that have parking in front and minimal landscaping or tree coverage. To that end, SR 21 has become one that focuses on moving automobiles and freight with the primary streetscaping being utility poles and advertisement signage to attract drivers to the business along the corridor. Figure 4-25 represents the typical sections along the corridor.

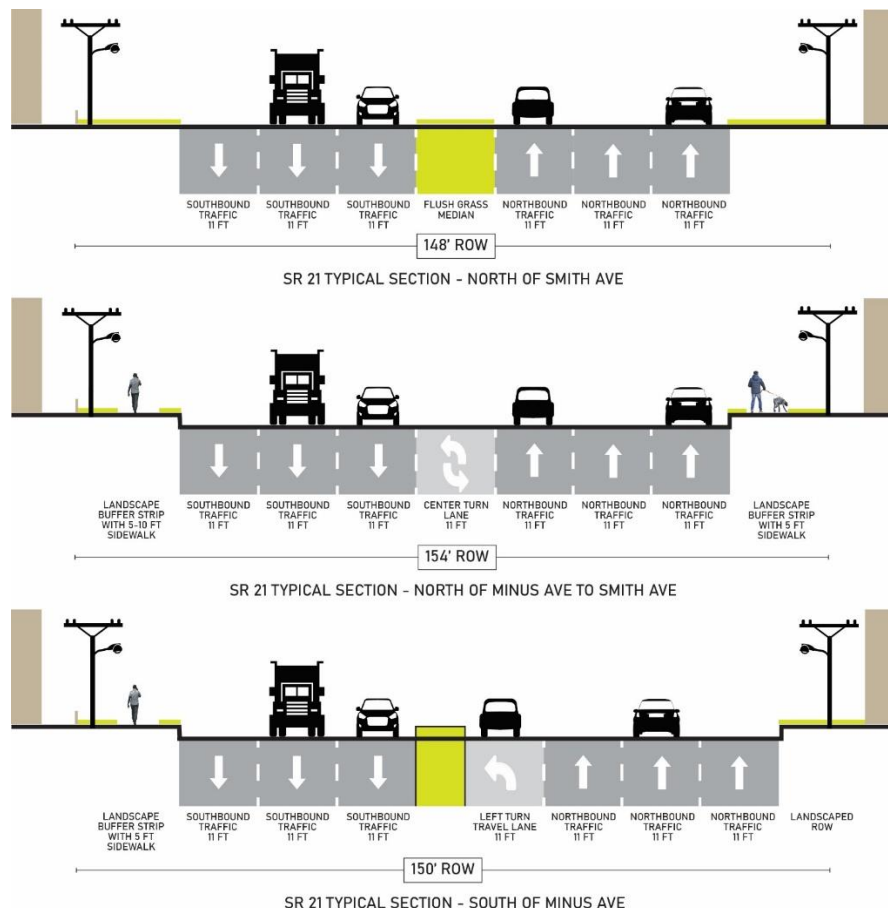


Figure 4-25: Typical Sections along SR 21

Despite the presence of sidewalks along segments of the corridor south of Smith Avenue, the deterioration of the sidewalks, lack of buffer between pedestrians and the roadway, and the lack of pedestrian crossings makes SR 21 difficult to traverse and not pedestrian-friendly. SR 21 has 3 travel lanes in both directions and a center two-way-left-turn lane, totaling approximately 84 feet of asphalt for pedestrians to cross without refuge. Moreover, significant stretches of SR 21 streetscape currently lack landscaping that can provide tree cover for pedestrians and provide a more visually appealing aesthetic by softening the view of utility poles and parking lots.

The corridor generally lacks roadway design and streetscaping to encourage slower travel, promote alternative modes of transportation, or accessibility to local amenities. Overall, the roadway typical section, aesthetics, and lack of placemaking along SR 21 creates the impression of being an area to travel through versus a destination.

### 4.11.2 STREETScape ELEMENTS

#### 4.11.2.1 LANDSCAPING

Landscaping and vegetation, such as planted buffers and street trees, not only improve aesthetics along a corridor and provide shade for pedestrians and cyclists, but they also help create the illusion of a narrower corridor for motorists, thereby helping to slow traffic. Along most of the length of the study corridor, there is a moderately-sized buffer strip behind the curb and between the sidewalk, where it exists. Tree-lining is observed on the south side of the corridor from Chatham City Service Road to Sparkman Drive. Some scattered trees are also observed on the south side of SR 21 from the railroad line to Denmark Street and near Colonial Trail. The median extending from I-516 to Minus Avenue has grassed landscaping with some scattered trees.

#### 4.11.2.2 STREET FURNITURE

Lighting poles are observed along the corridor. Transit stops are present along the corridor with some signposts and some transit shelters. The transit shelters include seating space and trash receptacles. Traffic signs are also observed within the right-of-way. Garden City does not have a branded vehicular-scale wayfinding signage plan.

## 4.11.2.3 ADA ACCESSIBILITY

At some intersections where sidewalks are present, ADA-compliant pads are observed. These truncated domes have raised bumps allowing visually impaired individuals to orient themselves on their routes and to indicate right-of-way changes and traffic flow patterns. At some locations, these ADA ramp pads need to be replaced.

## 4.11.2.4 RIGHT-OF-WAY (ROW)

About 50 feet public right-of-way is available outside of the roadway affording availability for future inclusion of streetscape landscaping. Image 4-26 and Image 4-27 show the streetscape along SR 21.



Image 4-26: Streetscape along SR 21



Image 4-27: Streetscape Furniture at Volunteer Park abutting SR 21

## 4.11.3 STREETScape AND AESTHETICS NEEDS ASSESSMENT

The current cross section along SR 21 has no consistent streetscape and lacks aesthetic appeal. With no curb and gutter in most segments and poor sidewalk infrastructure, the corridor presents the need to improve its bicycle/pedestrian amenities to include sidewalk connectivity, multi-use paths, tree-planting for shade, and street furniture including lighting, benches, trash receptacles and wayfinding/signage.

Streetscape enhancements not only promote walkability, lower Level of Traffic Stress for bicycle users, and improve corridor safety for all users but also improve aesthetics of the corridor thereby improving the quality of life for all residents. Elements of potential streetscape enhancements are shown in Figure 4-26.



Figure 4-26: Potential Streetscape Elements

## 4.12 TRAFFIC OPERATIONS

### 4.12.1 TRAFFIC VOLUMES

In response to the trends in traffic volumes related to the COVID-19 pandemic, a combination of newly collected count data and historical count data from GDOT's Traffic Analysis & Data Application (TADA) was obtained along SR 21. Twenty-four-hour traffic volumes were collected in May 2021 at three locations along SR 21. The three locations selected were approximately at the same locations as GDOT's count stations along SR 21. The locations are shown in Figure 4-27. The collected 24-hour traffic volumes, including the percent of heavy vehicles, the D Factor, and the K-Factor are included in Table 4-10. The D-factor represents the directionality of the traffic during the peak periods. The K-factor is the ratio of peak hour traffic to the total daily traffic volume. The historical average annual daily traffic (AADT), including the percent of heavy vehicles, the D Factor, and the K-Factor are included in Table 4-11.

**Table 4-10: 2021 Collected Traffic Counts**

#	Location	24-Hour Traffic	Percent Heavy Vehicles <sup>1</sup>	D Factor		K Factor
				AM Peak	PM Peak	
1	SR 21 south of Minus Avenue <sup>2</sup>	45,774	8.0%	60%	55%	8.0%
2	SR 21 north of Priscila D Thomas Way <sup>2</sup>	48,940	8.6%	50%	56%	7.7%
3	SR 21 north of Grange Road <sup>3</sup>	28,294	22.5%	62%	42%	7.9%

1. FHWA Vehicle Classifications 4 through 13

2. GDOT TADA Count Stations (April 2021)

3. Field Collected Data (May 2021)

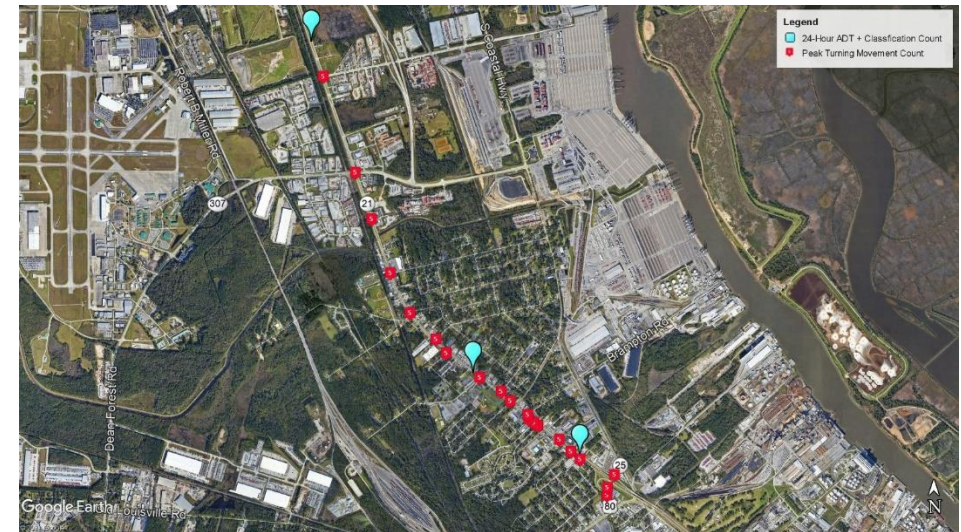
**Table 4-11: 2019 GDOT Historical Count Data**

#	Count Station ID	Location	24-Hour AADT	Percent Heavy Vehicles <sup>1</sup>	D Factor		K Factor
					AM Peak	PM Peak	
1	051-0123	SR 21 south of Minus Avenue	46,400	6.8%	56%	54%	7.9%
2	051-0121	SR 21 north of Priscila D Thomas Way	44,200	7.8%	64%	57%	8.7%
3	051-0118	SR 21 south of GA-307	36,500	9.3%	60%	50%	8.4%
4	067-0892	SR 21 north of Grange Road	32,100	12.6%	62%	45%	7.6%

1. FHWA Vehicle Classifications 4 through 13

Traffic counts collected on SR 21 south of SR 307, in May 2021, are relatively the same to the historical count data of 2019. SR 21 north of Grange Road, traffic is approximately 11% less now than it was in 2019. Shifts in traffic volumes could be related to the traffic trends related to the pandemic, other factors, such as the closing of Groves High School and Mercer Middle School during the construction of the new K-12 campus. Traffic data collected in May showed a higher percentage of freight traffic, which can possibly be attributed to the number of new warehousing, distribution, and other industrial development in the surrounding area coupled with expansion projects and growth at the Savannah Port.

In addition to daily and classification counts, intersection turning movements counts at key signalized and unsignalized intersections were collected as well during morning and afternoon peak periods. Those count locations are shown in Figure 4-27 as well. Peak hour turning movements at the study intersections are shown in Figure 4-28. Given that the average percent difference is 2019 historical data and the 2021 collected data is approximately 11% north of Grange Road, an adjustment factor of 1.1 was applied to the collected data at that location for the purposes of the roadway capacity analyses. For the intersection capacity analysis, traffic volumes were not adjusted.



**Figure 4-27: SR 21 Count Locations Map**

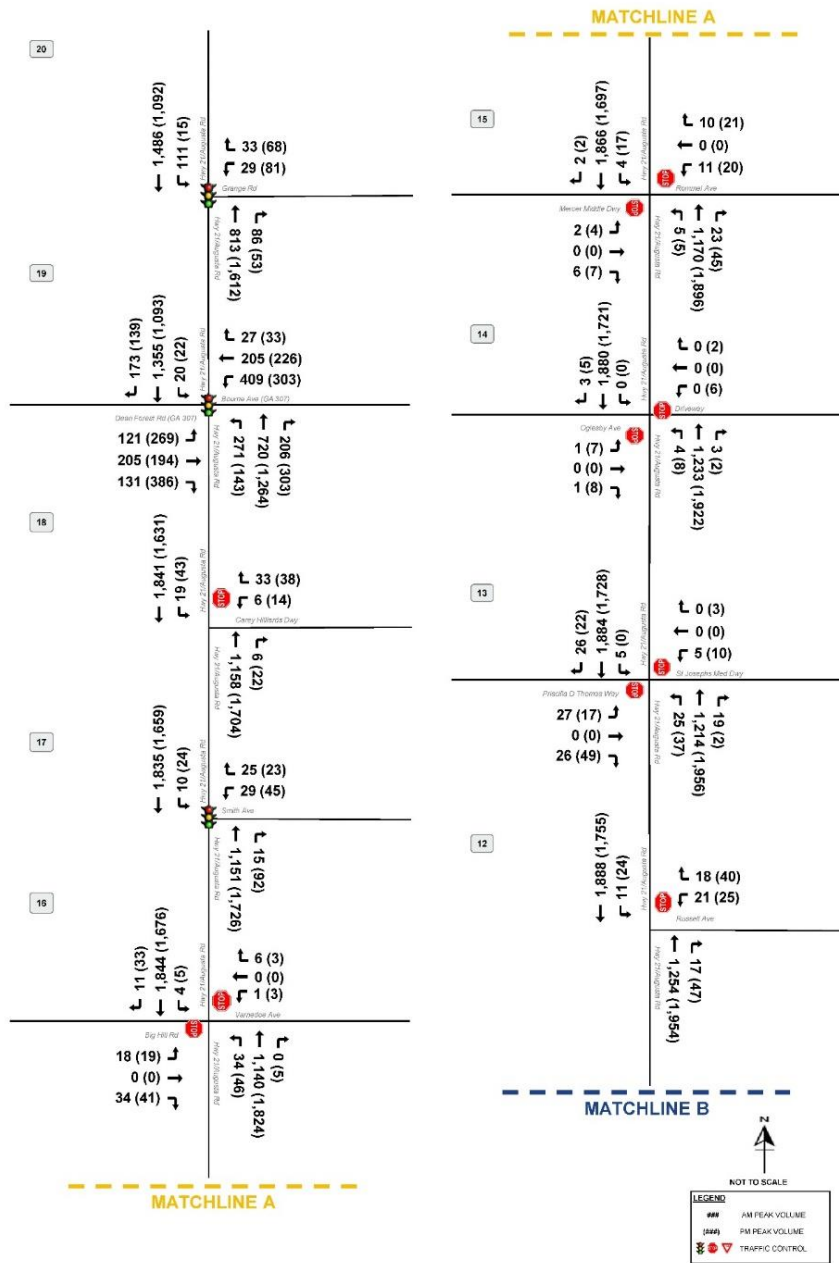


Figure 4-28: 2021 Existing Peak Hour Traffic Volumes (1)

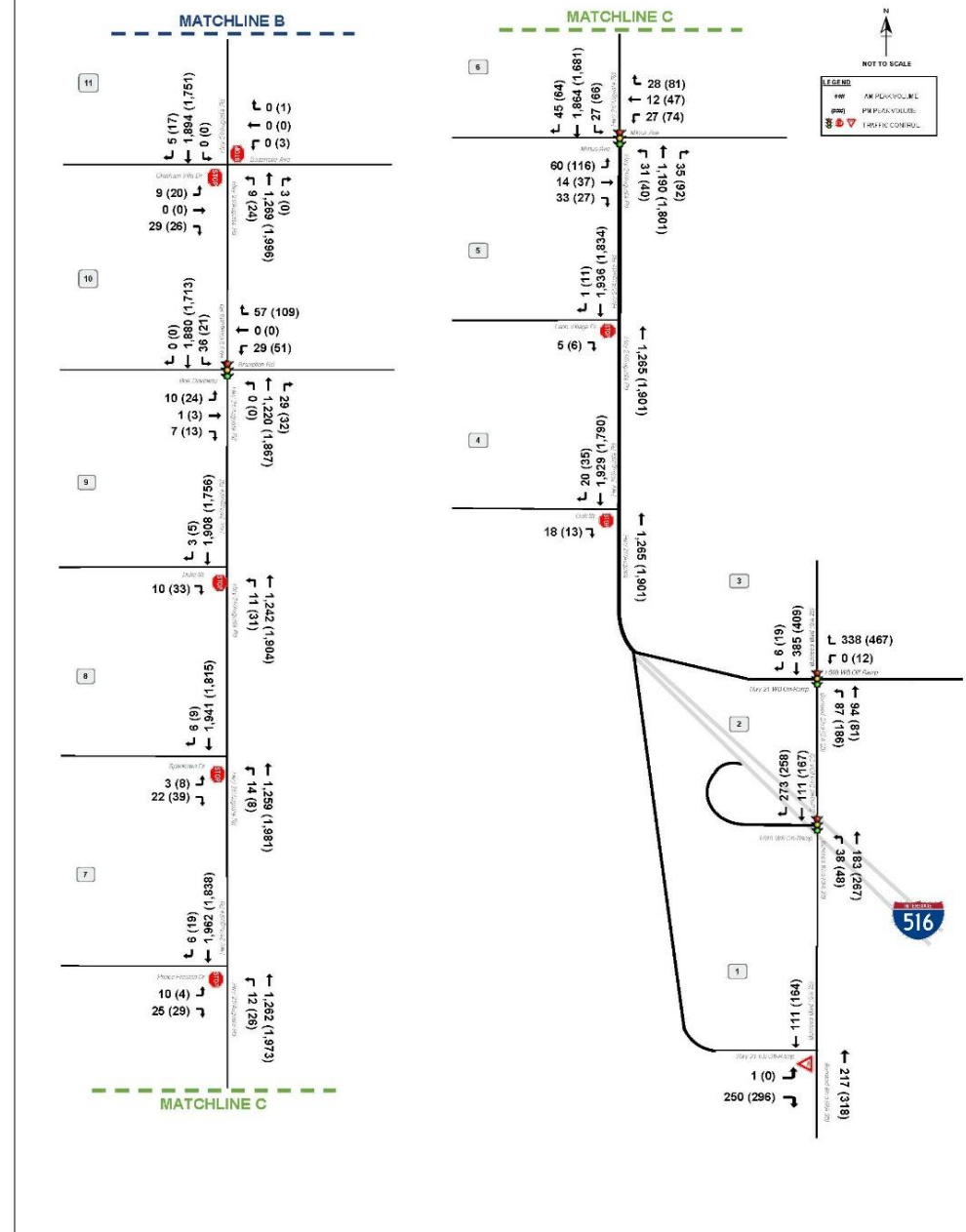


Figure 4-29: 2021 Existing Peak Hour Traffic Volumes (2)

### 4.12.2 CAPACITY ANALYSIS

The Transportation Research Board's Highway Capacity Manual, 2010 edition (HCM 2010) methodology was used to analyze Level of Service and delay at study intersections. Level of Service (LOS) is defined as a qualitative measure that describes operational conditions and motorists' perceptions within a traffic stream. Level A represents the best quality of traffic where the driver has the freedom to drive with free flow speed and LOS F represents the worst quality of traffic when the traffic flow breaks down. Level of Service is defined based on the measure of effectiveness (MOE). Typically, three parameters are used under this, and they are speed and travel time, density, and delay.

#### 4.12.2.1 ROAD CAPACITY

In general, capacity is defined as the maximum rate at which vehicles can reasonably traverse a point or uniform segment of a road. For highway capacity, the LOS is defined by density. Roadway LOS is defined based on its classification, average travel speed, time-spent-following, and free-flow speed. For roadway LOS, the HCM's service measure for basic freeway and multilane highway segments is density, which is measured in passenger equivalents per mile per lane (pc/mi/ln). The LOS criteria for multi-lane roadways are given in Table 4-12.

**Table 4-12: Level of Service Criteria for Intersections and Multi-Lane Roadways**

MULTI-LANE ROADWAY	
Level of Service	Density (pc/mi/ln)
A	≤ 11
B	> 11 and ≤ 18
C	> 18 and ≤ 26
D	> 26 and ≤ 35
E	> 35 and ≤ 45
F	> 45

Operational conditions were evaluated for the 2021 existing traffic conditions during the morning and afternoon peak hours. The roadway LOS and density (pc/mi/ln) are shown in Table 4-13.

**Table 4-13: Volume to Capacity LOS for SR 21**

	AM Peak		PM Peak	
	NB	SB	NB	SB
SR 21 south of Minus Avenue	B (15.8 pc/mi/ln)	C (19.9 pc/mi/ln)	C (23.0 pc/mi/ln)	C (19.5 pc/mi/ln)
SR 21 north of Priscila D Thomas Way	B (14.7 pc/mi/ln)	A (10.9 pc/mi/ln)	B (14.6 pc/mi/ln)	B (16.8 pc/mi/ln)
SR 21 north of Grange Road	A (8.7 pc/mi/ln)	B (14.8 pc/mi/ln)	B (15.0 pc/mi/ln)	B (10.8 pc/mi/ln)

For the 2021 existing traffic conditions, road capacity on SR 21 is operating at or above LOS C at all four count locations during both peak periods. This LOS is characterized by vehicles traffic flow being almost completely unimpeded in their ability to maneuver within the traffic stream. It is important to note that, traffic flow is periodically interrupted during the day as railcars cross at the railroad crossing that traverses SR 21, north of Brampton Road.

