JAXPORT Terminal Optimization Study

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JAXPORT TERMINAL OPTIMIZATION STUDY

Final Report

North Florida TPO UPWP 5.20

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EXECUTIVE SUMMARY

Background

To accommodate increasing cargo volumes and remain competitive, ports worldwide are facing growing pressure to expand and modernize their facilities. However, these expansions can place additional strain on land transportation networks, leading to congestion, delays, and operational inefficiencies. Effectively addressing the challenge of congestion and delays requires a comprehensive understanding of the problem. This study analyzes traffic flow patterns at JAXPORT's Blount Island Marine Terminal (BIMT), which is currently undergoing expansion. The main aim of the study is to recommend necessary geometric and operational improvements to accommodate expected traffic growth and ensure safe and efficient traffic flow.

Study objectives

The primary objective of the study is to recommend necessary geometric and operational improvements to accommodate the expected traffic growth at BIMT.

The specific objectives include:

1) Review current traffic conditions at the terminal and consider future expansion plans.
2) Simulate future traffic growth and infrastructure improvement needs.
3) Recommend targeted geometric and operational improvements to improve traffic circulation within the terminal.

Methodology

This study used VISSIM, a microscopic traffic simulation tool, to model and analyze the complex traffic dynamics of the terminal. A sample visualization snapshot of the VISSIM model is provided in the Appendix. A comprehensive assessment of current traffic patterns related to truck movements at the terminal was first conducted to provide input for developing and calibrating the VISSIM model. To account for future traffic conditions, time series analysis was employed to project growth in traffic demand, considering anticipated expansions in tenant yard facilities, and increase in berth capacity. Traffic forecasts for years 2030 and 2035 were developed using the Northeast Florida Regional Planning Model (NERPM), the region's travel demand model, and the

ITE Trip Generation Manual. These projections were integrated into the calibrated baseline model to evaluate future "No Build" and "Build" scenarios. The potential benefits of the improvements were measured in terms of travel time, vehicle delay, queue length, and Level of Service (LOS).

Major findings

The results indicated a deterioration of intersection performance with increased traffic demand, revealing operational deficiencies within the network. While all other intersections were projected to maintain an acceptable LOS (LOS D or better) in years 2030 and 2035, two intersections – Dave Rawls Boulevard/Intermodal Drive and Dave Rawls Boulevard/William Mills Street – will operate under failing conditions. To address these deficiencies, a range of geometric and operational improvements, listed below, were proposed and evaluated.

Improvement Scenario	Focus	Description
1 – Alternate security plaza entrance	Additional access point	Adds a new entrance and inbound lane for traffic accessing the AMPORTS vehicle transfer yard
2 – Inbound gate expansion	More inbound capacity	Adds an extra service lane for security vehicles at the main gate
3 – Outbound lane and service gate	Enhanced outbound flow	Introduces a new lane and service gate for outbound traffic
4 – SSA Atlantic gate expansion	Terminal-specific gate capacity	Adds an additional service gate at the SSA Atlantic terminal.
5 – Improved gate processing	Increased efficiency	Reduces dwell time at gates by 30% through assumed operational upgrades.
6 – Combined Intervention	Comprehensive upgrade	Combines the best performing scenarios (Scenarios 3 and 5)

Simulation results revealed that, among the individual improvement strategies, reduced processing time (scenario 5) resulted in the most significant improvement in overall network performance. Under the 2030 "No Build" scenario (see Figure 1), reducing dwell time at the gate decreased total travel time by 15% (395 to 334 hours) and total delay by 26% (240 to 177 hours). Adding an outbound lane and service gate (scenario 3) resulted in a 7% decrease in total travel time (from 395 to 365 hours) and a 15% reduction in total delay (from 240 to 205 hours). Additionally, adding an extra service gate at SSA Atlantic (scenario 4) led to a 7% decrease in total travel time (from 395 to 366 hours) and a 12% reduction in overall delay (from 240 to 210 hours).

Figure 2 shows the percentage change in overall network performance measures under the 2035 “No Build” scenario. Once again, reducing gate processing time (scenario 5) yielded the most significant improvement in overall network performance. Compared to the 2035 “No Build” scenario, this option led to a 17% decrease in travel time (from 528 to 437 hours) and a 26% reduction in network delay (from 370 to 273 hours). Scenario 3 (adding an outbound lane and gate) achieved a 12% reduction in travel time (from 528 to 466 hours) and a 19% reduction in delay (from 370 to 299 hours). Constructing an alternative entrance gate for Roll-on/Roll-off (Ro-Ro) traffic (scenario 1) resulted in a 10% decrease in total travel time (from 528 to 478 hours) and a 12% reduction in total delay (from 370 to 325 hours).

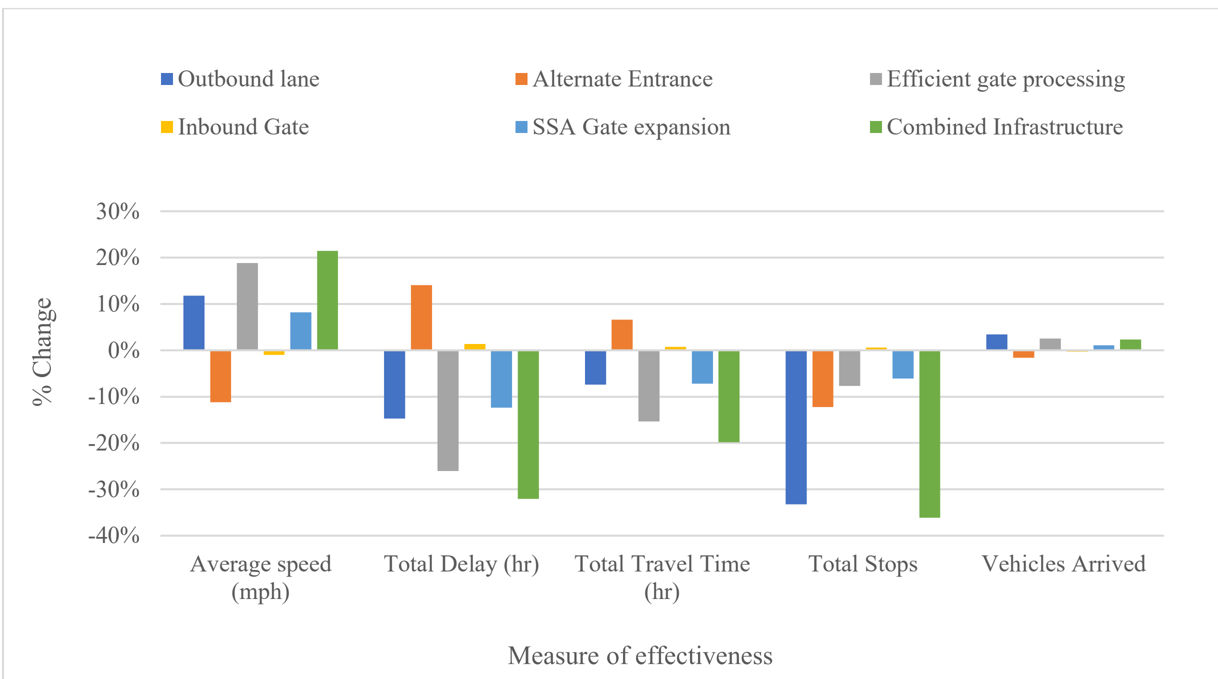

Figure 1: Percent change in overall network performance measures compared to the 2030 “No Build” scenario.