#### 4.12.2.2 INTERSECTION LEVEL OF SERVICE

For intersections, the HCM defines six Levels of Service from LOS A to LOS F, which are defined by average controlled delay. The LOS criteria for intersections and multi-lane roadways are given in Table 4-14. LOS for unsignalized intersections, with stop control on the minor street only, are reported for the side street approaches.

**Table 4-14: Level of Service Criteria for Signalized and Unsignalized Intersections**

Level of Service	SIGNALIZED	UNSIGNALIZED
	Average Delay (sec)	Average Delay (sec)
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

Operational conditions were evaluated for the 2021 Existing traffic conditions using the Synchro traffic simulation software package. The LOS and delay per intersection are shown in Table 4-15.

**Table 4-15: Level of Service Analysis at SR 21 Study Intersections**

#	Intersection	Traffic Control	AM Peak		PM Peak	
1	SR 25/Burnsed Blvd at SR 21 SB Off-Ramp	SSSC <sup>1</sup>	B (10.0 s)		B (11.2 s)	
3	SR 25/Burnsed Blvd at SR 21 NB On-Ramp/I-516 WB Off-Ramp	SSSC <sup>1</sup>	B (11.0 s)		B (13.4 s)	
4	SR 21 at Oak Street	SSSC <sup>1</sup>	D (25.8 s)		C (22.5 s)	
5	SR 21 at Leon Village Drive	SSSC <sup>1</sup>	A (9.1 s)		A (9.0 s)	
6	SR 21 at Minus Avenue	Signalized	B (13.4 s)		C (25.6 s)	
7	SR 21 at Prince Preston Drive	SSSC <sup>1</sup>	F (66.4 s)		D (34.6 s)	
8	SR 21 at Sparkman Drive	SSSC <sup>1</sup>	F (50.4 s)		E (46.8 s)	
9	SR 21 at Duke Street	SSSC <sup>1</sup>	C (23.5 s)		C (23.0 s)	
10	SR 21 at Brampton Road	Signalized	A (8.0 s)		A (9.3 s)	
11	SR 21 at Chatham Villa Drive/Bazemore Avenue	SSSC <sup>1</sup>	F (69.1 s)	A (0.0 s)	F (157.2 s)	F (155.4 s)
12	SR 21 at Russel Avenue	SSSC <sup>1</sup>	D (31.4 s)		F (147.4 s)	
13	SR 21 at Priscilla D Thomas Way/Private Driveway	SSSC <sup>1</sup>	F (***) <sup>2</sup>	F (63.4 s)	F (76.8 s)	F (261.3 s)
14	SR 21 at Oglesby /Private Driveway	SSSC <sup>1</sup>	F (64.1 s)	A (0.0 s)	F (62.5 s)	F (153.7 s)
15	SR 21 at Rommel Avenue	SSSC <sup>1</sup>	D (26.8 s)		F (93.6 s)	
16	SR 21 at Big Hill Road/Varnedoe Avenue	SSSC <sup>1</sup>	F (243.9)	C (20.8 s)	F (127.8 s)	F (154.5 s)
17	SR 21 at Smith Avenue	Signalized	A (4.0 s)		A (5.3 s)	
18	SR 21 at Carey Hilliard's/BP Gas Station Driveway	SSSC <sup>1</sup>	E (45.5 s)		F (291.8 s)	
19	SR 21 at Dean Forest Road-Bourne Avenue (SR 307)	Signalized	E (65.0 s)		E (66.0 s)	
20	SR 21 at Grange Road	Signalized	B (10.3 s)		B (11.0 s)	

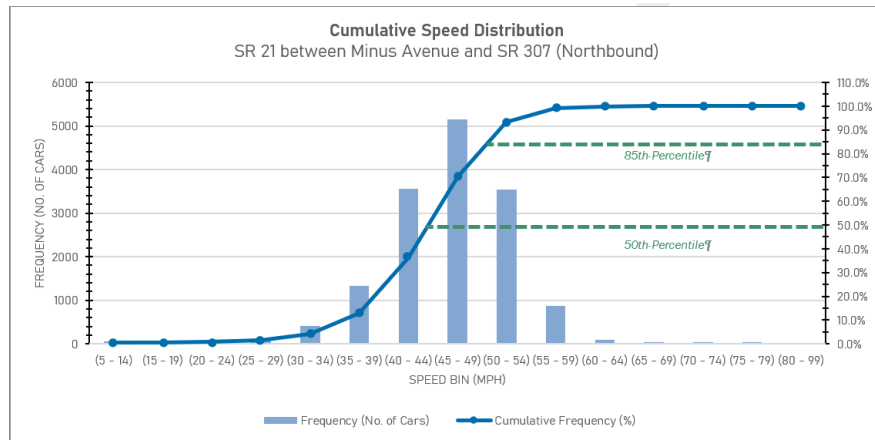
1. For Side-Street Stop Controlled (SSSC) intersections, LOS are reported for the side street approaches only.

2. The delay output by the software exceeds 300 seconds and the HCM methodology.

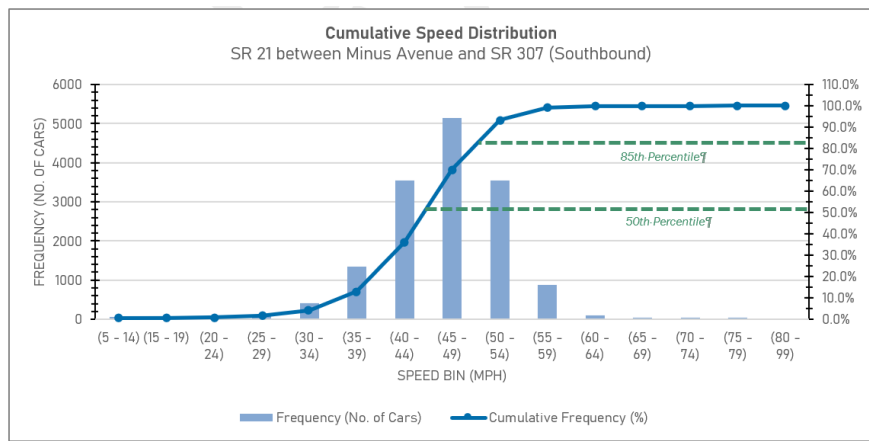
Under 2021 existing conditions, all the signalized intersections are operating above LOS D standard except for the intersection of SR 21 and GA 307, which is operating at LOS E. Several of the side street approaches along SR 21 experience excessive delay with many at LOS F. This delay can be related to the amount of through volume on SR 21 as well as the number of lanes turning vehicles must traverse to make a left turn. It is important to note that excessive delays at side-street stop-controlled intersections may cause motorist to execute turns with smaller gaps than are applied by model assumptions. That potential scenario increase safety concerns related to angle and rear end crashes on both approaches.

## 4.12.3 SPEED STUDY

Vehicle speeds were obtained for SR 21 in May 2021. Given the posted speed limit of 45 miles per hour, approximately 33% of the collective northbound and southbound vehicles between Grange Road and Minus Avenue were exceeding the speed limit by more than 5 mph. The 85<sup>th</sup> percentile for both directions fell between 50 mph and 54 mph. Given the posted speed limit along SR 21 is 45 mph, these results indicate that vehicles along the corridor are typically exceeding the speed limit. Figure 4-30 and Figure 4-31 show the average cumulative speed distribution along SR 21 for the northbound and southbound directions between Minus Avenue and SR 307.



**Figure 4-30: SR 21 Cumulative Speed Distribution (Northbound)**



**Figure 4-31: SR 21 Cumulative Speed Distribution (Southbound)**

## 4.12.4 TRAFFIC FORECASTING

The growth rate analysis for the SR 21 corridor was conducted using historical count data and information from the CORE MPO travel demand model. Overall, both information sources indicate robust growth over the short-term with more modest growth over the long-term along the SR 21 corridor.

### 4.12.4.1 EXISTING GROWTH RATE

Historical count data from the GDOT Traffic Analysis and Data Application (TADA) was used to estimate the existing traffic growth rate. TADA provides data collected from the Georgia Traffic Monitoring Program located on public roads. Five count stations along SR 21 were selected for the analysis. These stations are listed below and shown in Figure 4-32.

- Station 015-0114: Between Jimmy Deloach Parkway and Sonny Dixon Interchange
- Station 015-0116: Between Gulfstream Road/Crossgate Road and Grange Road
- Station 015-0118: Between SR 307/Bourne Avenue and Smith Avenue
- Station 015-0121: Between Rommel Avenue and Priscilla D. Thomas Way
- Station 015-0123: Between SR 21 Spur/Brampton Road and Burnsed Boulevard

To determine the existing traffic growth rate, the compound annual growth rate (CAGR) was calculated for each count station. Only actual, as opposed to estimated, AADT values were used in the analysis. The results of that analysis are shown in Table 4-16. They indicate that the existing growth rate along the corridor is approximately 2.6 percent.

**Table 4-16: Existing Traffic Growth Rate**

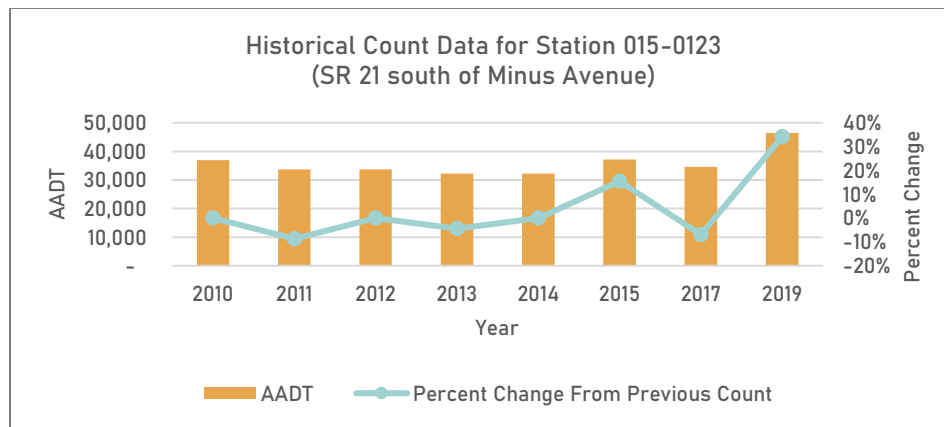
Station	Location	CAGR	Time Period
015-0114	Between Jimmy Deloach Parkway and Sonny Dixon Interchange	3.1%	2011-2019
015-0116	Between Gulfstream Road/Crossgate Road and Grange Road	-1.6%	2010-2018
015-0118	Between SR 307/Bourne Avenue and Smith Avenue	4.1%	2011-2019
015-0121	Between Rommel Avenue and Priscilla D Thomas Way	3.3%	2010-2019
015-0123	Between SR 21 Spur/Brampton Road and Burnsed Boulevard	4.1%	2011-2019
Average		2.6%	

Interestingly, based on the historical count data station 015-0116 between Gulfstream Road /Crossgate Road and Grange Road shows negative growth. However, the data also indicates that growth at that location has largely been flat since 2014, hovering at around 32,000 vehicles per day. If flat as opposed to negative growth (i.e., 0 percent instead of -1.6 percent) were assumed at that location, then the average growth rate would equal approximately 2.9 percent. The reduction in traffic at the count location could be related to the opening of the Jimmy Deloach Parkway extension project sponsored by the Georgia Ports Authority, which opened in 2016. The project limits were from SR 307/Bourne Avenue and continued north along new location and connect to the existing Jimmy Deloach Parkway at SR 21 to improve the Port's connectivity to Interstate 95.

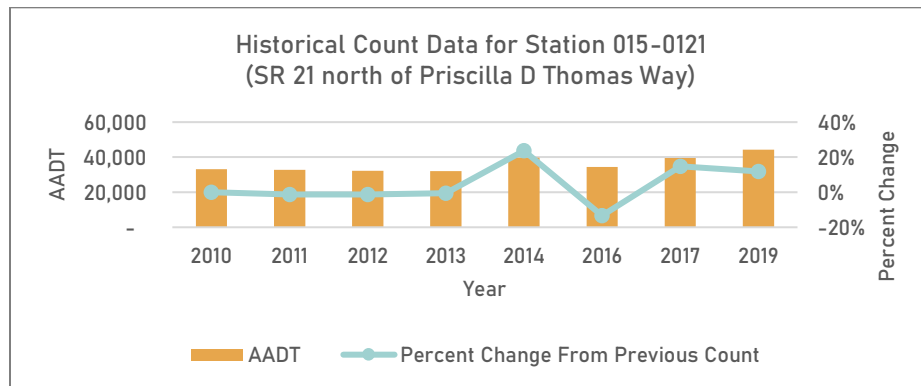
For the count stations on SR 21 within the study limits, stations 015-0118, 015-0121, 015-0123, the annual growth rate over the past 10 years has on average been 3.8%. The steady growth could possibly be related to the influx of industrial and warehousing developments coming into the area, as well as expansion projects at the port. The percent changes in AADT at count stations 015-0118, 015-0121, 015-0123, are shown in Figure 4-33, Figure 4-34, and Figure 4-35, respectively.



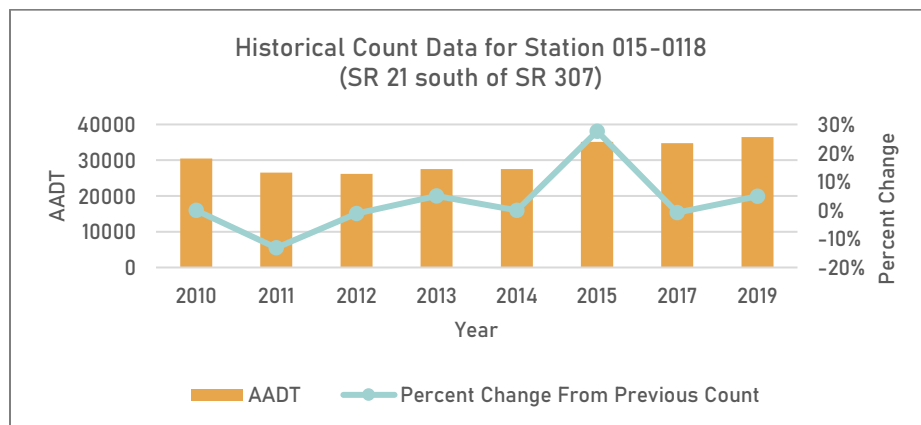
**Figure 4-32: Historical Traffic Count Sites on SR 21**



**Figure 4-33: SR 21 Historical Count Data south of Minus Avenue**



**Figure 4-34: SR 21 Historical Count Data north of Priscilla D Thomas Way**



**Figure 4-35: SR 21 Historical Count Data south of SR 307**

## 4.12.4.2 FUTURE TRAFFIC GROWTH RATE

The CORE MPO travel demand model was used to estimate the future traffic growth rate for the SR 21 corridor. Future traffic growth rates as produced by travel demand models account for various underlying socioeconomic factors that drive the demand for transportation across modes.

For the CORE MPO Metropolitan Planning Area (MPA), the travel demand model projected annual population growth of about 0.88 percent for the MPA over the 2015–2045 time. For households and total employment, the model projected annual growth of about 0.85 and 0.60 percent, respectively. In comparison, the Savannah Metropolitan Statistical Area (which is comprised of Bryan, Chatham, and Effingham Counties) has historically grown at a rate of about 1.3 percent annually based on 2010 and 2019 U.S. Census Bureau estimates. This implies that the travel demand model is generally more conservative in terms of estimating future growth.

Using the CORE MPO travel demand model, the future traffic growth rate was estimated using the following process:

1. All roadways within a 3-, 4-, and 5-mile radius of the SR 21 corridor were selected.
2. Model estimates for the 2015 base year and 2045 future year vehicle miles traveled (VMT) for all roadways within those boundaries were gathered.
3. Annual growth over the analysis period was calculated.

The “Existing + Committed” version of the CORE MPO travel demand model was used for the analysis. This version of the model accounts for network improvements that would have been completed by the time forecast year occurs. The calculated growth rates for the three areas are shown in Table 4-17. They range from 0.42 to 0.52 percent with an average of 0.49 percent. Overall, these results imply modest long-term growth in traffic activity in the area encompassing the SR 21 corridor.

**Table 4-17: Traffic Growth Centered on the SR 21 Corridor from the CORE MPO Travel Demand Model**

Radius	2015 VMT	2045 VMT	CAGR
3 Miles	345,109	391,906	0.42%
4 Miles	436,203	509,562	0.52%
5 Miles	522,531	608,984	0.51%
<b>Average</b>			<b>0.49%</b>

## 4.13 SAFETY

### 4.13.1 CRASH HISTORY

To identify crash trends and safety characteristics for the corridor, crash data was obtained from the Georgia Electronic Accident Reporting System (GEARS) database. Crash records were collected along SR 21 within the study area from 2016 through 2020. Over the analysis period, 1,187 crashes occurred along SR 21, an average of 99 crashes per year. Most of the crashes being contributed to rear end (51%) and angle crashes (27%). Of the total 1,187 crashes, 343 of the crashes resulted in one or more injuries and one fatal crash at SR 21 and GA 307. For alternate modes of travel, there were 13 crashes involving pedestrians and one crash involving a bicyclist. Of the total pedestrian crashes, 9 of the crashes occurred between Brampton Road and Priscilla D Thomas Way. These findings indicate that there is a recognizable need to implement techniques to reduce the frequency and severity of crashes along the corridor.

Crashes by intersection and by manner of collision are shown in Figure 4-37 and Figure 4-36, respectively. Most of the crashes occurred at the signalized intersections, particularly at SR 307. For the unsignalized intersections, the intersections with the highest crash occurrences are Priscilla D Thomas Way, Chatham Villa Drive-Bazemore Avenue, and Prince Preston Road. Based on the time-of-day distribution of crashes shown in Figure 4-38, crash frequency spiked during peak morning and afternoon periods, with the highest frequency between 3 PM and 6 PM.