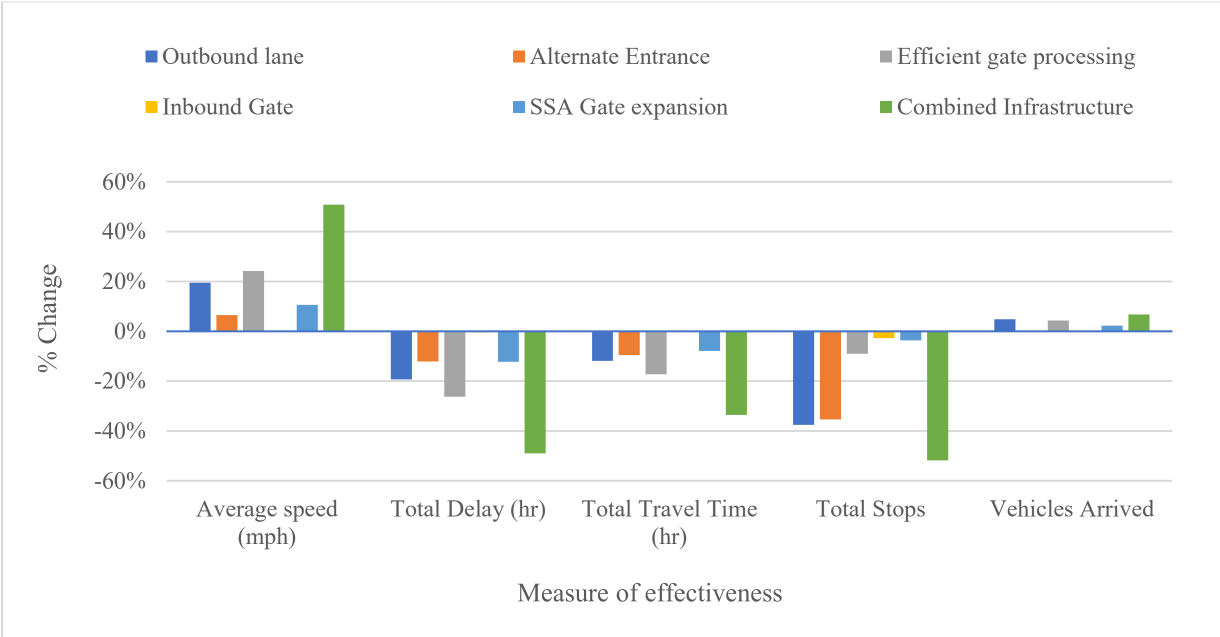

Figure 2: Percent change in overall network performance measures compared to the 2035 "No Build" scenario.

The most significant overall performance improvements in both 2030 and 2035 projections resulted from combining the best performing scenarios (scenarios 3 and 5). Under the 2030 traffic conditions, this scenario resulted in a 42% reduction in total delay (from 240 to 140 hours) and a 32% decrease in total travel time (from 395 to 303 hours). For 2035, it led to a 63% decrease (370 to 138 hours) in overall network delay and a 43% decrease (528 to 300 hours) in overall travel time relative to the 2035 "No Build" conditions, with all intersections operating at a Level of Service (LOS) D or better.

Recommendations

Based on these outcomes, the study recommends implementing scenario 3 (adding an outbound lane and service gate) and scenario 5 (reducing gate processing time).

- Reducing gate processing times (Scenario 5): This intervention resulted in a 17% reduction in total travel time (from 528 to 437 hours) and a 26% decrease in total delay (from 370 hours to 273 hours) under 2035 traffic conditions. Faster gate processing helps to clear queues more quickly, preventing spillback and reducing bottlenecks at intersections.

Efficient gate processing can be achieved through deploying Information Technology (IT) solutions, including Artificial Intelligence (AI)-integrated, real-time truck appointment systems, and gate operating systems connected to the Terminal Operating System (TOS). While JAXPORT has taken initial steps towards modernizing BIMT gates such as installing cameras for pre-screening inbound trucks and transitioning to paperless processing with electronic Transportation Worker Identification Credential (TWIC) checks beginning in 2025, further efficiency gains can be achieved through a real-time truck appointment system integrated with AI algorithms capable of analyzing vessel schedules, predicting traffic increases, and dynamically adjusting appointment availability to optimize flow and reduce peak-time congestion. Moreover, implementing fast lanes for truck drivers who have completed all required documentation in advance by using License Plate Recognition (LPR) and Optical Character Recognition (OCR) technologies to validate truck and cargo details automatically upon arrival can further streamline gate operations.