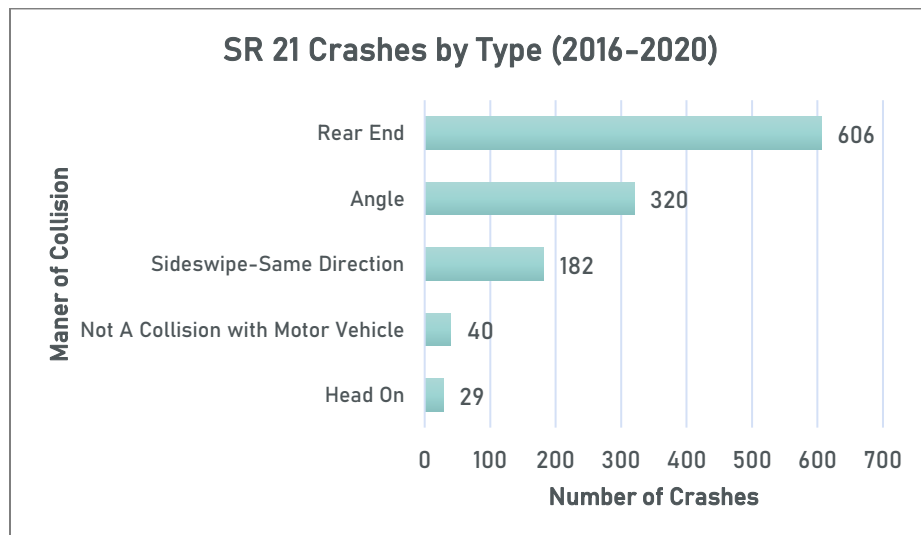


Figure 4-36: SR 21 Crashes by Type

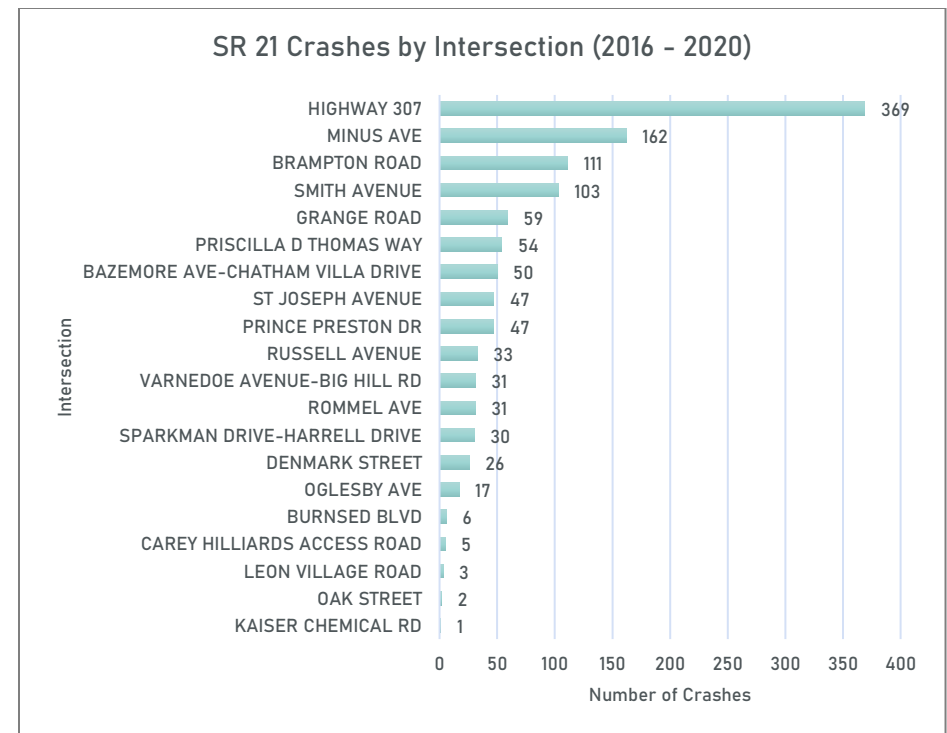


Figure 4-37: SR 21 Crashes by Intersection

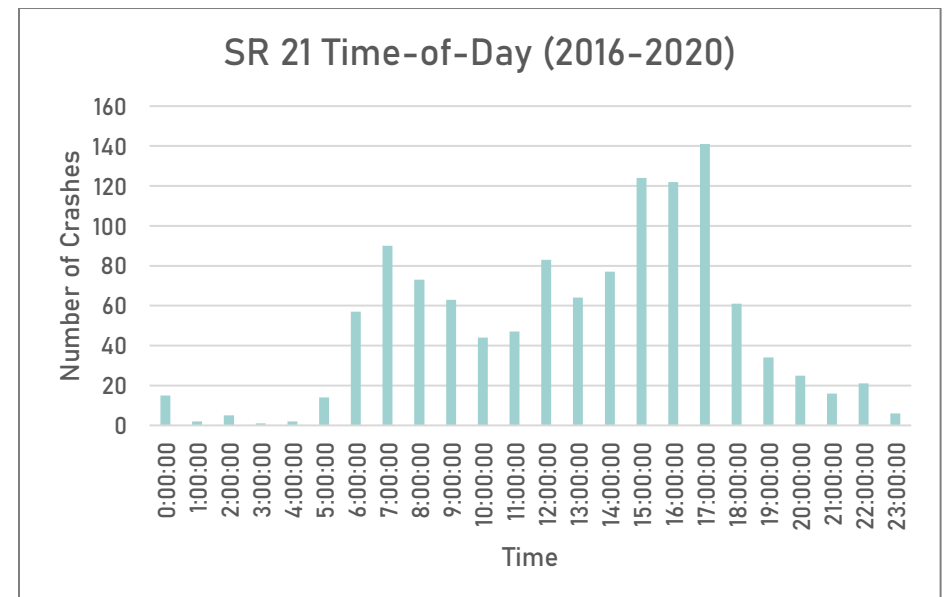


Figure 4-38: SR 21 Crashes by Time of Day

Figure 4-39 shows a summary heat map, including the location of the fatal crashes, pedestrian crashes, and bicyclist crashes. The highest concentration of crashes at an intersection is at the SR 21 and Dean Forest Road-Bourne Avenue (SR 307) intersection, with 369 crashes at the intersection between 2016 and 2020. Over 70% of crashes at the Dean Forest Road-Bourne Avenue (SR 307) intersection were rear end collisions. The second most visible safety hotspot is an elongated area between the two signalized intersections of Brampton Road and Minus Avenue. The section also includes 9 of the 13 recorded pedestrian crashes along the corridor.



Figure 4-39: Crash Heat Map along SR 21

Crash rates describe the number of crashes in each period as compared to the traffic volume (or exposure) to crashes. Crash rates are calculated by dividing the total number of crashes at a given roadway section or intersection over a specified time by a measure of exposure. Crash rate analysis typically uses exposure data in the form of traffic volumes or roadway mileage. The crash rate is calculated to determine relative safety compared to other similar roadways, segments, or intersections.

The benefit of crash rate analysis is that it provides a more effective comparison of similar locations with safety issues. This allows for prioritization of these locations when considering safety improvements with limited resources. Table 4-18 shows the roadway crash rate along the corridor and for the analyzed roadway segments. Figure 4-40 shows the crash rates along SR 21, which for each segment analyzed, is higher than the statewide average for principal arterials. Crash frequency and severity is a recognizable issue along SR 21, and measures should be taken to reduce the crash experience along the corridor.

Table 4-18: Crash Analysis Along SR 21

	No. of Crashes	Corridor Crash Rate	Statewide Avg Crash Rate
<b>CORRIDOR WIDE</b>			
All Crashes	1187	493	396
Total Non-fatal Injury Crashes	343	142	96
Total Injuries	369	153	145
Total Fatal Crashes	4	2	1.34
Total Fatalities	4	2	1.42
<b>SEGMENT 1: I-516 TO BRAMPTON RD</b>			
All Crashes	627	1122	396
Total Non-fatal Injury Crashes	158	283	96
Total Injuries	0	0	145
Total Fatal Crashes	3	5.37	1.34
Total Fatalities	0	0	1.42
<b>SEGMENT 2: BRAMPTON RD SMITH</b>			
All Crashes	349	624	396
Total Non-fatal Injury Crashes	120	215	96
Total Injuries	0	0	145
Total Fatal Crashes	1	1.79	1.34
Total Fatalities	1	0	1.42
<b>SEGMENT 3: SMITH AVE TO GRANGE RD</b>			
All Crashes	211	378	396
Total Non-fatal Injury Crashes	61	109	96
Total Injuries	0	0	145
Total Fatal Crashes	0	0	1.34
Total Fatalities	0	0	1.42

## 4.13.2 CRASH RATES

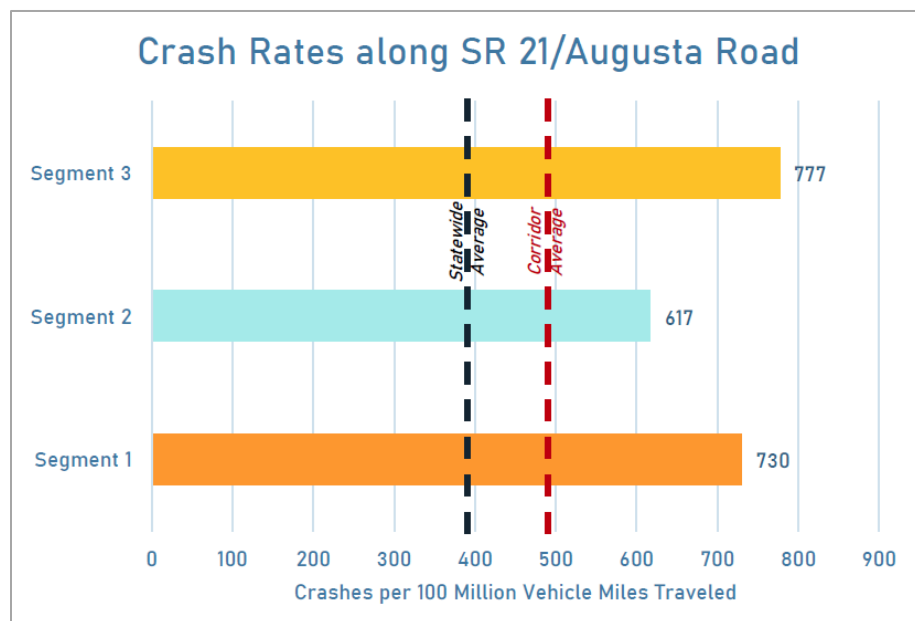


Figure 4-40: SR 21 Crash Rates

### 4.13.3 CRASH SEVERITY AND COST

A summary of crash severity along SR 21 based on injury sustained is shown in Table 4-19. The table summarizes the total number of crashes that resulted in an incapacitating injury, a non-incapacitating injury, a possible injury, and crashes that resulted in property damage only.

The National Safety Council (NSC) makes estimates of the average costs of fatal and nonfatal injuries to illustrate their impact on the nation's economy. The costs are a measure of the dollars spent and income not received due to accidents, injuries, and fatalities. The NSC economic costs for motor-vehicle crashes were used for this analysis, which includes the economic costs, such as wage and productive loss, medical expenses, administrative expenses, and motor vehicle damages. The cost of crashes for the study corridor based on severity was determined using 2019 annual crash cost estimates from NSC. The 1,187 crashes along the 3.2 mile stretch of SR 21 between 2019 and 2011 resulted in a total economic cost of over \$22,195,000, approximately \$4,450,000 per year. The findings of this analysis clearly indicate that the safety issues along SR 21 also result in a significant economic cost.

Table 4-19: Economic Cost of Crashes per Crash Severity along SR 21

Injury Severity	Number of Crashes	Number of Persons Injured	Total Cost of Crashes 2016-2020
K - Fatal	1	1	\$ 1,704,000.00
A - Incapacitating	15	15	\$ 1,476,000.00
B - Non-incapacitating	44	49	\$ 1,396,500.00
C - Possible Injury	280	301	\$ 7,043,400.00
O - Property Damage Only	846	0	\$ 10,575,000.00
<b>Total</b>	<b>1186</b>	<b>366</b>	<b>\$ 22,194,900.00</b>

### 4.13.4 ROAD SAFETY AUDIT

A Road Safety Audit (RSA) is the formal safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team. It qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in safety for all road users. The objectives of RSAs per the Federal Highway Administration (FHWA) guidelines are:

- To make corridors safer for all road users
- To reduce crashes (fatal, injury, and property damage) on audited roads
- Integrate multimodal (all means of travel) safety concerns
- Connect human factors from various viewpoints and facets of design
- Promote awareness and discussion of safe design practices

The RSA for SR 21 was conducted on June 09, 2021 to quantify existing safety conditions along the corridor. Crash locations were examined along the corridor and feedback from the project management team and members of the project advisory group were used to help identify safety issues or concerns. The RSA team was comprised of the consultant team and representatives from CORE MPO, Savannah MPC, Chatham County, Garden City, GDOT and Walk-Bike Savannah.

Key findings from the RSA included the following:

- High number of curb cuts along roadway south of SR 307
- Need to upgrade signal equipment and ADA accommodations at signalized intersections
- Lack of lighting
- Concern with conflicting vehicles turning into and from center two-way left turn lane
- Minimal or no buffer between vehicles and pedestrians walking along SR 21
- No sidewalk connectivity north of Smith Avenue
- Deterioration and overgrown vegetation in sidewalk south of Smith Avenue
- Varying sidewalk width
- Pedestrians crossing several lanes between signalized intersections
- Other obstructions to sight distance at intersections, such as overgrown vegetation
- Lack of multimodal options such as transit or bike facilities

The RSA team discussed several countermeasures to improve safety along the corridor. The recommendations will be carried forward to the next phase of the SR 21 Access Management Study based on engineering judgment and feasibility. Images from the RSA follow.



**Image 4-28: Road Safety Audit Participants Walking along SR 21 near Groves High School**



**Image 4-29: Road Safety Audit Participants Walking along SR 21 South of Smith Avenue**



**Image 4-30: Road Safety Audit Participants Walking along SR 21 at Grange Road**

## 4.14 ENVIRONMENTAL DUE DILIGENCE

The purpose of the environmental due diligence is to identify sensitive environmental and historic land uses that may provide improvement opportunities and/or constraints. An environmental survey was performed for the SR 21 transportation corridor from Grange Road to Burnsed Boulevard. The survey included agency database research, as well as a review of the corridor using Google Earth and Google Maps. Sensitive environmental land uses were surveyed along the corridor to include:

- Natural resources identified include watershed; streams; wetlands; floodplains; and threatened and endangered species.
- Cultural resources identified include historic and archaeological resources.
- Community resource assessments include parks and recreation areas; churches; cemeteries; Section 4(f) resources; and any other resources.
- Physical resources include Potential Contamination Sites (PSC) or Potential Hazardous Waste Sites.

Environmental resources that were identified along the SR 21 study corridor are itemized below and are mapped in Figure 4-41.

### 4.14.1 NATURAL RESOURCES

#### 4.14.1.1 STREAMS

Two man-made streams have been identified in the project corridor: Pipe Maker's Canal and Dundee Canal (see Environmental Resources Location Map). The canals are identified as riverine systems in the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) and are monitored by the National Water Quality Monitoring Council. The canals are not included in the Georgia Environmental Protection Division's (GEPD's) 2020 Integrated 305(b)/303(d) list of impaired waters. Prior to construction activities in the area of the canals, field studies would need to be conducted and coordinated with the U. S. Army Corps of Engineers (USACE) for stream identification and to determine if the canals meet the USACE criteria for USACE jurisdiction. If impacts to jurisdictional streams are anticipated, a USACE Section 404 permit would be required. For more information concerning the Pipe Maker's Canal and Dundee Canal, see the Wetlands, Floodplains, and Cultural Resources discussions.

No natural perennial, intermittent, or ephemeral streams have been identified along the study corridor.

#### 4.14.1.2 WETLANDS

The NWI identified several wetlands in the area of the SR 21 study corridor (refer to Figure 4-41). Freshwater emergent wetlands and freshwater forested/shrub wetlands are identified primarily in association with floodplains, Pipe Maker's Canal, and the Dundee Canal. However, several other, smaller wetland sites are identified in the vicinity of the study corridor. Prior to construction activities along the study corridor, field studies would need to be conducted and coordinated with the USACE to determine if the potential wetland areas meet the USACE criteria for a wetland determination, to determine USACE jurisdiction, and to delineate the wetlands identified in the NWI, as well as other wetlands that may be present in the project area. If impacts to jurisdictional wetlands are anticipated, a USACE Section 404 permit would be required.

#### 4.14.1.3 FLOODPLAINS

There are several special flood hazard areas crossing the SR 21 study area as shown in Figure 4-41. These special flood hazard areas are primarily associated with Pipe Maker's Canal, Dundee Canal, and wetland system located just south of Grange Road. If project implementation would require the placement of fill material in the floodplains, the project should be designed in such a way that it would have no significant encroachment on these floodplains.

The project should be designed so that it would not represent a significant risk to life or property; it would not have a significant impact on natural and beneficial floodplain values; it would not support incompatible floodplain development; and it would not interrupt or terminate a transportation facility which is needed for emergency vehicles or provides a community's only evacuation route.

Chatham County, the City of Port Wentworth, Garden City, and the City of Savannah are members of the Regular Program of the National Flood Insurance Program. The proposed project should be developed and designed in compliance with the provisions of Executive Order 11988 for the protection of Federal Emergency Management Agency (FEMA) designated Special Flood Hazard Areas (SFHAs). Procedures for Coordinating Highway Encroachments on Floodplains with the FEMA should be followed, and the Georgia Department of Natural Resources (GDNR) should be notified of the project's involvement.

## 4.14.1.4 WATER QUALITY

The SR 21 study corridor is located within the Dasher Creek – Savannah River Watershed (Hydrologic Unit Code [HUC] 10 ID #0306010903). This watershed is listed as a High Priority Watershed in the GDNr's State Wildlife Action Plan (SWAP). The SWAP is a statewide strategy to conserve populations of native wildlife species and their natural habitats before these animals, plants, and places become rarer and more costly to conserve or restore. High priority species or habitats are species or habitats that rank highest for recommended research or other conservation related measures. For more information concerning the SWAP, see the threatened and endangered species discussion in the following section.

## 4.14.1.5 THREATENED AND ENDANGERED SPECIES

The GDNr lists eight federal and state protected species known to occur in HUC10 Watershed #0306010903. The federal and state listed species known to occur in the watershed are identified in Table 4-20 and Table 4-21 along with federal and state designations, descriptions of preferred habitat, and information concerning potential habitat along the corridor. Protected species surveys and agency coordination, as applicable, would need to be conducted prior to construction activities. Special provisions may be required to ensure avoidance and minimization of state and/or federal protected species.

**Table 4-20: Protected Plant Species in Study Area**

SCIENTIFIC NAME	COMMON NAME	FEDERAL & STATE PROTECTION STATUS	PREFERRED HABITAT	POTENTIAL HABITAT POSSIBLY PRESENT?
<i>Carex dasycarpa</i>	Velvet sedge	US: None GA: Rare	Evergreen hammocks; mesic hardwood forests	Yes
<i>Epidendrum magnoliae</i>	Greenfly orchid	US: No GA: Unusual	Epiphytic on limbs of evergreen hardwoods; also, in crevices of Altamaha Grit outcrops	Yes
<i>Foresteria segregata</i> *	Florida wild privet	US: None GA: Rare	Shell mounds on barrier islands in scrub or maritime forests	No
<i>Sarracenia minor</i> var. <i>minor</i>	Hooded pitcherplant	US: None GA: Unusual	Wet savannas; pitcherplant bogs	Yes

**Table 4-21: Protected Animal Species in Study Area**

SCIENTIFIC NAME	COMMON NAME	FEDERAL & STATE PROTECTION STATUS	POTENTIAL HABITAT POSSIBLY PRESENT?
<i>Acipenser brevirostrum</i> *	Shortnose sturgeon	US: Endangered GA: Endangered	No
<i>Acipenser oxyrinchus oxyrinchus</i> *	Atlantic sturgeon	US: Endangered GA: Endangered	No
<i>Alasmidonta arcuata</i> *	Altamaha arc mussel	US: None GA: Threatened	No
<i>Ambystoma cingulatum</i> *	Frosted flatwoods salamander	US: Threatened GA: Threatened	Yes
<i>Calidris canutus rufa</i> *	Red knot	US: Threatened GA: Threatened	No
<i>Caretta caretta</i> *	Loggerhead sea turtle	US: Threatened GA: Endangered	No
<i>Corynorhinus rafinesquii</i> *	Rafinesque's big-eared bat	US: None GA: Rare	Yes
<i>Dermochelys coriacea</i> *	Leatherback sea turtle	US: Endangered GA: Endangered	No
<i>Elanoides forficatus</i> *	Swallow-tailed kite	US: None GA: Rare	Yes
<i>Elassoma okatie</i> *	Bluebarred pygmy sunfish	US: None GA: Endangered	Yes
<i>Eubalaena glacialis</i> *	Northern Atlantic right whale	US: Endangered GA: Endangered	No
<i>Gopherus polyphemus</i> *	Gopher tortoise	US: Candidate GA: Threatened	No
<i>Haliaeetus leucocephalus</i> *	Bald eagle	US: Bald & Golden Eagle Protection Act GA: Threatened	No
<i>Heterodon simus</i> *	Southern hognose snake	US: None GA: Threatened	No
<i>Moxostoma robustum</i> *	Robust redhorse	US: None GA: Endangered	No
<i>Mycteria americana</i> *	Wood stork	US: Threatened GA: Endangered	Yes
<i>Picoides borealis</i> *	Red-cockaded woodpecker	US: Endangered GA: Endangered	No
<i>Sternula antillarum</i> *	Least tern	US: None GA: Rare	No
<i>Trichechus manatus</i> *	West Indian manatee	US: Threatened GA: Endangered	No

## 4.14.2 CULTURAL RESOURCES

### 4.14.2.1 HISTORIC RESOURCES

The Georgia Natural, Archaeological, Historic Resource Geographic Information System (GNAHRGIS) database was reviewed to identify potential resources along the SR 21 study corridor and no resources were identified. However, based on experience of the Environmental Professional, it was assumed that 3 resources along the study corridor were potentially eligible for the National Register of Historic Places (NRHP): Pipe Maker's Canal, Dundee Canal, and the railroad corridor that parallels SR 21 just north of Pipe Maker's Canal, which are shown in Figure 4-41.

Further internet research confirmed that Pipe Maker's Canal and Dundee Canal have been determined eligible for the NRHP by the Georgia Department of Community Affairs (GDCA), Historic Preservation Division (HPD), which was formerly part of the GDNR. These canals were originally constructed for drainage to enable development in the area and have been determined eligible for the NRHP under Criterion A for association with the development of Savannah and under Criterion C as structures.

The HPD has traditionally considered mainline railroad corridors eligible for the NRHP under Criteria A and C since they have been determined to possess a state level of significance in the areas of commerce, transportation, engineering, and architecture. Conversely, they do not normally consider spur line railroad corridors eligible for the NRHP. As such, the railroad corridor that parallels the SR 21 study corridor on the west side from just north of Pipe Maker's Canal north to Grange Road would potentially be considered eligible for the NRHP and the spur line that crosses SR 21 just south of Bazemore Avenue would most likely not be considered eligible for the NRHP.