- Adding an outbound lane and gate (Scenario 3): This ensures that the additional outbound traffic generated by the new Southeast Toyota vehicle operation facility is accommodated. With this intervention, total travel time and delays in the network are reduced by 12% (528 to 466 hours) and 19% (370 to 299 hours), respectively, under 2035 traffic conditions.
- Combined implementation of scenarios 3 and 5 will result in a 63% decrease (370 to 138 hours) in overall network delay and a 43% decrease (528 to 300 hours) in overall travel time relative to the 2035 "No Build" conditions.

These strategies are both scalable and adaptable. For example, automated gate systems and truck appointment systems can be introduced gradually—initially during peak periods, then expanded, as needed. Lane assignments can be dynamically adjusted in response to evolving traffic patterns, usage levels, or operational hours.

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[1] The Appendix includes: 1) a sample visualization snapshot of the VISSIM model; 2) balanced hourly traffic volumes for the base, 2030 and 2035 models; 3) BlueTOAD data; and 4) a study brochure.

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LIST OF ACRONYMS AND ABBREVIATIONS

AADT	Annual Average Daily Traffic
AI	Artificial Intelligence
BIMT	Blount Island Marine Terminal
BlueTOAD	Bluetooth Travel-Time Origination and Destination
CCTV	Closed-Circuit Television
FDOT	Florida Department of Transportation
GHG	Greenhouse Gas
HGV	Heavy Goods Vehicles
IT	Information Technology
ITE	Institute of Transportation Engineers
JAXPORT	Jacksonville Port Authority
JFRD	Jacksonville Fire and Rescue Department
LOS	Level of Service
LPR	License Plate Recognition
MAC	Media Access Control
MOEs	Measures of effectiveness
NERPM	Northeast Florida Regional Planning Model
OCR	Optical Character Recognition
POVs	Privately owned vehicles
RBC	Ring Barrier Controller
RFID	Radio Frequency Identification
Ro-Ro	Roll-on/Roll-off
TAS	Truck Appointment Systems
TEU	Twenty-foot equivalent unit
TOS	Terminal Operating System
TWIC	Transportation Worker Identification Credential
VDTW	Vessel-Dependent Time Windows

1 INTRODUCTION

The Jacksonville Port Authority (JAXPORT) Blount Island Marine Terminal (BIMT) is undergoing a significant expansion expected to substantially increase truck traffic volumes and impact truck circulation on the terminal and in the surrounding areas. This change in truck traffic presents challenges to the existing roadway infrastructure, particularly at critical intersections and road segments that provide access to and within the port.

The purpose of this study is to conduct a comprehensive assessment of current traffic patterns related to truck movements at the terminal and identify necessary geometric and operational improvements to accommodate expected growth and evolving traffic circulation needs. The analysis results will offer recommendations for geometric and operational enhancements to accommodate anticipated traffic growth and ensure safe and efficient traffic flow.

This report outlines the analysis process and presents the findings. It also specifies the years of the analysis, the study area boundaries, the methodology for traffic volume forecasting, and scenario development.

The report is organized as follows:

- Section 1 presents the introduction and study background.
- Section 2 provides a literature review of traffic congestion on port roadways.
- Section 3 presents an analysis of the current traffic patterns at the terminal.
- Section 4 outlines the methodology for developing the VISSIM microsimulation model.
- Section 5 outlines the traffic forecasting methodology.
- Section 6 describes scenario development.
- Section 7 discusses the results.
- Section 8 provides the conclusions.

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1.1 Background

The BIMT is the largest marine facility at JAXPORT and one of the largest automobile import/export hubs in the United States, overseeing a diverse range of cargo, including containerized goods, bulk commodities, vehicles, and general cargo (JAXPORT, n.d.).

Located on Blount Island on the St. Johns River in Jacksonville, Florida, the terminal provides direct access to major highways, including I-295 which leads to Heckscher Drive (State Road 105), and on-terminal rail connections, offering intermodal connectivity to inland distribution networks (Figure 1-1).