Surveys for Phase I historic and archaeological resources and coordination with the GDCA/HPD to determine eligibility in the NRHP would need to be conducted prior to project implementation.

## 4.14.3 COMMUNITY RESOURCES

Several community resources have been identified in the vicinity of the SR 21 study corridor and are shown in Figure 4-41. Identified community resources include:

- Four churches: The Garden City Church of Christ, Abundant Love Ministries, Living Hope Community Fellowship, and Marantha Family Church
- Two schools: New K-12 at Groves High School Site and Mercer Middle School
- One U.S. Post Office located at 4431 Augusta Road, Garden City, GA.

- Garden City's City Office and Recreation Center
- Garden City Stadium
- Two local parks: Bazemore Park and Volunteer Park



Image 4-31: Volunteer Park

### 4.14.3.1 SECTION 4(F) RESOURCES

Section 4(f) of the USDOT Act refers to the temporary and/or permanent use and constructive use of land from a significant publicly owned park, recreation area, or wildlife and waterfowl refuge, or any historic site. Investigation of the project corridor has identified no wildlife and waterfowl refuge. However, publicly owned parks and recreation areas, as well as historic resources eligible for, or potentially eligible for, the NRHP, have been identified in the study area. Historic resources determined to be eligible for the NRHP and parkland/recreation areas determined to be locally significant would be considered Section 4(f) resources. Such resources would be protected under the auspices of Section 4(f) of the U.S. Department of Transportation Act (U.S. DOT ACT).

### 4.14.3.2 OTHER

Other community resources such as cemeteries, fire stations, or community centers were not identified along the SR 21 corridor.

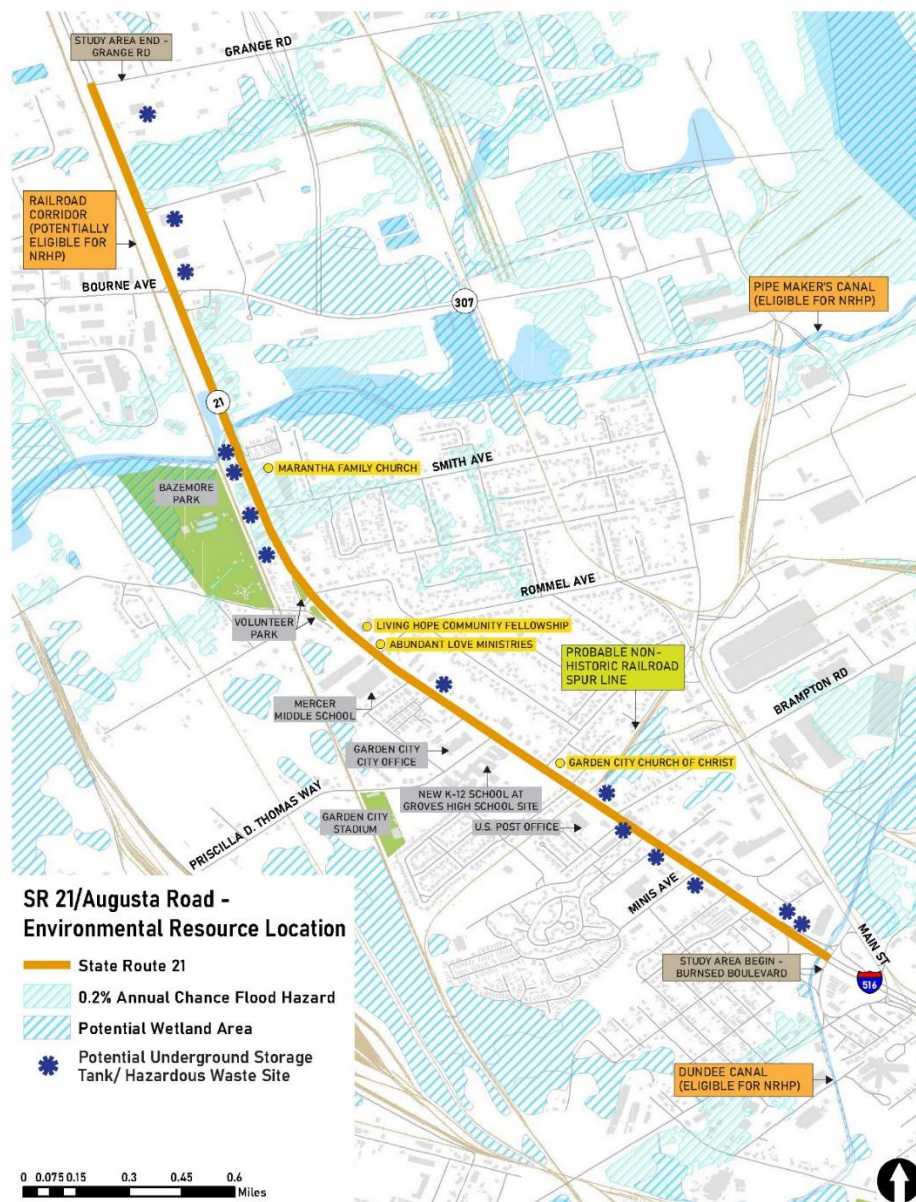


Figure 4-41: Environmental Resources Location in Study Area

## 4.14.4 PHYSICAL RESOURCES

Approximately 14 sites have been identified that may contain underground storage tanks (USTs) or may have hazardous waste or contamination present since they would be likely to involve the use, treatment, storage, disposal or generation of hazardous substances or petroleum products. These sites may have Recognized Environmental Conditions (RECs) in connection with the parcel as defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). "Recognizable environmental conditions" means the presence or likely presence of any hazardous substances or petroleum products on the property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property.

The objective of CERCLA is to clean up uncontrolled releases of specified hazardous substances. The CERCLA or "Superfund" may be enforced to compel property owners or operators to assess and remediate contamination that occurred during, or before, their association with a property, despite the source or cause of contamination. The Superfund Amendments and Reauthorization Act (SARA) provides an "innocent purchaser" defense in cases where the defendant did not know, and had no reason to know, of existing contamination at the time the property was acquired. To support the innocent purchaser defense, "...the defendant must have undertaken, at the time of acquisition, all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice..."

Prior to acquisition of right-of-way from any of these sites, a Phase I Environmental Assessment (ESA) should be conducted in accordance with the 2013 American Society of Testing and Materials (ASTM) Standard Practice for ESA's (Standard E1527-13) developed for the evaluation of environmental risk associated with a parcel of real estate or the most recent Standard E1527. The standard is expected to be updated late in 2021 (Standard E1527-21).

## 4.15 UTILITIES

The accessibility of any utilities could have an impact on the schedule, cost, and overall concept design. A database survey was conducted to create an inventory of existing utilities along SR 21 within the study limits. The list of utilities identified includes but is not limited to:

- Water Vaults
- Fire Hydrants
- Sync Global Fiber Optic Markers
- Sanitary Sewer Manhole
- Comcast Cabinet
- GAPC Panels
- Signal Cabinets
- Stormwater Drainage

Examples of these utilities are shown in the images below. The utility locations are detailed and mapped in Figure 4-42 and will help create feasible concepts to avoid conflicts with potential construction activities. A detailed analysis must be conducted prior to any preliminary engineering design.



Image 4-32: Culvert on SR 21



Image 4-33: Conduit Pullbox on SR 21



Image 4-34: Damaged Traffic Signal Equipment on SR 21

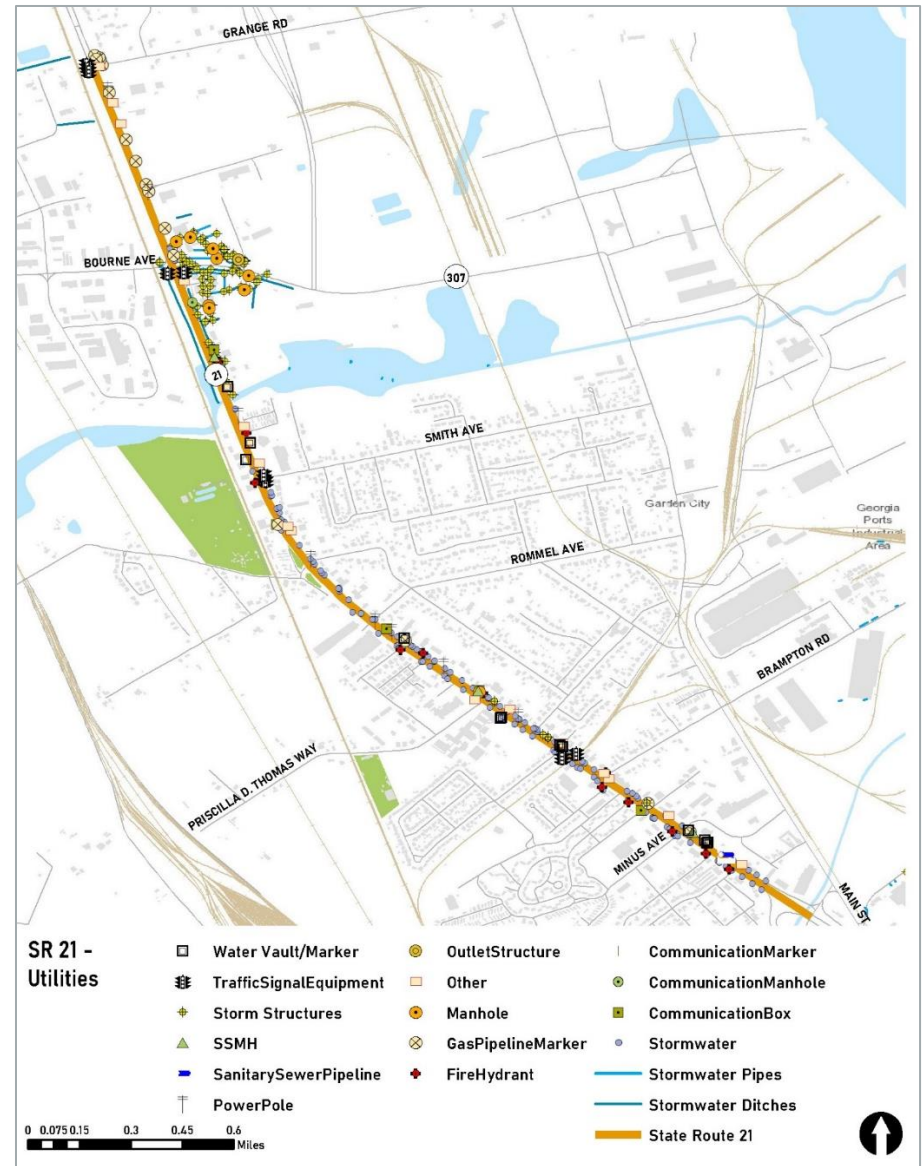


Figure 4-42: Utilities Inventory on SR 21

## 4.16 RELEVANT PLANS AND STUDIES

### 4.16.1 CORE MPO MOBILITY 2045 METROPOLITAN TRANSPORTATION PLAN (2019)

Following were the goals identified in the 2045 Metropolitan Transportation Plan prepared in 2019.

- System performance: An efficient, reliable, multi-modal transportation system that supports economic competitiveness and enhances tourism.
- Safety and Security: A safe, secure, and resilient transportation system for all types of users and for freight.
- Accessibility, Mobility and Connectivity: Access and mobility, equitably and reliably available, for people and for freight, through a range of travel options and an integrated, connected transportation system.
- Environment and Quality of Life: A healthy sustainable environment through the compatible integration of land use and transportation while taking into consideration the impact of transportation including that of stormwater.
- State of Good Repair: Maintain a state of good repair.
- Intergovernmental Coordination: Wise use of public funds through coordination and a performance-based planning process.

2040 MTP projects not to be carried forward to 2045 MTP are shown in Table 4-22. Roadway projects identified in the plan pertaining to the SR 21 study area are shown in Table 4-23.

**Table 4-22: 2040 Projects Not to Be Carried Forward to 2045 MTP**

PROJECT	STATUS
PI# 0013281, SR 21 Culvert Replacement at Pipe Maker Canal	Now a local project under development by Chatham County)
PI# 0012722, SR 21 from SR 30 to I-95; Including Interchange (Diverging Diamond Interchange)	Completed
PI# 0010553, CS651/Crossgate Rd from SR 21 to NS#734150L in Port Wentworth	Completed
PI# 0013549, SR 21 @ CS 705/Parkside Blvd in Port Wentworth	Completed
PI# 0007885, CS 602/CS 650/Grange Rd from SR 21 to E of SR 25	Under Construction

**Table 4-23: 2045 Mobility Plan Roadway Projects**

GDOT PI	PROJECT	FROM	TO
NA	I-95 at SR 21 / Augusta Road Interchange Reconstruction		
NA	Gulfstream Widening	SR 21	Airways
0006328	Brampton Road Connector from Foundation Drive to SR 21/SR 25/US 80	SR 25	GA Ports Authority

### 4.16.2 GARDEN CITY COMPREHENSIVE PLAN (2016)

The 2016 Garden City Comprehensive Plan identified 6 goals as listed below.

- Promote retail and light commercial
- Implement the redevelopment plan
- Update the City's codes and ordinances
- Protect neighborhood developments from potential adverse impacts from the Georgia Ports Authority – Garden City Terminal
- Create design guidelines for development along commercial corridors
- “Brand” the City through strategic marketing

SR 21 was identified as a Local Commercial Corridor established to “enhance the quality and compatibility of development, to encourage the most appropriate use of land, and to promote safe and efficient movement of traffic. The local commercial corridor allows for a higher intensity of development than neighborhood scale commercial development but does not allow for commercial development as intensive as commercial redevelopment corridor.”

As per the plan, over 50 percent of land located within this character area is currently zoned for industrial or residential use, however the plan identifies the need to evaluate current development trends and the demand for property to determine the best approach for steering future development along these corridors. Transportation projects identified in the plan related to the SR 21 corridor are listed below.

- Project 1: SR 21 Widening - Effingham County to I-95 | Total cost: \$147,463,000
- Project 2: Jimmy DeLoach Connector Express Lanes - Jimmy DeLoach Connector | Total cost: \$119,897,000
- Project 3: SR 21 Elevated Lanes - Bourne Avenue to South of Minus Avenue | Total cost: \$136,921,000

## 4.16.3 GARDEN CITY URBAN REDEVELOPMENT PLAN (2016)

The Garden City Urban Redevelopment Plan (URP) was developed and adopted as a tool to assist with development and redevelopment of the blighted and/or underdeveloped areas of the City. Garden City identified three (3) Target Areas to be included in this URP as follows: (1) the West Highway 21 Residential Area, (2) Garden City South, and (3) the Highway 21 Commercial Corridor.

The West Highway 21 Residential Target Area is in the middle of the City, bordered by SR 21 and US Highway 80, and included the Rossignol Hill and Chatham Villa neighborhoods. The study recommended land use with a focus on the following:

- Infill and redevelopment that is consistent with the neighborhood in terms of architecture and design
- Identification and protection of historic resources
- Enforcement of property maintenance standards
- Continuation of existing sidewalk network
- Continuation of the existing street grid with street scape improvements

The Highway 21 Gateway Target Area consists mainly of the commercial development directly adjacent to SR 21. The land use recommendation for each of these Character Areas was consistent with the needs and opportunities proposed for this Target Area. Development patterns along the Commercial Redevelopment Corridor should focus on the following:

- Mix of commercial uses that serve a regional market
- Compatible architecture design
- Infill development, redevelopment, and adaptive reuse of underutilized properties
- Appropriate standards for any new proposed billboards
- Focus on the establishment of new employers
- Affordable housing and higher density residential development

Land use patterns proposed in the Public / Institutional Area include:

- Consideration should be given when new developments and uses are proposed near these areas
- Development adjacent to these areas should be appropriate.

## 4.16.4 CORE MPO FREIGHT STUDY (2015)

The CORE MPO Freight Transportation Plan was prepared in 2015 to provide the region's long-term blueprint for enhancing freight mobility across the Savannah region and improving its economic competitiveness. The plan assessed freight transportation assets, identified needs, and provided recommendations for achieving the region's vision and goals for freight. As

a component of the study, SR 21 was discussed in multiple sections. The segment of SR 21 between the Chatham-Effingham County line and SR 25 was identified as a top ten crash hotspot. The CORE MPO's Freight Advisory Committee identified SR 21, along with other corridors providing primary access to the Port of Savannah, as a bottleneck. Also, the communities surrounding SR 21 were identified as environmental justice areas. In addition, the interchange of SR 21 with I-95 was identified as a hotspot for congestion. Goals for the Combined Freight Development Recommended Areas included the following.

- Develop an ITS/Traffic Messaging System for communication with trucks to utilize alternative routes on the freight transportation network
- Develop corridor signal timing on major truck routes – example GDOT Regional Traffic Operations Program (RTOP). RTOP candidates for the Savannah MSA would include U.S. 80, SR 21, and SR 307
- Develop a Wayfinding System between Port of Savannah and Interstate Corridors
- Continue the CORE MPO Freight Advisory Committee (FAC)

The short – term freight infrastructure improvement recommendation (years 0 – 5) pertaining to the SR 21 corridor included the SR 21 Culvert Replacement at Pipemakers Canal. Mid-term freight infrastructure improvement recommendations for the study area are listed below.

- SR 21 from CS 346/Mildred Street to SR 204 (West DeRenne Improvements)
- Brampton Road Connector from Foundation Drive to SR 21/SR 25/US 80
- Operations and Safety Enhancements – SR 21 Corridor
- Intersection Operational Improvements - SR 25 at SR 21 – Right Turn Lane
- Intersection Operational Improvements – SR 30 at SR 21 – Right hand turn from US 80 eastbound to SR 21 southbound
- Operational Improvements - Jimmy DeLoach Parkway – add right hand turn lane eastbound Jimmy DeLoach Parkway to Port Logistics Center Crossroads southbound (near SR 21)

Long-term freight infrastructure improvement recommendations included the I-95 interchange reconstruction at SR 21/Augusta Road and SR 21 grade separation at CSXT rail crossing.

## 4.16.5 CORE MPO NON-MOTORIZED TRANSPORTATION PLAN (2014)

The Non-Motorized Transportation Plan was developed in 2014 with a goal to provide feasible transportation options in the region. Objectives for the study are listed below.

- Provide pedestrian and bicycle facilities to achieve a connected network and convenient amenities for access to key destinations and to transit.
- Reduce pedestrian and bicycle crashes.
- Facilitate development and redevelopment that creates attractive, dense, human-scaled, mixed-use areas, to promote shorter trips.
- Educate drivers, bicyclists, and pedestrians about the rights and responsibilities of sharing the road.
- Actively encourage people to walk or bike for some trips.
- Institutionalize data collection for pedestrian and bicycle modes.

Pedestrian projects identified for the SR 21 corridor are listed below:

- Brampton Road, sidewalk one side, from SR 21 to SR 25
- Dean Forest Road, from I-16 to SR 21
- Priscilla D Thomas Way, sidewalk 1-2 sides from end to SR 21
- SR 21, path from Dean Forest Road to Pierce Avenue
- SR 21, path from Pierce Avenue to SR 30
- SR 21, path from Smith Avenue to Dean Forest Road (city limits)
- SR 21, path from SR 30 to Old Augusta Road

In addition to pedestrian projects, bikeway projects were identified as listed below:

- Jimmy Deloach Corridor - Jimmy Deloach Parkway, from Crossroads Parkway to SR 21
- Houlihan Bridge Corridor - Crossgate Road from SR 21 to SR 25
- Airport/Gulfstream Corridors - Gulfstream Road from Savannah limits to SR 21
- SR 21 Corridor - SR 21 from Minus Avenue to Smith Avenue
- SR 21 Corridor - SR 21 from Smith Avenue to Dean Forest Road (city limits)
- SR 21 Corridor - SR 21 from Dean Forest Road (city limits) to Pierce Ave
- SR 21 Corridor - SR 21 from Pierce Avenue to SR 30
- SR 21 Corridor - SR 21 from SR 30 to Old Augusta Road (near county line)
- Dean Forest Corridor - Dean Forest Road from I-16 to SR 21

## 4.16.6 CORE MPO THOROUGHFARE PLAN (2014)

The Thoroughfare Plan in coordination with the non-motorized plan 2040 was intended to:

- Ensure/increase accessibility, mobility, and connectivity for people and freight.
- Promote safe and efficient travel for all users and create a framework for common sense trade-offs between automobile capacity and multimodal design elements.
- Support community development and land use goals and promote a sense of place and support activities with on-street parking, bike travel, land access, and pedestrian friendly intersections.
- Establish transparent expectations for transportation infrastructure and create consistency in code references to the road network, which provides predictable and consistent information to development community

Projects identified in the plan specific to SR 21 are listed below.