Figure 1-1 Geographic location of the Blount Island Marine Terminal
Source: Google Earth, 2024

Vehicular traffic at the terminal comprises cars, heavy goods vehicles (HGVs), and rail traffic. This traffic can be further classified as internal and external vehicles (Li et al., 2016). Internal vehicles are those that remain within the port's gates. These include specialized cargo handling vehicles, such as forklifts, used for loading and unloading cargo, terminal tractors for moving containers and other cargo within the port, and vehicles for maintenance and support operations. External vehicles refer to those entering and leaving the terminal through the port gates. These vehicles include trucks that facilitate cargo transportation in and out of the port, as well as privately owned vehicles (POVs) used by port employees and port visitors.

The arrival and departure patterns of ships influence the traffic movement within the port. Depending on the day of the week and the time of day when ships arrive, a surge of activity is generated as cargo is loaded or unloaded onto trucks and trains, increasing traffic movement within the terminal.

Due to the high volume of shipments arriving in and departing from the terminal via the road network, traffic congestion occurs both inside and outside the terminal gates. Additionally, as some cargo is transported by rail, congestion occurs when vehicles must wait at a railroad crossing for trains to pass. This results in long queues, increased travel time, and delays, which significantly impact operational efficiency.

Moreover, in recent years, the terminal has undergone significant rehabilitation and reconstruction to improve container handling capabilities. Currently, the terminal is undergoing significant expansion, which is expected to substantially increase truck traffic volumes and impact truck circulation in the terminal and the surrounding areas (JAXPORT, 2023). This change in truck traffic presents challenges to the existing roadway infrastructure, particularly at critical intersections and road segments that provide access to and within the port.

This study recognizes this challenge and proposes the use of a microscopic traffic simulation model to evaluate and enhance traffic circulation within the port and access roads. Microscopic traffic simulation models are used to study vehicle interactions in complex environments (Toledo et al., 2005). These models provide a relatively accurate means of evaluating various road geometry configurations, infrastructure, vehicle technologies, and traffic flow control measures before implementing them on-site, thereby avoiding costly mistakes and unnecessary disruptions to traffic flow (Abadi et al., 2009). Moreover, simulation models produce data and visualization that aid decision-makers in evaluating policies to optimize traffic conditions (Li et al., 2016).

This study's primary goal is to analyze traffic patterns associated with truck movements in the BIMT and propose necessary geometric improvements to accommodate anticipated growth and ensure efficient and safe traffic flow. The study is driven by the hypothesis that optimizing truck operations and investing in infrastructure development can significantly alleviate congestion.

2 LITERATURE REVIEW

This literature review examines road congestion in port areas. It provides an overview of the composition and characteristics of road traffic in these areas and discusses the causes, impacts and potential mitigation strategies for landside port congestion, drawing on a range of relevant studies to enhance understanding.

2.1 Characteristics of road traffic in port areas

2.1.1 Traffic composition

Road traffic on access roads to and within port areas typically consists of a diverse mix of passenger and freight traffic, with larger volumes of freight traffic. Freight traffic includes container trucks and trailers used to transport cargo, while passenger vehicles primarily consist of cars or shuttles used by port staff and visitors (Shi, 2021). Most congestion in port areas is caused by truck traffic. Thus, many ports are exploring alternatives for inland transport, including rail, pipeline, and water (Arvis et al., 2018).

Additionally, the composition of vehicles in port areas is linked to the type of terminal. For example, roads in the container port areas are heavily used by container trucks.

2.1.2 Traffic patterns

The traffic flow in port areas is linked to ship schedules. The arrival of large cargo vessels or ships with significant container loads triggers increased activity on roads and railways as cargo is moved to and from these ships (J.G.P. Jr et al., 1996). When multiple ships arrive simultaneously or within a short period, congestion and delays can result. To manage traffic flow, most ports maintain ship arrival schedules. Vessel schedules may vary based on seasonal and yearly trends.

2.2 Landside port congestion

2.2.1 Causes

Several factors contribute to traffic congestion at ports. A key factor identified by multiple studies is the increase in truck traffic – driven by greater demand for inland freight transportation – coupled with the limited capacity of port access roads to accommodate this traffic (Wan et al., 2013; Muchori, 2015 ; Gidado, 2015). Many seaport facilities operate at or near capacity, resulting in significant delays at gates and container transfer yards (Chen et al., 2011).