- Sidewalk and bike lanes from I-516 to Minus Avenue
- Median and bike lanes from Minus Avenue to Smith Avenue
- Sidewalk and bike lanes from Smith Avenue to County line

## 4.16.7 CORE CONNECTIONS-2035 LRTP TRANSIT MOBILITY VISION PLAN (2013)

A major component of the 2035 CORE Connections Framework Mobility Plan was the development of a regional transit mobility vision. The purpose of the transit mobility vision was to provide a meaningful understanding of mobility needs within the region to frame and guide future public transportation policies and activities.

SR 21 was identified as a 'Priority Corridor' extending from I-516 to Springfield. As indicated in the Employment Patterns analysis, the study highlighted significant work trip demand from Effingham County into Savannah and to the Port area, suggesting the potential for commute service alternatives. That potential was also reinforced by numerous housing developments along the SR 21 corridor. The study recommended potential service opportunities including rideshare activities, park and ride facilities, and phasing into commuter service connections. Service potential opportunities for the corridor are listed below:

- Expand MPC rideshare program to Effingham County and employers.
- Coordinate MPC and CRC rideshare program.
- Implement express bus service from Effingham County to downtown Savannah. This could initiate with peak hour limited stop services.

- Coordinate with rural transit service in Effingham County to ensure seamless connections.
- Develop Park and Ride facilities in Springfield, Rincon, and at the I-95/SR 21 junction.
- Implement transit priority along corridors, such as bus only shoulders and signal preemption.

## 4.16.8 SR 21 CORRIDOR STUDY (2013)

The SR 21 Corridor Study, completed in 2013, investigated existing and future transportation needs along the SR 21 corridor (from the Chatham-Effingham County line to I-516) and recommended various improvements. The study was motivated by the observation that the corridor's ability to serve commuter and freight traffic had deteriorated due to increasing congestion. As the population of the Savannah region was projected to continue to grow, conditions on the corridor would worsen over time. Specifically, the SR 21 Corridor Study sought to:

- Provide congestion relief and improve operations during peak periods at major intersections
- Improve regional and local truck accessibility to the Port of Savannah
- Minimize truck-car conflicts
- Minimize delay for commuter traffic
- Accommodate future travel demand while minimizing impacts to the community and the environment
- Improve connectivity to Interstates and major arterials in the area
- Improve safety and viability for multimodal access
- Preserve or enhance adjacent land uses

Based on the results of the traffic analysis performed for the SR 21 Corridor Study, the study recommended the following changes to the corridor:

- Widen the northern end of SR 21 to six lanes
- Construct elevated lanes above SR 21 from north of SR 30 to a connection with the Jimmy DeLoach Connector
- Provide flyover ramps at I-95
- Provide slip ramps at Pinderpoint Road
- Construct express lanes on the Jimmy DeLoach Connector
- Construct elevated lanes beginning at the terminus of the Jimmy DeLoach Connector, shifting to the SR 21 alignment, and connecting to I-516 just south of Minus Avenue
- Reconstruct SR 21 between Smith Avenue and Minus Avenue, narrowing the road from six to four lanes and adding a raised, landscaped median, bicycle lanes, and sidewalks

## 4.16.9 CORE MPO COORDINATED PUBLIC TRANSIT - HUMAN SERVICES TRANSPORTATION PLAN FOR THE SAVANNAH AREA (2011)

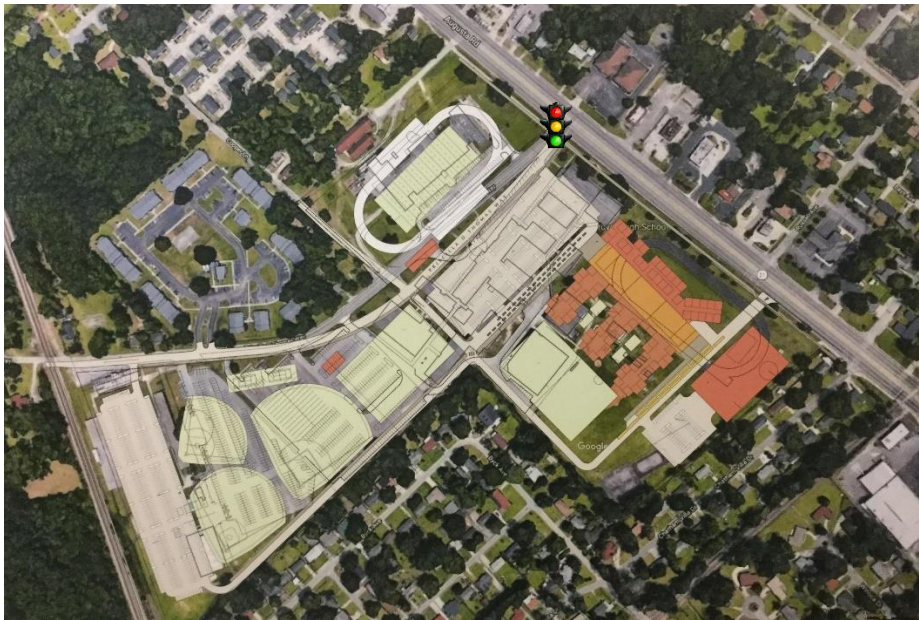
The Coordinated Plan was aimed to guide funding decisions for identified Federal Transit Authority (FTA) programs and to broaden the dialogue and support further collaboration between human services agencies and transportation providers. Goals identified in the plan are listed below:

- Improve services to the elderly, handicapped, and limited-income populations. These services include transportation services for accessibility and mobility, public information, and customer service.
- Improve the efficiency of transportation services by minimizing duplicate services, pooling resources, and improving the overall cost-effectiveness of service provision.
- Improve the coordination of services and planning efforts. Coordination of both planning and services will facilitate public information, ease of use, and cost-efficiency.

## 4.17 ACTIVE/PROGRAMMED PROJECTS IN STUDY AREA

### 4.17.1 DEVELOPMENTS

Savannah Chatham County School District is planning to redevelop the existing Groves High School campus, which is accessed via Priscilla D Thomas Way and SR 21, into a new K-12 campus. The new school facility will bring students from Gould Elementary, Mercer Middle, and Groves High Schools on a single campus. The three-story space will hold 2,400 students and contain well over 370,000 square feet as well as a 2,500 seat, multipurpose stadium. The campus will have separate sports fields and play areas for the high school and K-8 students. As part of the construction of the new school campus, a new traffic signal at Priscilla D Thomas Way and SR 21 will be installed. The signal permit has already been reviewed and approved by GDOT. The projected opening for the school will be in the fall of 2023. The new campus layout is shown in Figure 4-43.



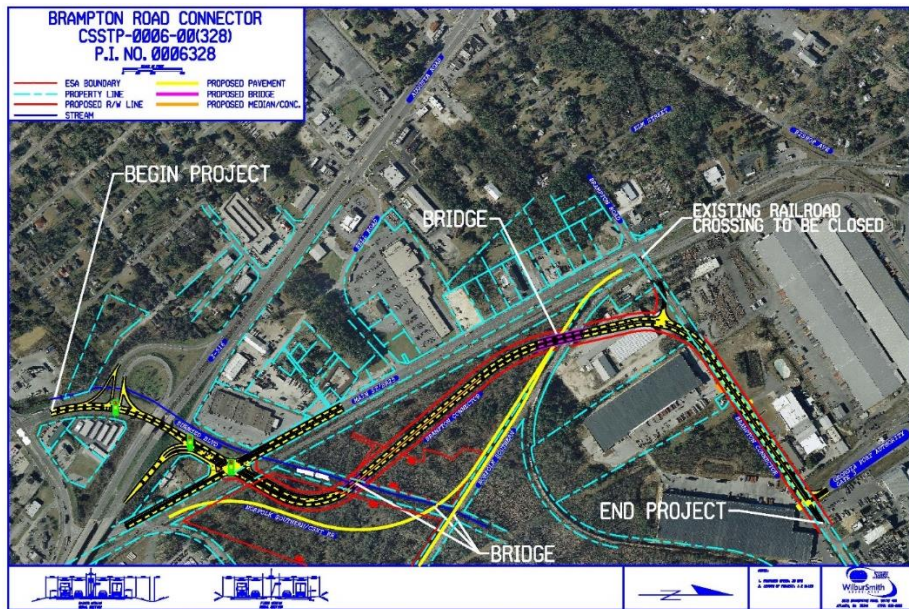
**Figure 4-43: New Groves K-12 Campus Conceptual Layout**

### 4.17.2 ACTIVE TRANSPORTATION PROJECTS

Programmed and planned transportation plans in the vicinity of the proposed development were reviewed per the CORE MPO's Regional Transportation Plan, GDOT Statewide TIP (STIP), GDOT's Construction Work Program, and the Chatham County – Savannah Comprehensive Plan. Table 4-24 lists the projects that are in the immediate vicinity of SR 21 and their completion year.

**Table 4-24: Planned and Programmed Transportation Improvements in Study Area**

Project Name	Completion Year	Project ID	Source
<b>BRAMPTON ROAD CONNECTOR FROM SR 21/SR 25 to SR 21 SPUR</b>  This project will construct a 4-lane highway and State Route Spur to connect Brampton Road, Georgia Ports Authority Gate 2 and Foundation Drive to SR 25, SR 21, and US 80. This project will provide direct access to the Interstate System for the heavy commercial truck traffic related to the intermodal terminal transfers and will improve the efficiency of the transfer of goods between the port, rail, and interstate highway systems. This project includes closing off the SR 25/Main Street at Brampton Road railroad crossing. Concept Layout is shown in <a href="#">Figure 4-44</a> .	2024	P.I. 0006328	GDOT
<b>SR 21 @ PRISCILLA THOMAS WAY (CS 610)</b>  This project includes the construction of a right turn lane from SR 21 onto Priscilla D Thomas Way and a new traffic signal. The new traffic signal will also provide safe pedestrian facilities and crosswalks to supplement the HAWK. Additional costs associated with the project include widening of Priscilla D Thomas Way to three lanes to allow for a dedicated left turn movement onto SR 21.	2023	P.I. 0017516	GDOT



**Figure 4-44: Brampton Road Connector Conceptual Layout**

## 4.17.3 ACTIVE INTERMODAL PROJECTS

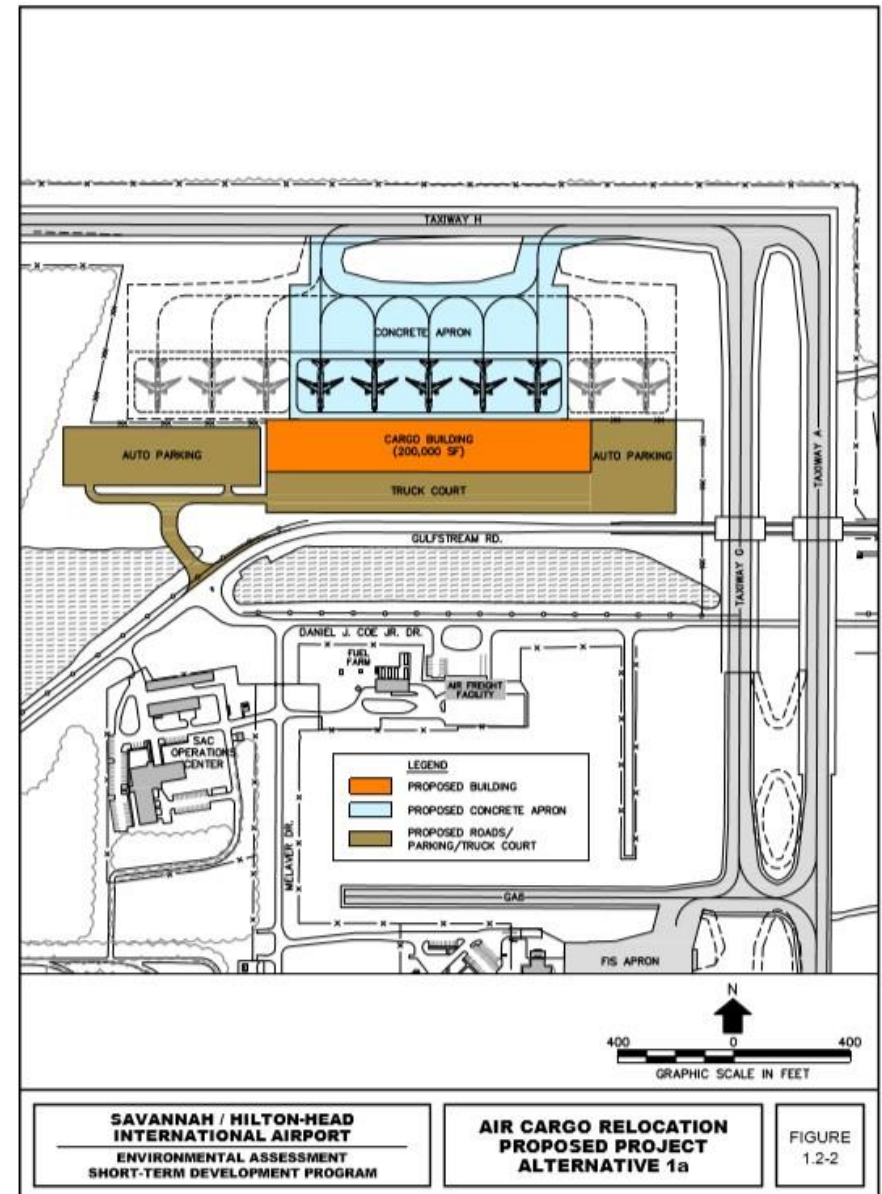
There are multiple planned and/or ongoing freight system investments that potentially impact the SR 21 corridor. These include investments to air cargo, rail, highway, and port assets. This section of the report discusses major freight investments proximate to the SR 21 corridor.

### 4.17.3.1 SAVANNAH-HILTON HEAD INTERNATIONAL AIRPORT AIR CARGO FACILITY PROJECT

The planned relocation and expansion of air cargo facilities at the Savannah-Hilton Head International Airport (SAV) is another freight investment with the potential to impact the SR 21 corridor as shown in Figure 4-45. The project expands the airport's cargo capacity by developing a new cargo facility that can accommodate up to five cargo aircraft, from the current limit of two, and constructs a new air cargo apron with approximately 40,000 square yards of concrete ramp. The cargo facility will be in the northwest quadrant of the airfield adjacent to Taxiway H and north of Gulfstream Road.

In addition to added aircraft capacity, the project will include over 160,000 square feet of cargo building space and expanded truck and automobile parking with access to Gulfstream Road. Importantly, Gulfstream Road connects to SR 21 less than two miles to the east of the future cargo facility. Though beyond the project limits for this study, the expansion of the

airport's cargo facilities could also impact freight activity at the northern end of the SR 21 corridor.



**Figure 4-45: Savannah-Hilton Head International Airport Air Cargo Facility Project**

## 4.17.3.2 SAVANNAH HARBOR EXPANSION PROJECT

The Savannah Harbor Expansion Project (SHEP) is a \$973 million federal and state investment to deepen the Savannah Harbor from 42 feet to 47 feet. The project began in 2015 and many phases have been completed including outer harbor dredging, wetlands acquisition and other environmental/water management protections. The project has exceeded the 80 percent completion mark and is expected to be completed by early 2022. Figure 4-46 shows the SHEP project extent and progress. The deeper harbor will allow higher capacity ships to call on the Port of Savannah. Due to the geographic and economic importance of the Savannah Harbor and the Port of Savannah, the SHEP was estimated to generate \$7.30 in benefits for every dollar spent.

The SHEP will facilitate continued growth in cargo volumes at the Port of Savannah. As SR 21 is a major truck corridor serving the port, the implication of the SHEP for SR 21 is that the historical growth observed on the corridor is not likely to subside. In addition, as significant investments have also been made in increasing rail capacity in the study area, the SHEP also implies that rail volumes can increase. This would impact at-grade rail crossings on or near SR 21.

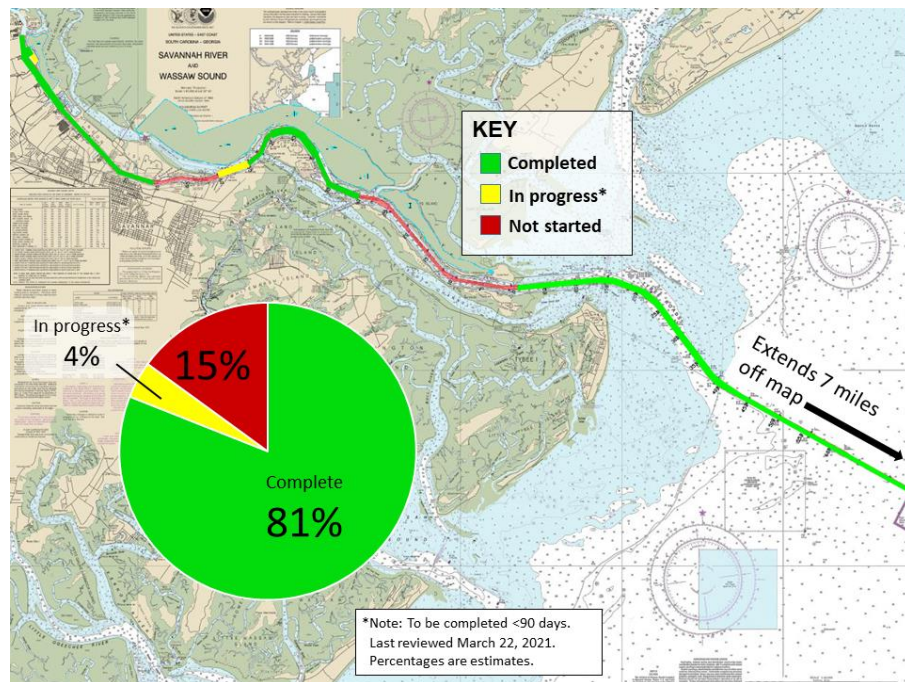


Figure 4-46: Savannah Harbor Expansion Project Progress

## 4.17.3.3 MASON MEGA RAIL PROJECT

The Mason Mega Rail project is a rail infrastructure investment that will substantially increase the capacity of the Mason intermodal rail yard at the Garden City Terminal. The project, which is expected to be fully completed by mid-2022, will:

- Increase the number of working tracks from 8 to 18,
- Add over 18 new miles of track at the terminal, bringing the total rail mileage at the Garden City Terminal to 34 miles, and
- Increase capacity at the Garden City Terminal from approximately 500,000 to 1 million containers per year.

Upon completion, the Mason Mega Rail Terminal will be able to build and receive six 10,000-foot trains simultaneously.

The impact to the SR 21 corridor of the Mason Mega Rail Project is that it will increase freight movements, both truck and rail, through the study area. This is particularly true for SR 21 near Grange Road as Grange Road provides access to the Mason Mega Rail Terminal. It should be noted that other investments made in conjunction with the Mason Mega Rail project work to limit impacts to the SR 21 corridor and the surrounding community. Notably, more than 20 at-grade rail crossings were removed because of the SR 307 overpass.



Image 4-35: Savannah Port Facility

## 4.17.3.4 I-16 AT I-95 IMPROVEMENT PROJECTS

The I-16 at I-95 interchange is an important gateway into the study area. As part of the Major Mobility Investment Program (MMIP), the interchange will be reconstructed so that it can accommodate anticipated future growth in traffic volumes, reduce travel times, and improve travel time reliability as shown in Figure 4-47. Specifically, the project will:

- Widen the I-16 mainline corridor from two-lanes to three-lanes in each direction
- Reconstruct six bridges, replace four bridges, and construct three new bridges
- Replace two existing loop ramps located on the west side of I-95 with turbine configuration system-to-system ramps
- Construct a collector-distributor (CD) lane on I-95 northbound to separate vehicles exiting and entering from I-16
- Build a two-lane, emergency-use median crossover on I-16 between I-95 and Dean Forest Road to facilitate hurricane evacuations
- Install Intelligent Transportation System (ITS) technology, such as cameras and changeable message signs, to provide real-time driving conditions
- Add interchange lighting



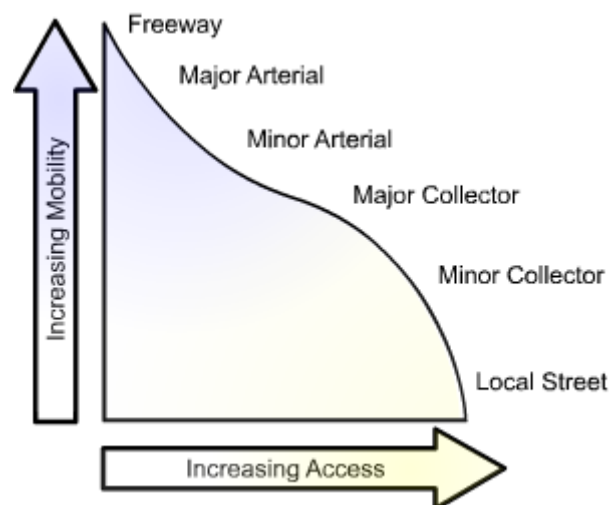
Figure 4-47: Interstate 16 at Interstate 95 Project Extent

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## 5 ACCESS MANAGEMENT TOOLBOX

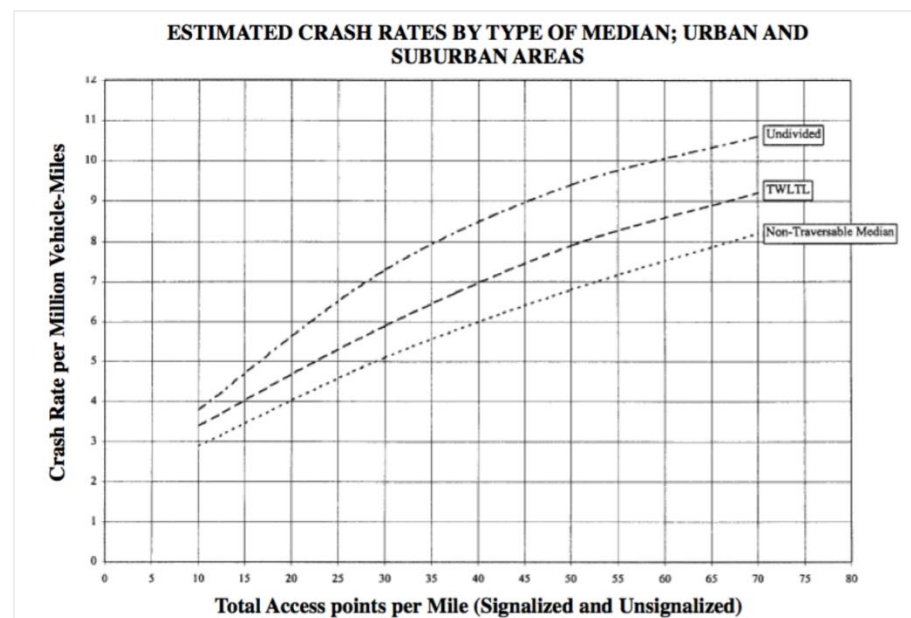
## 5.1 BENEFITS OF ACCESS MANAGEMENT

Corridor Access Management provides an important avenue for maintaining mobility and access. Access management includes effective ingress and egress to a parcel, efficient spacing and design to preserve the functional integrity of a roadway, and overall operational viability of street and road systems. Depending on its road classification, a corridor is intended to provide varying mobility and access for road users as shown in Figure 5-1.



**Figure 5-1: Conceptual Roadway Functional Hierarchy**

The primary objectives of these tools are to increase mobility and safety for vehicular traffic and improve the facilities for pedestrian and bicycle traffic. Figure 5-2 shows the direct relationship between access points on a corridor and crash rates per FHWA's Safety Evaluation of Access Management Policies and Techniques (March 2018).



**Figure 5-2: Relationship between Total Access Points per Mile and Crash Rate**

The existing facilities along SR 21 provide limited or substandard options for bicyclist and pedestrians. Improvements in this area would incentivize a more diverse mode choice for the corridor. The SR 21 Access Management Study incorporated principles from GDOT's Complete Streets Design Policy, which emphasizes safety, mobility, and accessibility for all modes of travel and for individuals of all ages and abilities. GDOT's primary strategy for implementing Complete Streets is to incorporate bicycle, pedestrian, and transit accommodations into roadway construction and maintenance projects.

To help decision-makers to properly plan and implement access management improvements along SR 21, the study team created an access management toolbox that discusses multiple improvement options for all modes of transportation. These options include roadway improvements, technology systems, policies, and other corridor management techniques.

Benefits that have been realized in communities with effective access management policies and improvements include the following:

- Improved roadway safety conditions (reduced crash rates)
- Reduced traffic delay and congestion
- Increased the area available for streetscaping
- Safe access to roadway for property owners and customers
- Reduced air pollution
- Enhanced options for safe pedestrian and bicycle travel
- Increased property value and economic redevelopment

A multi-modal transportation system incorporates several modes of transportation into the network of facilities and creates connections for travelers to go from one mode to the next. Providing seamless transportation mode transitions can create a more livable space, therefore a more desirable destination area.

There are a variety of tools that can be used as part of an access management plan including the following, which are discussed in the following subsections:

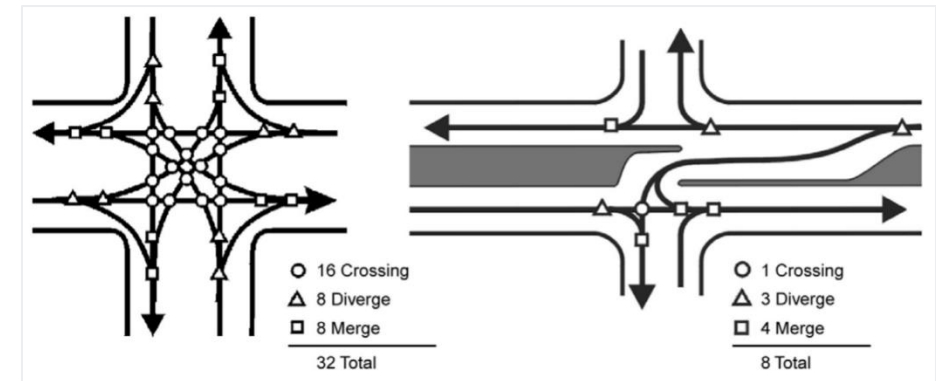
- Raised Median Treatments
- Intersection and Signal Improvements
- Walking and Biking Improvements
- Driveway Modifications and Consolidation
- Streetscape Improvements
- Transit Improvements
- Economic Development
- Regional and Local Policies

## 5.2 RAISED MEDIAN TREATMENTS

At each intersection, cross street, or driveway, a vehicle faces several conflict points with other movements of travel. Each of these conflict points poses an opportunity for the vehicle to hit another vehicle, pedestrian, or bicyclist. The implementation of a raised median significantly reduces the number of conflict points. Medians increase safety for motorists while also providing potential pedestrian refuges when crossing the street.

SR 21 between Minus Avenue and Smith Avenue currently has a flush center two-way-left-turn lane which allows for left-turn ingress and egress along the entire length of the road section. While this is convenient for access to and from adjacent developments, the high traffic volumes and speed can create an unsafe situation for motorists and pedestrians, which is evident with the above average crash rates along SR 21.

As shown in Figure 5-3, an intersection with no access control has a total of 32 conflict points. With the installation of a directional median the number of conflict points is reduced to 8. FHWA studies have shown that replacing a two-way left-turn lane on a 4-lane roadway with a raised median can reduce crashes by as much as 15 - 57 percent and can reduce delay by up to 30 percent and increase capacity of the roadway by up to 30 percent. These findings demonstrate that implementing a raised median as an access management tool improves both safety and mobility along a corridor.



**Figure 5-3: Conflict Points for Typical 4-Way Intersection vs Directional Median Opening (Source: FHWA)**

In addition to safety and mobility benefits, the installation of a raised median offers opportunities to enhance the aesthetics of a corridor through landscaping or other streetscaping improvements, thereby increasing the corridor's appeal and potentially attracting additional economic development.



### 5.3 INTERSECTION AND SIGNAL IMPROVEMENTS

Intersection and signal improvements improve mobility and safety along a corridor. This can include traffic signal optimization, pavement markings, pedestrian crosswalks and the installation of exclusive turning lanes where warranted. Exclusive left-turn and right-turn lanes allow turning vehicles to leave the roadway with less disruption to traffic in the through travel lanes. This minimizes the speed differentials along a facility and improves traffic flow and safety.

Signal coordination and optimization incorporates the demands of motor vehicles, bicycles, and pedestrians and minimizes stops and delays, fuel consumption, and air pollutions. Over recent years, GDOT has made significant investments in Intelligent Transportation Systems (ITS), including signal, and connected vehicle (CV) infrastructure such as advanced traffic signal control software; statewide license for all signalized intersections in the state of Georgia; 4G LTE communications for traffic signals across the state, and software modules for signal interface with connected vehicle software.

The implementation of Freight Signal Priority along corridors with significant freight traffic gives signal priority to freight vehicles based on the vehicle's location, speed, type, and real-time traffic data. GDOT's SigOps™ program is currently piloting a Freight Signal Priority project in partnership with the Georgia Ports Authority along port ingress/egress routes, as shown in Figure 5-4. This project includes installing roadside units (RSUs) at signalized intersections, broadcasting SPaT and MAP, traveler information for road conditions, and outfitting fleet vehicles to demonstration benefits.

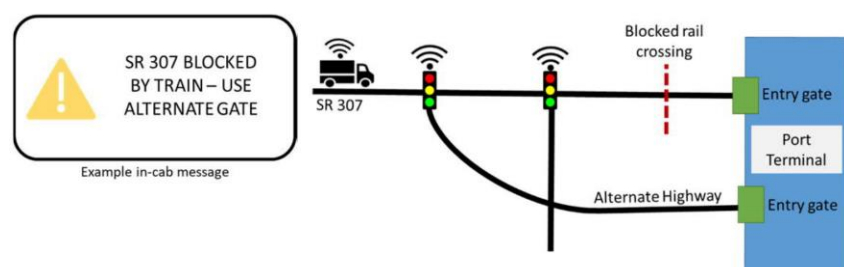


Figure 5-4: GDOT Connected Vehicles GPA Freight Pilot Program

### 5.4 PEDESTRIAN AND BICYCLIST IMPROVEMENTS

Adequate infrastructure for active modes of transportation along a corridor is a key element in complete street design. Active transportation facilities include continuous sidewalks, multi-use paths, bicycle lanes, crosswalks, and ADA accommodations at intersections. Access to quality pedestrian and bicycle facilities aids in reducing congestion and delay, promoting alternative modes of travel, and improving a corridor's appeal and users' quality of life. Figure 5-5 shows an example of a roadside multi-use path.

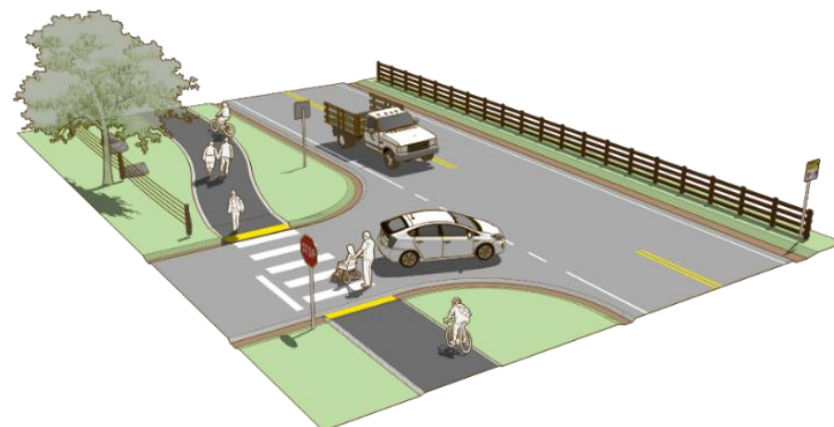
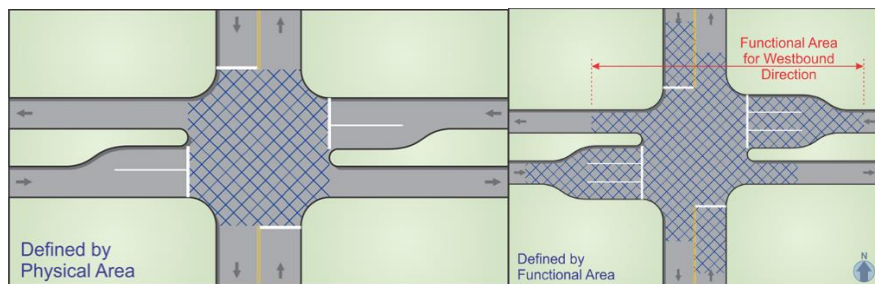


Figure 5-5: Roadside Multi-Use Path (Source: Rural Design Guide)

### 5.5 DRIVEWAY MODIFICATIONS AND CONSOLIDATION

Per the American Association of State Highway Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets*, crash frequency is higher at driveways than at other intersections; thus, special consideration should be given driveway design and location. A driveway's location should be designated in a way that minimizes its adverse effects on roadway safety and traffic flow. Adequate driveway spacing between access points can be achieved through proper planning of future access and consolidating existing access points improves traffic flow and safety along the roadway.

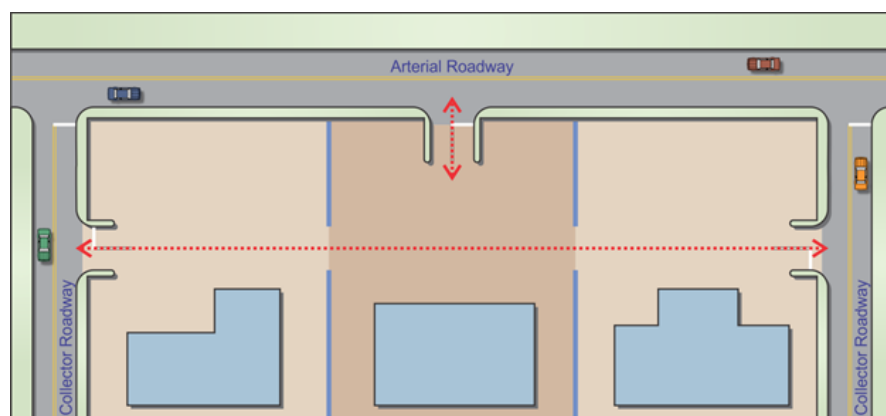
Intersections are made up of its physical area and functional area, as shown in Figure 5-6. A good rule-of-thumb for corridor access management is to locate driveways outside the functional area of intersections where deceleration, maneuvering, and queuing tasks place and driveways could potentially introduce conflicts and impact delay at adjacent intersections.



**Figure 5-6: Physical and Functional Area of Intersection (Source: FHWA)**

Driveway consolidation is another access management tool that reduces the access points along a corridor resulting in increased mobility and safety for all road users. Another access management tool, as shown in Figure 5-7, is the implementation of shared driveways and internal cross-connectivity. Shared access driveways, where possible, provide vehicles and pedestrians connectivity between parcels without having to re-enter the adjacent roadway.

Consolidating driveways can come with challenges from property owners who assume that reducing their access points will result in a loss of patrons for the business. However, the reality for commercial areas like those along SR 21, the length of frontage available to each individual property is limited and impacts the design of each driveway and ease of access for road users. By consolidating driveways and providing shared access, cross-access improves overall access to the adjacent properties and increases available area for parking and/or deliveries.



**Figure 5-7: Improved Access Configuration with Cross Connectivity (Source: FHWA)**

## 5.6 TRANSIT IMPROVEMENTS

Given ongoing coordination with CAT to extend transit service along SR 21 within the study area, there is great value in identifying transit stop locations and accommodations early in the coordination and implementation process to maximize benefits for potential users on the front end. Components to be mindful of include safe and secure areas for transit users at designated transit stops, adequate sidewalk connectivity, lighting, and shelters.

## 5.7 ECONOMIC DEVELOPMENT

There is an inherent relationship between transportation and economic development. Improving access, reducing congestion, and providing alternate modes of travel have been shown to increase property values and economic vitality.

## 5.8 REGIONAL AND LOCAL POLICIES

Policy frameworks can be created on a regional or local level to provide standards that enforce access management principles. During the development and permitting review process, access management guidelines should be integrated into the overall requirements. Having these types of policies in place helps maintain optimum levels of traffic operation and safety as well as provides developers a clear understanding of expectations by the local agency. It is typical for roadways such as SR 21 to go through various jurisdictions so it's important for there to be coordination between the various agencies to ensure consistency.

## 6 FINAL RECOMMENDATIONS AND IMPLEMENTATION STRATEGY

The recommendations in this section are a combination of the findings from the Existing Conditions and Needs Assessment of the corridor, and feedback received during the public engagement process. The primary concerns revealed through this process included mobility and safety, as well as the lack of sufficient pedestrian and bicycle infrastructure. Utilizing elements detailed in the Access Management Toolbox section, recommendations were developed to address these concerns and sorted into short-term, medium-term, and long-term recommendations, which are described in later in this section.

### 6.1 RECOMMENDED ROADWAY TYPICAL SECTIONS

The existing cross-section of SR 21 between Minus Avenue and Smith Avenue is a seven-lane roadway with three travel lanes in each direction and a center two-way-left-turn lane. South of Minus Avenue, SR 21 becomes limited access maintaining the six travel lanes with a center grassed median until it enters Interstate 516. North of Smith Ave, the cross section is reduced to four travel lanes with a center grassed median.

It is recommended that the existing two-way-left-turn lane between Minus Avenue and Smith Avenue be replaced with a raised landscaped median. Full median openings would be at signalized and major unsignalized intersections. Directional openings allowing left-turns will be implemented strategically at various locations as well. With the installation of a raised median, some driveways will require U-turns for ingress and egress, which will be accommodated at all median openings by a U-turn eyebrow.

Traffic analyses determined that the existing travel lanes are acceptable for existing and future traffic along SR 21. In addition to installing raised median segments and maintaining the existing travel lanes, 12-foot multi-use paths and continuous sidewalks are also recommended for the corridor to accommodate pedestrians and bicyclists and to align with complete street guidelines.

The proposed typical sections shown in Figure 6-2, Figure 6-3, and Figure 6-4 can all be constructed within the existing right-of-way. Being able to construct within the limits of the existing right-of-way will minimize cost and support a timely implementation of the upgrades. The recommended cross-sections are aligned with project goals to improve safety and mobility and addresses stakeholder and public feedback. Additionally, it allows for the opportunity to implement streetscape improvements to beautify and create a sense of place along the corridor.

Table 6-1 below details the proposed cross-section per segment shown in Figure 6-1. Currently, right-of-way along SR 21 is approximately 140 feet to 150 feet. The proposed typical sections shown in Figure 6-2, Figure 6-3, and Figure 6-4 can all be constructed within the existing right-of-way. Being able to construct within the limits of the existing right-of-way will minimize cost and support a timely implementation of the upgrades. The recommended cross-sections are aligned with project goals to improve safety and mobility and addresses stakeholder and public feedback. Additionally, it allows for the opportunity to implement streetscape improvements to beautify and create a sense of place along the corridor.