Similarly, studies have shown that slow processing at terminal and port gates substantially increases delays and contributes to landside congestion. This inefficiency primarily stems from manual processing of documentation, insufficient staffing, and a notable absence of automated systems (Ezzahra et al., 2023; Heilig and Voß, 2017).

Additionally, the irregular arrival of trucks at terminals has been established as a cause of landside congestion. Regan and Golob (2000) revealed that trucks arriving well before operations begin or when terminals are closed, such as during lunch breaks, contribute to delays and congestion experienced at ports.

External factors, including weather conditions, road work, and incidents within or near the port, can also lead to temporary but significant disruptions (Saeed et al., 2018).

2.2.2 Impacts

The impacts of landside port congestion extend beyond the port itself, affecting both local and surrounding road transportation networks. A study of the Port of Mombasa revealed that road traffic congestion increases freight logistics costs and reduces the efficiency and reliability of the port (Muchori, 2015). Similarly, Abadi et al. (2009) noted that traffic congestion raises container transportation costs, undermining the terminals' competitiveness.

Landside port congestion also contributes to climate change. Approximately, 40 percent of port greenhouse gas (GHG) emissions have been attributed to heavy-duty trucks (Fortin, 2021). Since most of these trucks operate on fossil fuels, the frequent stop-and-go operations combined with extended idling times intensify their environmental impact.

In addition to environmental impacts, port traffic congestion also has social implications. Long wait times at gates often lead to decreased pay, which discourages truck drivers (Regan and Golob, 2000). Further, truck drivers experience increased risk of fatigue upon exposure to these extended wait times which increases the likelihood of crashes on the road (McCartt et al., 2008).

Beyond the port, studies indicate that even minor increases in vehicle traffic from port activities can severely disrupt the performance of the surrounding road transportation system (Ziemska-Osuch and Guze, 2023). These impacts include increased delays, more road crashes, higher fuel consumption, and elevated air pollution, which adversely affect the public health and quality of life of the neighboring communities (Chang et al., 2009).

2.2.3 Mitigation strategies

Addressing traffic congestion in port roadways is complex, with no simple solutions. However, numerous studies have proposed strategies to ease traffic congestion in these areas. For example, Muchori (2015) proposed various strategies such as improving road capacity and infrastructure, increasing the use of and modernizing railway networks, streamlining port clearance processes and adopting innovative technologies to enhance efficiency.

(Roberts et al., 2023) proposed similar measures to alleviate port-related traffic congestion in port cities, further suggesting establishing designated freight corridors, extended gates, and dry ports. Moreover, the authors proposed introducing gate appointment systems and using innovative technologies, including autonomous vehicles, smartphone applications, and vehicle tracking systems, to improve operational efficiencies.

Truck Appointment Systems (TAS) and Vessel-Dependent Time Windows (VDTW) have been shown to effectively reduce congestion caused by the irregular arrival of trucks at terminals (Xu et al., 2021 ; Ma et al., 2019).

2.3 Relevant studies

2.3.1 Simulation

Few studies have explored using traffic simulation models to analyze traffic congestion in and around ports. These models are developed using microscopic traffic simulation tools like VISSIM, CORSIM, and Aimsun. VISSIM provides a robust and flexible platform for simulating multimodal traffic flows and diverse traffic situations. Thus, many studies have used VISSIM to model traffic flow in ports compared to other alternative models.

Rajamanickam and Ramadurai (2016) conducted a simulation study using VISSIM to model truck congestion at Chennai Port in India. The study aimed to enhance the port's capacity by identifying the causes of congestion and recommending network improvements. The leading cause of congestion was identified as early queuing at the gate due to inadequate information about container status within the terminal, and lengthy processing times and security checks. To reduce queue lengths, the authors proposed adding slip roads, which offered more routing flexibility. Incorporating slip roads into the model significantly decreased congestion and delays.

Additionally, they recommended adopting technology to expedite processing and security checks at the gate.