**Table 6-1: SR 21 Proposed Typical Section**

Proposed Typical Sections	
<b>Segment A</b> <i>(Grange Road to Smith Avenue)</i>	<ul style="list-style-type: none"> <li>• Four 11-ft Travel Lanes (Existing)</li> <li>• Median (Existing)</li> <li>• Install Curb &amp; Gutter (East Side Only)</li> <li>• Install 5-ft Beauty Strip (East Side Only)</li> <li>• 12-ft Multi-Use Path (East Side Only)</li> </ul>
<b>Segment B</b> <i>(Smith Avenue to Minus Avenue)</i>	<ul style="list-style-type: none"> <li>• Six 11-ft Travel Lanes (Existing)</li> <li>• Install 20-ft Landscaped Median</li> <li>• Install Curb &amp; Gutter (Both Sides of Road)</li> <li>• Install 5-ft Beauty Strip (Both Sides of Road)</li> <li>• Install 12-ft Multi-Use Path (Both Sides of Road)</li> <li>• Incorporate Streetscaping Elements: Lighting Banner Poles, Street Furniture, Transit Stops, etc.</li> </ul>

## Segment C

(Minus Avenue to Oak Street)

- Four 11-ft Travel Lanes (Existing)
- Median (Existing)
- Install Curb & Gutter (West Side Only)
- Install 5-ft Beauty Strip (West Side Only)
- 12-ft Multi-Use Path (West Side Only)

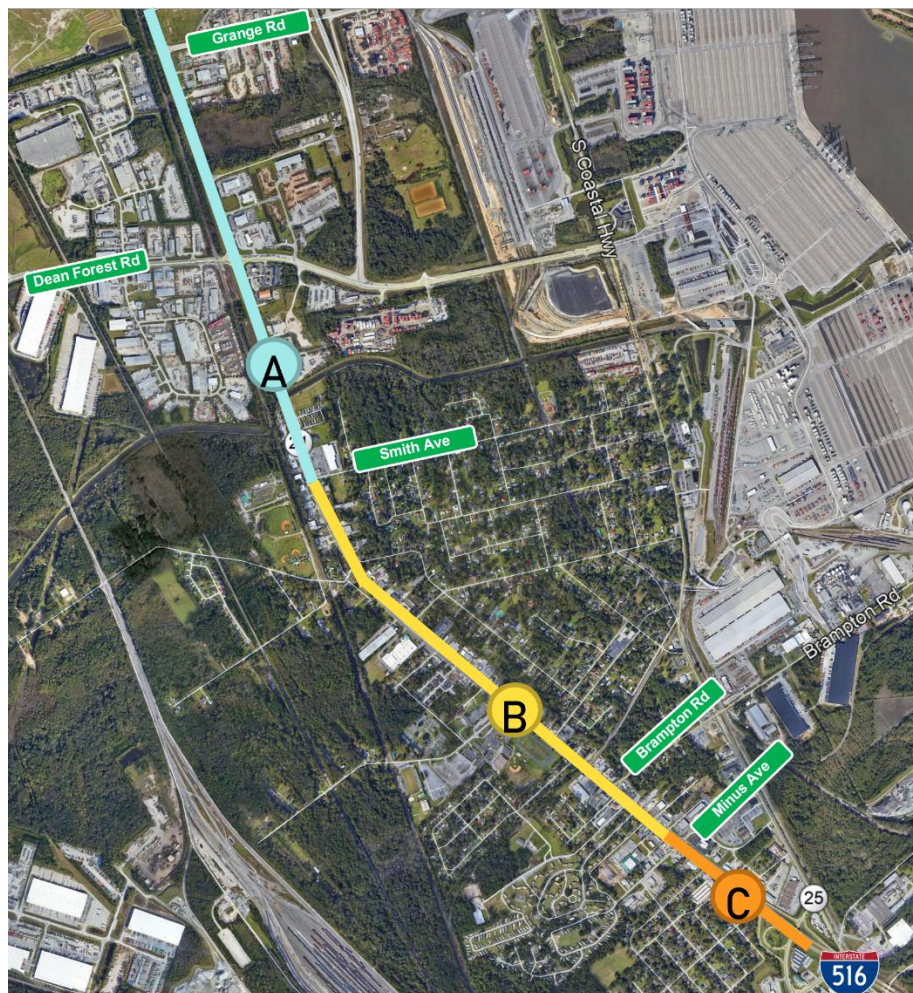


Figure 6-1: SR 21 Proposed Cross Sections Segments

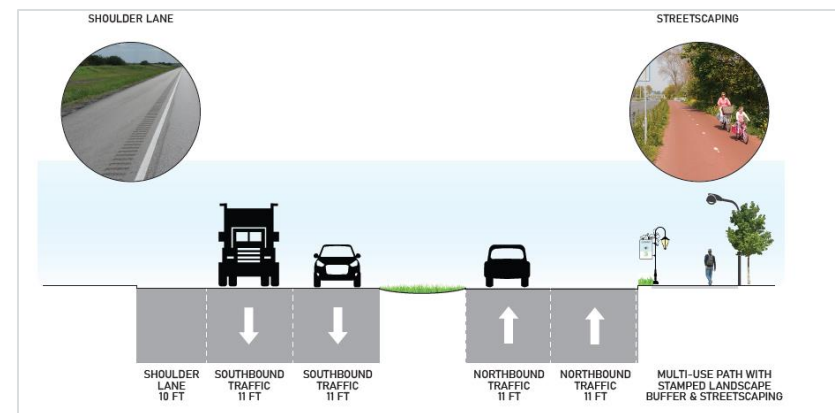


Figure 6-2: Segment A: Proposed Typical Section (Grange Road to Smith Avenue)

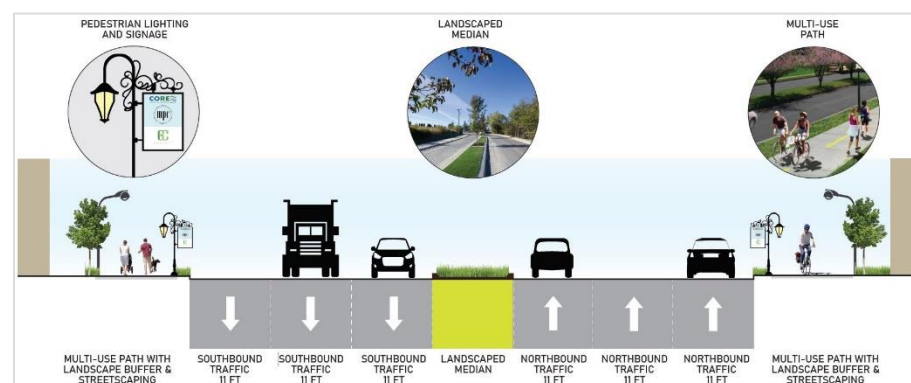


Figure 6-3: Segment B: Proposed Typical Section (Smith Avenue to Minus Avenue)

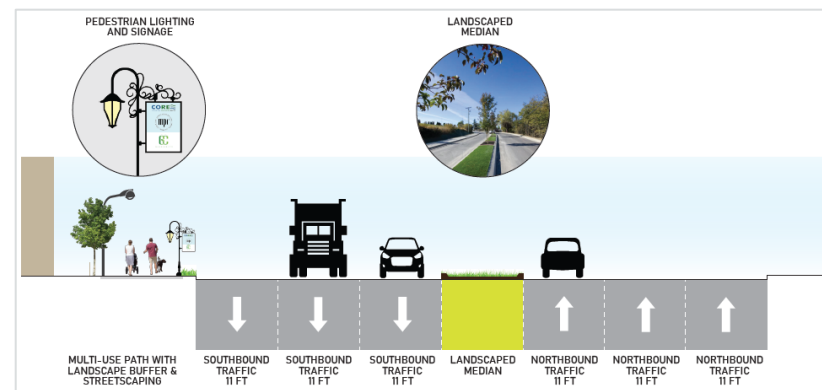


Figure 6-4: Segment A: Proposed Typical Section (Minus Avenue to Oak Street)

## 6.2 INTERSECTION IMPROVEMENTS

Intersection-specific improvements should be included with all recommended roadway typical sections along SR 21 to increase mobility for all road users, minimize operational impacts of turning vehicles, and improve pedestrian and bicyclist safety.

### 6.2.1 TRAFFIC SIGNAL IMPROVEMENTS

Currently there are five signalized intersections along SR 21 between Minus Avenue and Grange Road with a sixth coming online at Priscilla D. Thomas Way as part of the construction of the new Groves K-12 School campus. At all signalized intersections, the following improvements are recommended to address operational and safety issues:

- Signal equipment upgrades, including signal head retroreflective backplates
- Signal timing improvements, including coordination and freight signal priority, etc.
- Turn lane improvements
- Mountable curbs at location with high right-turn movements
- U-Turn Eyebrows, where appropriate
- Signage and striping improvements
- Pedestrian and bicyclist accommodations, including ADA compliant ramps, crosswalks, and pedestrian countdown timers

In terms of incorporating Intelligent Transportation Systems (ITS) at signalized intersections along the corridor, a path forward would be coordinating with GDOT's existing CV and Freight Signal Priority programs to incorporate SR 21 signals south of SR 307.

#### 6.2.1.1 SR 21 AT SR 307/DEAN FOREST ROAD

The SR 307 at SR 21 intersection has the highest crash frequency of all intersections along the study corridor, attributable to its entering traffic volumes and the port's freight ingress and egress. With that in mind, improvements at this intersection are vital to maintaining traffic flow into and out of the port as well as reducing crash experience in the area. Improvements recommended at this location include freight signal priority and coordination with adjacent railroad crossing on Dean Forest Road, channelized right turn islands for all approaches, and upgrade pedestrian accommodations.

Concurrent with this study, a separate [SR 307 Corridor Study](#) is being completed. Recommendations from this study should be incorporated and succeeded by final recommendations from the SR 307 study.

## 6.2.2 PEDESTRIAN CROSSINGS

To provide better pedestrian connectivity to destinations such as the new Groves K-12 campus and Bazemore Park, locations for pedestrian crossings aside from signalized intersections were examined. From the evaluation, it is recommended that an actuated High intensity Activated crosswalk (HaWK) crossing near Varnedoe Avenues-Big Hill Road be included with the roadway improvements between Minus Avenue and Smith Avenue. Per the FHWA, HAWK pedestrian treatments were found to reduce total crashes by 29% and pedestrian crashes by 69%.



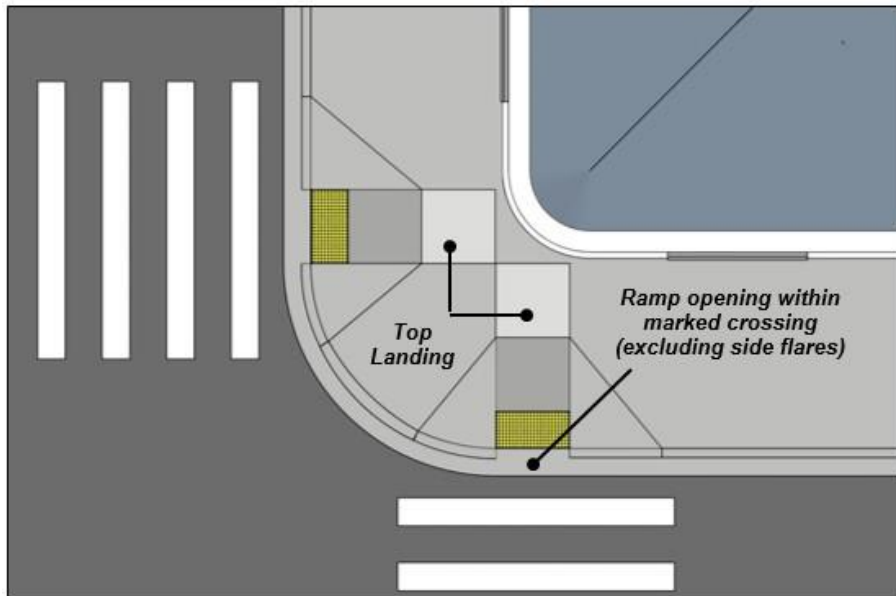
Image 6-1: High Intensity Activated Crosswalk (HAWK)

### 6.2.3 RAILROAD CROSSING AT BRAMPTON ROAD

Throughout the public engagement process, there were several comments received regarding frustration with the frequency of trains blocking traffic at the railroad crossing north of Brampton Road. From conversations with stakeholders from Georgia Ports Authority, it was shared that onsite expansion of tracks and other improvements will reduce jockeying or switching train cars entering the port, thus, reducing delay at the railroad crossing north of Brampton Road. Additionally, upgrades to the railroad crossings safety devices are recommended to include gates and other safety measures. ITS technologies should be explored to notify motorists on train wait times.

## 6.3 BICYCLE AND PEDESTRIAN INFRASTRUCTURE

Comments regarding the completion of sidewalks and bicycle facilities were received several times throughout the public engagement process. The proposed typical sections include a multi-use path along the extent of SR 21 from Oak Street to Grange Road. This recommendation is in line with recommendations from CORE MPO's Non-Motorized Transportation Plan and provides an opportunity to provide connectivity and dedicated infrastructure to the East Coast Greenway in the area. ADA accommodations, such as those shown in Figure 6-5, are recommended at all crosswalks as well.



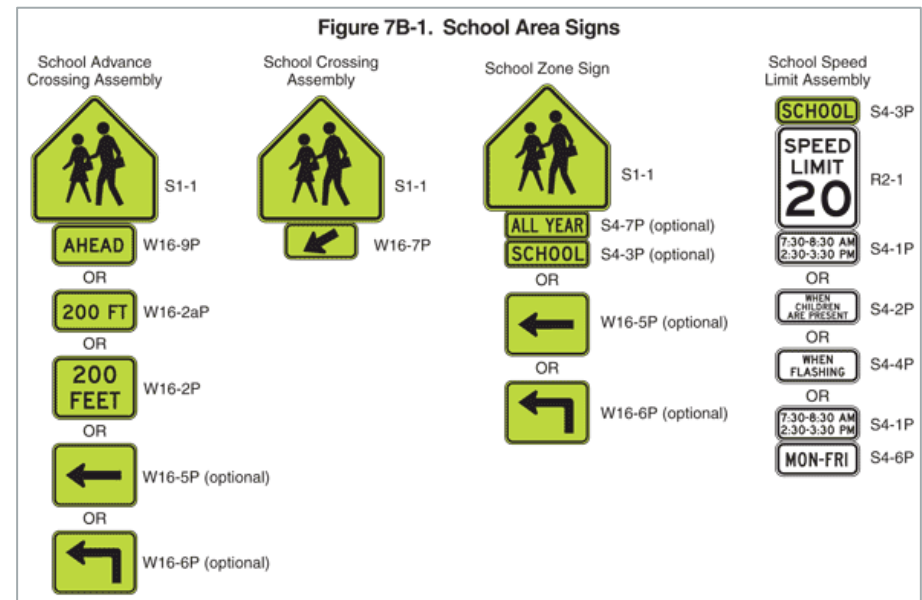
**Figure 6-5: Example of ADA Compliant Curb Ramps at Intersections**  
(Source: U.S. Access Board)

The establishment of continuous sidewalk and enhanced pedestrian and bicyclist infrastructure will allow pedestrians to safely travel along the corridor without being forced to walk in the roadway or grass and dirt; not only improving their experience and safety, but also the predictability of their actions from the automobile drivers' perspective.

## 6.4 SCHOOL ZONE IMPROVEMENTS

The new Groves K-12 campus currently under construction will serve up to 2,400 students as well as be home to two gymnasiums and a multi-purpose stadium. Safe access for students, parents, and staff is of the utmost importance. Improvements should be done with input and coordination from Savannah-Chatham County Public Schools (SCCPS). School Zone improvements can include school area signage, as shown in Figure 6-6, and school zone pavement markings.

Additionally, it is recommended that a study be conducted to determine if the speed limit needs to be reduced and/or school zone changes be implemented as well. The reduction in speed will improve safety and, with the addition of the other short-term recommendations, will transform the existing corridor into a more pleasant and safer driving, walking, and bicycling experience.



**Figure 6-6: MUTCD School Area Sign Examples**

## 6.5 TRANSIT EXPANSION

Coordination with CAT should be continued to move forward plans to expand transit along SR 21 and finalized logistics for implementation. Recommended stop locations based on key destinations and likely rider usage include the following:

- Northbound/Southbound Stops near Priscilla D Thomas Way
- Northbound/Southbound Stops near Varnedoe Avenue-Big Hill Road
- Northbound/Southbound Stops at Smith Avenue
- Northbound/Southbound Stops at SR 307
- Southbound Stop at Grange Road

## 6.6 BEAUTIFICATION AND PLACEMAKING

With the implementation of continuous sidewalk and multi-use paths, other streetscape elements such as benches, public art, and pedestrian-scale lighting, can be added to improve the pedestrian experience along SR 21. Landscaping treatments can include trees, bushes, and flowers and should be examined in detail to see where these should be installed during the roadway design process. Additionally, opportunities to incorporate green infrastructure should be explored.



Poor lighting within a corridor contributes to safety concerns of customers and residents along the corridor. This condition particularly affects non-motorized transportation users in a negative way. Pedestrians and bicyclists feel less safe traveling on the roadway, and transit users feel less safe walking to and from bus stops, as well as waiting at bus stops. It is recommended that street lighting options along the corridor be evaluated in detail.

Additionally, a creative placemaking element recommended for the corridor is a signage and wayfinding program focused on creating simple and aesthetic systems that enhance community vibrancy and character along the SR 21 as a gateway corridor. Another tool to engage the community in the beautification process is to develop a local public art program for public art/gateway projects along corridor.

## 6.7 SUMMARY OF RECOMMENDATIONS

In summary, the proposed corridor-wide recommendations along SR 21 include the following and are shown in Figure 6-7 and Figure 6-8:

- Install Raised Median Segments
- Install continuous sidewalk/multi-use path along corridor
- Improve intersection turn lanes and ped/bike accommodations
- Signal retiming, coordination, and equipment upgrades
- Pedestrian-scale lighting and streetscaping
- Gateway and Wayfinding Signage Program
- Creative Placemaking
- Transit Expansion

Figure 6-9 shows a conceptual rendering of what the implementation of proposed recommendations along SR 21 could look like south of Priscilla D Thomas Way. Figure 6-10 shows a conceptual layout of improvements along SR 21 between Minus Avenue and Priscilla D Thomas Way.

The proposed recommendations were developed to meet the study goals, address concerns and desires from stakeholders and the public, and align with the goals of the CORE MPO's Mobility 2045 Metropolitan Transportation Plan. The benefits of the proposed improvements include:

- Reducing likelihood and severity of crashes along SR 21
- Reducing likelihood of crashes involving pedestrians
- Reducing delay and queuing at key intersections
- Reducing potential turning movement conflicts
- Enhance multimodal options along corridor
- Create a sense of place and gateway corridor along SR 21

The proposed improvements aid in improving traffic flow and safety for vehicular traffic while concurrently improving access to alternative modes of travel including walking, biking, and transit. On average, the proposed recommendations could yield a \$1,700,000 reduction in crash costs per year and \$300 worth of fuel savings per year per road user.

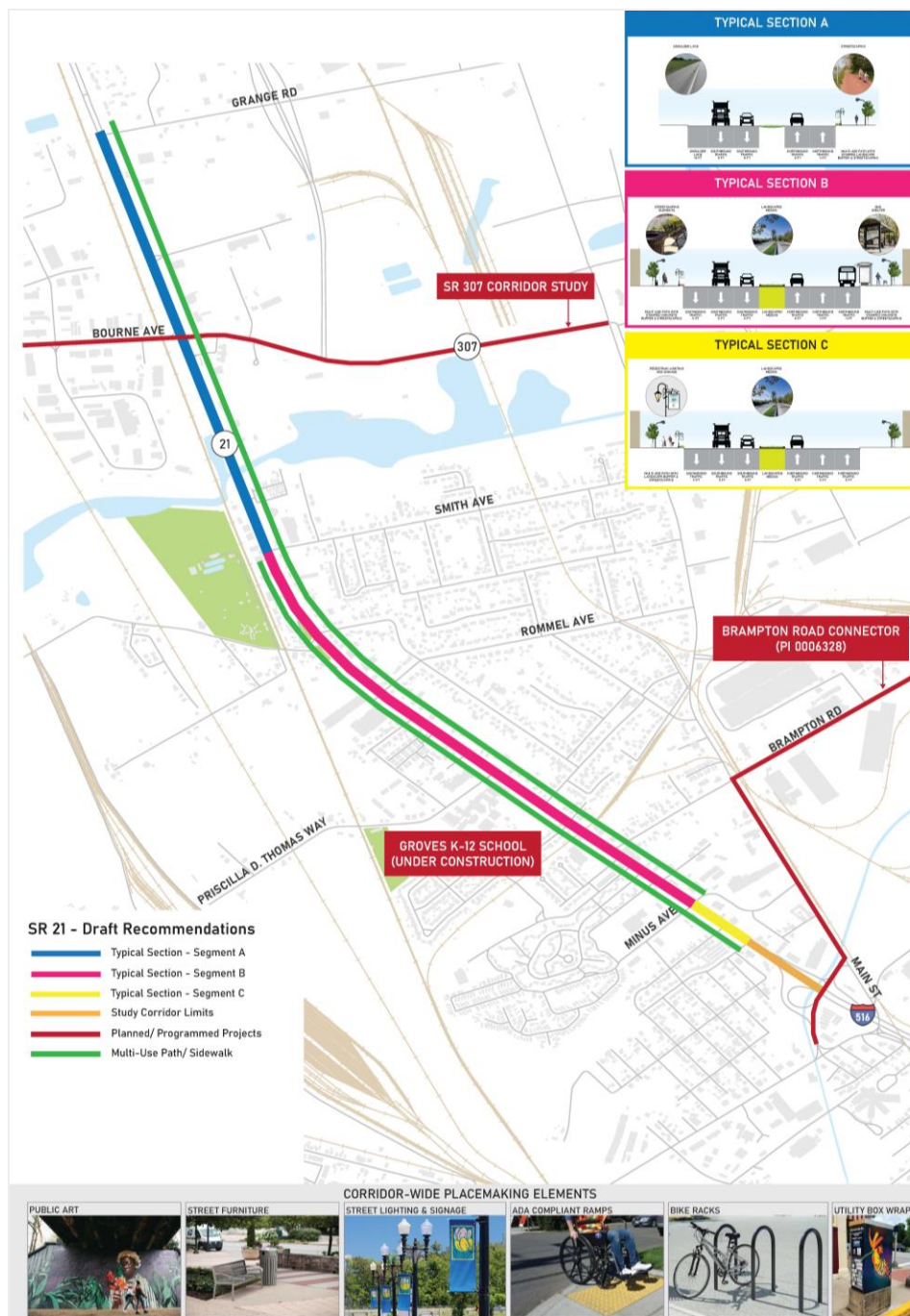


Figure 6-7: Corridor Wide Recommendations along SR 21

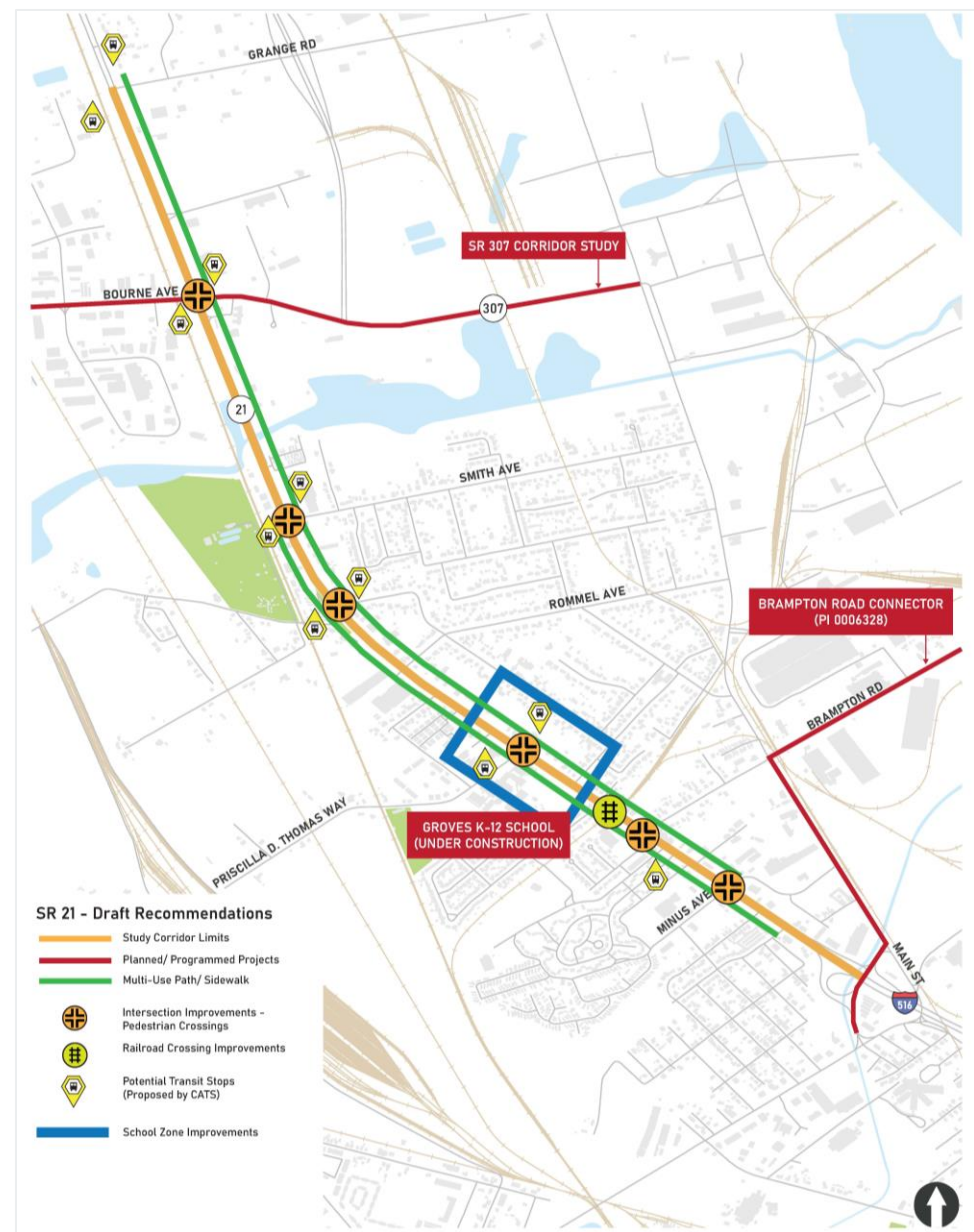


Figure 6-8: Intersection Specific Recommendations along SR 21

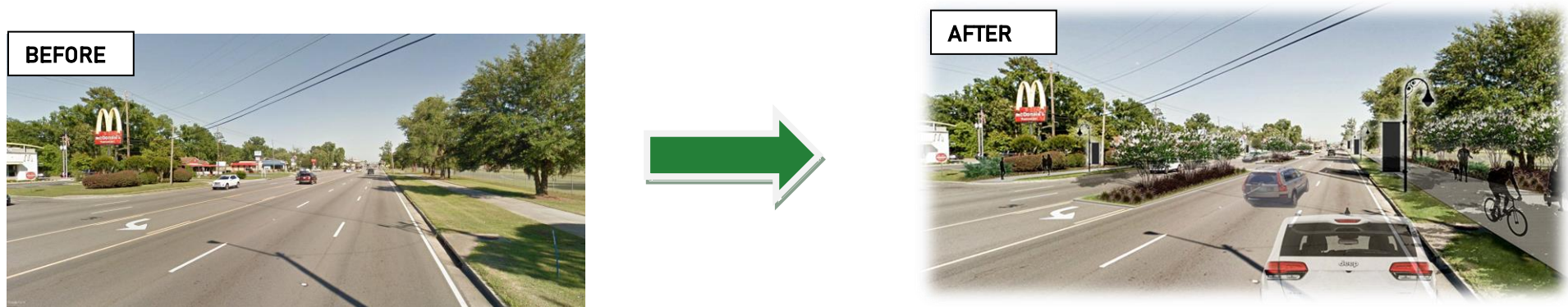


Figure 6-9: Conceptual Rendering of Recommendations along SR 21

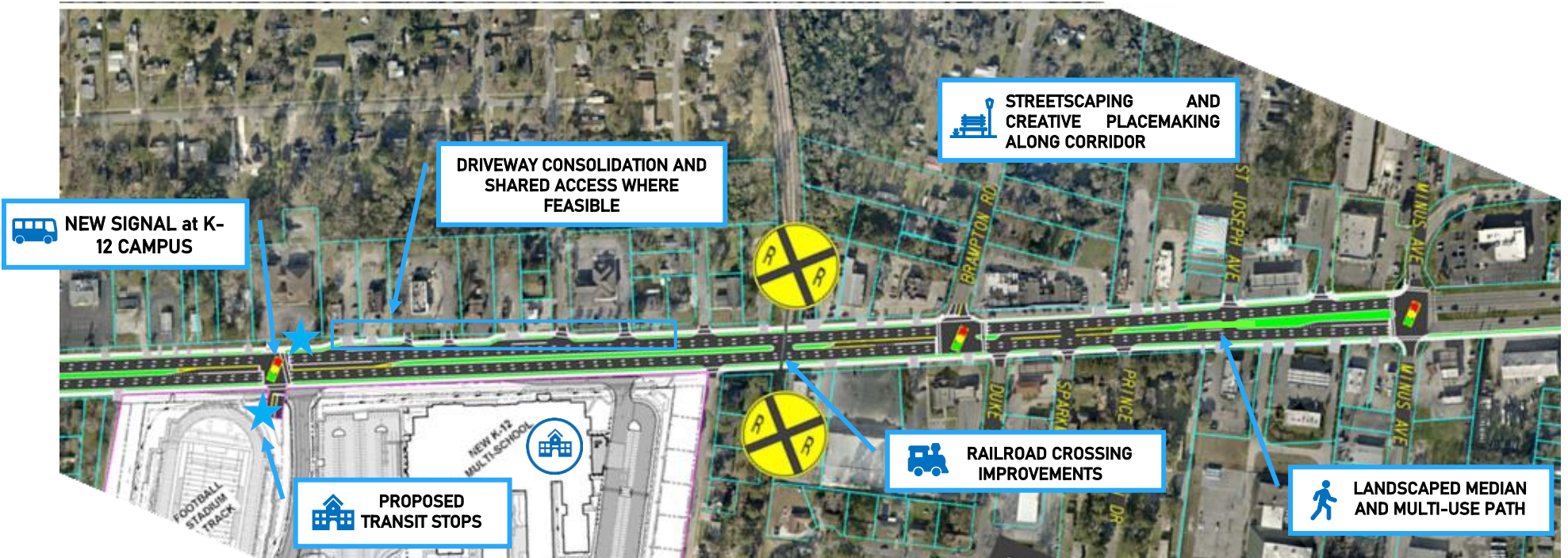


Figure 6-10: Conceptual Layout of Recommendations between Minus Avenue and Priscilla D Thomas Way

## 6.8 IMPLEMENTATION STRATEGY

Recommended improvements were classified as short-, medium-, or long-term depending on implementation timeframe. Short-term recommendations are designed for implementation within a five-year timeframe. Short-term improvements are generally confined to the existing right-of-way and include projects which can be constructed relatively quickly. Medium-term and long-term improvements require more implementation time with more extensive engineering, acquisition of right-of-way, negotiation with property owners, funding, or investment from other entities. The prioritize list of projects are shown in Table 6-2.

Given that the preferred typical section with the raised median and multi-use path can all be completed within existing right-of-way coupled with the prioritized need to improve operations and safety between Minus Avenue and Smith Avenue, which has the highest crash rate along the corridor, the roadway improvements for Segment B were included in the Short-Term Improvements to maintain current momentum to secure funding and preliminary engineering design for the project.

The improvements recommended as part of this study are conceptual in nature and are based on the technical analysis, feedback from the project advisory group, and comments received from stakeholders and public. Preliminary implementation costs are estimated based on average cost summaries prepared by local agencies or GDOT for similar projects. Based on the availability of funding, Garden City can further analyze these conceptual improvements in coordination with GDOT to finalize, design, and construct the improvements.

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Table 6-2: SR 21 Prioritized List of Final Recommendations

Project Title	Project Description	Type	Cost	Partners
Short-Term (0 - 5 Years)				
SR 21 Safety and Operational Improvements	Improvements along SR 21 from Minus Avenue to Smith Avenue. Includes installation of raised median, signalized intersection upgrades, school zone enhancements, and driveway consolidations. Install multi-use path along both sides of SR 21 from Minus Avenue to Smith Avenue; (ADA) compliant crosswalks.	Corridor	\$4,250,000	CORE MPO, GDOT, Garden City
SR 21 Streetscaping Improvements	Streetscaping elements within the pedestrian realm such as pedestrian lighting, street furniture, and to provide placemaking elements including shade and buffer, lighting, street furniture, etc.	Streetscape	\$1,250,000	CORE MPO, Garden City
SR 21 Multi-Use Path - South of Minus Ave	Installation of multi-use path on west side of SR 21 from Minus Avenue to Oak Street.	Corridor	\$250,000	CORE MPO, GDOT, Garden City
SR 21 Transit Expansion Program	Transit Expansion along SR 21 North of Brampton Road	Corridor	Staff Time/, TBD	CATS, Garden City
Gateway and Wayfinding Signage Program	Create a signage and wayfinding program focused on creating simple and aesthetic systems that enhance community vibrancy and character along the gateway corridor. Efforts were made to create gateway and wayfinding systems that address the needs of all users, whether traveling by foot, bicycle, vehicle, or transit.	Corridor	\$60,000	Garden City
SHORT TERM IMPROVEMENTS (SUB-TOTAL)			\$ 5,810,000	
Medium (5 - 10 Years)				
SR 21 at SR 307 Improvements	Intersection improvements, signal equipment upgrades; signal timing improvements (**Coordinate with SR 307 Corridor Study Recommendations)	Intersection	\$300,000	GDOT, Chatham County, Garden City
SR 21 at Railroad Crossing Improvements	Upgrade the crossing's safety devices to include gates and other safety measures. Explore ITS technologies to notify motorists on train wait times. Coordinate with system GDOT is developing at SR 307 to provide information to motor carriers on delays, alternate routes, etc.	Intersection	\$300,000	GDOT, GPA, CSX
SR 21 Multi-Use Path - Smith Avenue to SR 307	Installation of multi-use path on east side of SR 21 from Smith Avenue to SR 307.	Corridor	\$950,000	GDOT, Chatham County, Garden City
MEDIUM TERM IMPROVEMENTS (SUB-TOTAL)			\$ 1,550,000	
Long Term (10+ Years)				
SR 21 Multi-Use Path - SR 307 to Grange Rd	Installation of multi-use path on east side of SR 21 from SR 307 to Grange Road.	Corridor	\$700,000	Chatham County, GDOT, CORE MPO
Regional Bike Connectivity Plan	To support the proposed bicycle facilities along SR 21 and enhance connectivity to the East Coast Greenway, a regional bike plan should be built upon to increase access to regional destinations.	Regional	TBD	Garden City, Chatham County, CORE MPO
Roadway Connectivity	SR 21 is one of a few major corridors that provides access north-south between City of Savannah and Chatham County to I-95. Regional growth has contributed to congestion along the corridor and the relatively sparse roadway connectivity limits the possible dispersion of the existing and projected traffic onto alternate routes. Additional north south roadway connections should be explored to ensure continued mobility and strengthen connections between destinations locally and regionally.	Regional	TBD	Garden City, Chatham County, CORE MPO, GDOT
LONG TERM IMPROVEMENTS (SUB-TOTAL)			\$ 700,000	
TOTAL COST FOR RECOMMENDATIONS			\$ 8,060,000.00	

## 6.9 FUNDING SOURCES

Several funding sources may be explored to secure funding for improvements identified in this SR 21 Access Management Study. These include federal funds, state funds, regional and local funds, among others. Garden City can leverage a combination of funding programs to help improve mobility, safety, and operations along the corridor.

### 6.9.1 FEDERAL FUNDING SOURCES

#### *Fixing America's Surface Transportation (FAST) Act*

The Fixing America's Surface Transportation (FAST) Act includes several federal competitive grant programs. CORE MPO is the federally designated metropolitan planning organization for this region, and it oversees and provides access to funds through the six-year Transportation Improvement Program (TIP) for a variety of federal programs. Projects which impact air quality and seek federal funding must be included within CORE MPO's long-range transportation plan.

#### *Infrastructure Investment and Jobs Act*

The Infrastructure Investment and Jobs Act (IIJA) was signed into law by President Biden November 2021. The IIJA is to include funding for broadband access, clean water, electric grid renewal in addition to the transportation and road proposals, which totals to an additional \$550 billion being newly authorized spending on top of what Congress was planning to authorize regularly. This investment in the nation's roads, bridges, waterworks, and broadband includes new grant opportunities and could provide a significant amount of funding for a wide range of projects.

### 6.9.2 STATE FUNDING SOURCES

#### *Highway Safety Improvement Program*

The Highway Safety Improvement Program (HSIP) is a core Federal-aid program with the purpose to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned roads and roads on tribal land. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads with a focus on performance.

#### *Transportation Alternatives Program (TAP)*

GDOT partners with the Federal Highway Administration (FHWA) in facilitating and providing an opportunity for local governments to pursue non-traditional transportation related activities such as pedestrian facilities, bicycle facilities, and pedestrian streetscaping projects. TAP

improves the quality of life for citizens in communities across the state by providing local governments the means to pursue projects that might not otherwise be possible.

#### *Roadside Enhancement and Beautification Council (REBC) Grant Program*

The REBC Grant Program provides funding for roadside enhancement and beautification projects along Georgia's roadsides. The funding for grants comes from contributory value fees paid by outdoor advertising companies to Georgia DOT for vegetation removal at outdoor advertising signs. The funds may be used only for landscape plant material and its installation for the furtherance of roadside enhancement and beautification projects along state routes in Georgia.

#### *Georgia Transportation Infrastructure Bank (GTIB)*

The Georgia Transportation Infrastructure Bank (GTIB) is a grant and loan program administered by SRTA for projects up to \$10 million. GTIB funds can be utilized as a local match for federal funding sources. Eligible costs include preliminary engineering, right-of-way authorization, and construction costs. Key criteria for the selection of projects include demonstrating economic development potential, project readiness, and feasibility.

#### *Safe Routes to School (SRTS) Program*

The Safe Routes to School (SRTS) program is designed to fund comprehensive programs that encourage and enable more children to walk and bike to school safely. The funds are intended to start an SRTS program in communities and assist community members in sustaining successful SRTS programs.

## 6.9.3 OTHER FUNDING SOURCES

### ARTWORKS

The ARTWORKS grant program is a part of the National Endowment for the Arts. Funding ranging from \$10,000-\$100,000 is distributed exclusively on a project basis; funding is not allocated for the creation, maintenance, or upkeep of an organization or group.

### Challenge America

Challenge America grant program is a part of the National Endowment for the Arts which provides up to \$10,000 conditional funding for projects that support Engagement, defined as: “Public Engagement with, and access to, various forms of excellent art across the nation,” with the intent of extending the reach of arts to populations that have limited access to the arts, due to geographic location, ethnicity, economic hardship, and/or disability.

## 6.10 NEXT STEPS

With the outlined recommendations and implementation plan, there is a series of steps that must be taken to advance the conceptual recommendations into a final design and construction. The timeline for this strategy may vary between three years at the short end to over ten years at the long end depending on the amount of funding that is obtained. These steps are illustrated in Figure 6-11 for the larger-scale projects identified. For the smaller recommendations, this flow chart can be tailored to meet the specific implementation process.

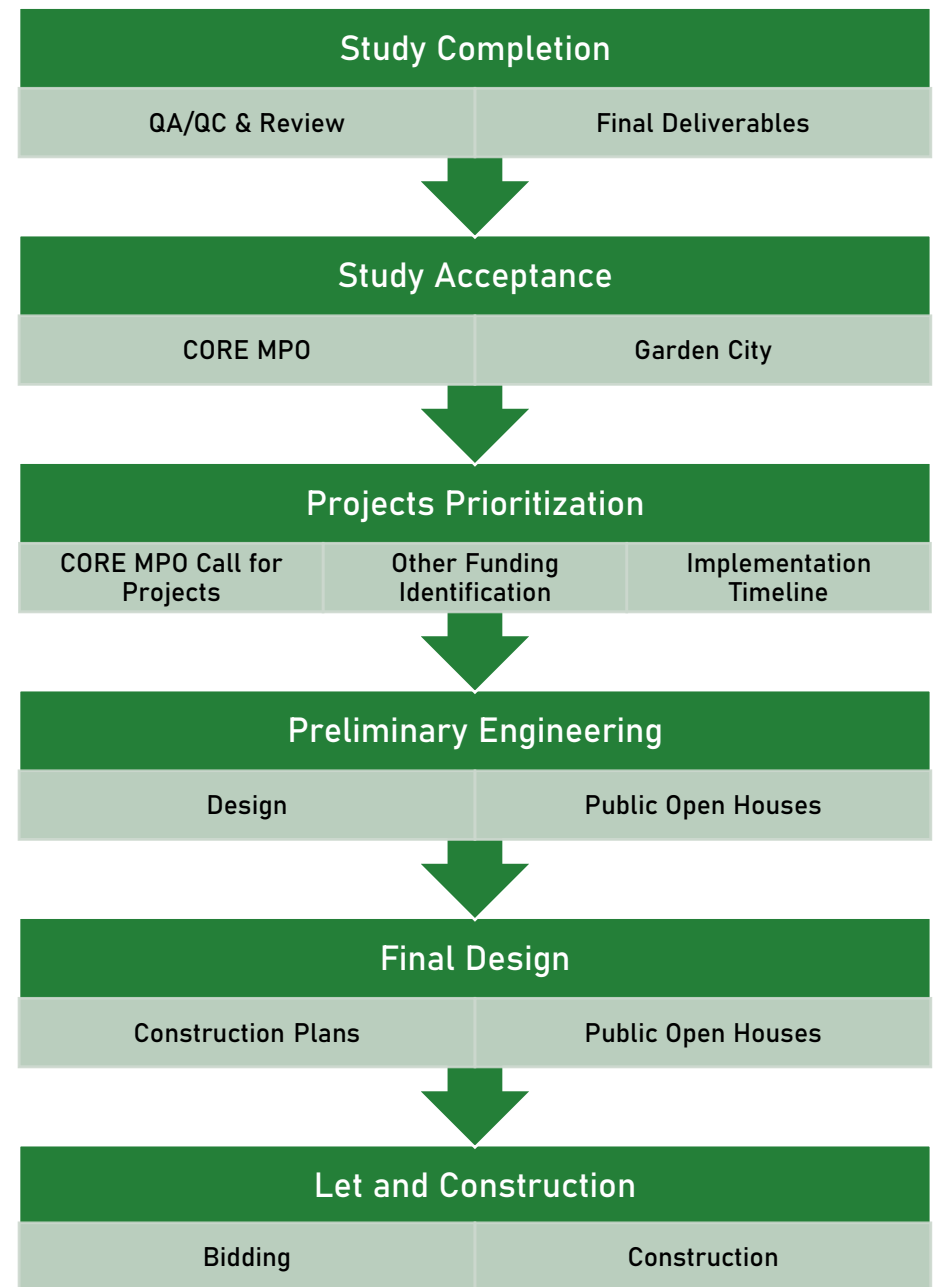


Figure 6-11: General Flow Chart for SR 21 Recommendations Implementation