Similarly, to mitigate traffic congestion and delays in China's Dayaowan port area, Du and Sun (2018) employed VISSIM to simulate an arterial coordination control scheme at a key road intersection within the port area. After implementing this coordinated control in the model, the total traffic delay at the intersection decreased by 11.6 percent. The study concluded that maintaining coordinated control along the main roads in the port area can effectively reduce delays and enhance road capacity.

Another study examined the impact of vehicle traffic generated from the Port of Gdynia, Poland, on the surrounding road transport network. The existing and anticipated traffic conditions of the road network were modeled using VISSIM software (Ziemska-Osuch and Guze, 2023). The study found that increased truck traffic resulted in longer travel times in the surrounding road network. To alleviate this impact, the study recommended creating alternative routes for residents, enhancing rail connectivity for intermodal transportation, and establishing a dry port outside the city limits.

Similarly, Spasovic et al. (2015) used VISSIM to create different scenarios representing growth in freight demand to explore the impact of increased truck traffic from the Port Authority of New York-New Jersey (PONYNJ) on highway operations and the impact of traditional gate operation strategies on queues and delays. The study concluded that a 45 percent increase in baseline demand would cause truck queues to spill over onto the highway.

Abadi et al. (2009) and Chang et al. (2009) also developed detailed microscopic traffic simulation models using VISSIM to replicate traffic flow on the road networks adjacent to the ports of Long Beach and Los Angeles. However, these studies went further to integrate microscopic simulation models with macroscopic models also developed in the studies. The integrated models were used to evaluate the impact of container inspection delays (Abadi et al., 2009) and the container reuse concept (Chang et al., 2009) on terminal operations. Similarly, an integrated VISSIM and ARENA model was used to identify capacity constraints at the Port of Savannah and its surrounding road network, resulting from increased container volumes being processed by the Port (Puglisi, 2008).

2.3.2 Previous work by the North Florida Transportation Planning Organization (TPO)

Before the JAXPORT Terminal Optimization Study, the North Florida TPO conducted three transportation planning initiatives aimed at updating the North Florida Freight Logistics and Intermodal Framework Plan.

The first of these studies focused on strengthening North Florida's role as a gateway for national and international trade by analyzing the region's current infrastructure, market trends, and stakeholder input (North Florida TPO, 2012). The primary objective was to develop a strategic plan to improve freight movement, logistics efficiency, and intermodal connectivity. The plan emphasized the importance of regional collaboration, innovation, and adopting alternative fuels and green practices to improve the sustainability of logistics operations. Key recommendations included infrastructure upgrades, such as deepening the Jacksonville Harbor and developing intermodal facilities, along with initiatives to capture new markets and increase competitiveness.

The second study focused on examining the traffic generated by 24-hour regional distribution centers in Jacksonville (North Florida TPO, 2018). The first phase of the study involved developing trip generation rates for the 24-hr regional distribution centers to be included in the Trip Generation Handbook. The second phase aimed to conduct traffic counts, assess the temporal impacts of different operational schedules, and document unique needs of the distribution centers, including parking, circulation, security, and transit needs.

The third study used Bluetooth devices (BlueTOAD) to monitor truck movements from JAXPORT terminals to intermodal rail facilities and other major destinations within Clay, Duval, Nassau, and St. Johns counties (North Florida TPO, 2021). The study’s objective was to map the origins and destinations of trips associated with JAXPORT facilities, identifying key routes for regional entry, transit, and exit. Findings indicated that most trips took place weekdays, with main generators and attractors identified for each JAXPORT location. Additionally, the study revealed that a large portion of the traffic in the JAXPORT locations exited the region via the I-95 and I-10 corridors.

3 ANALYSIS OF CURRENT TRAFFIC PATTERNS

3.1 Study area

The study focused on JAXPORT BIMT roadways and the access roads that are affected by traffic to and from the terminal. Key intersections both within the terminal and along the access roads leading to it were analyzed along with the terminal's comprehensive rail network (Figure 3-1).

The terminal is accessed from land via Dave Rawls Boulevard and Blount Island Boulevard. Within the terminal, cargo movement is facilitated by a network of minor roads, including Intermodal Drive, William Mills Street, Longshore Way, Maritime Street, Plimsoll Street, and Container Way.

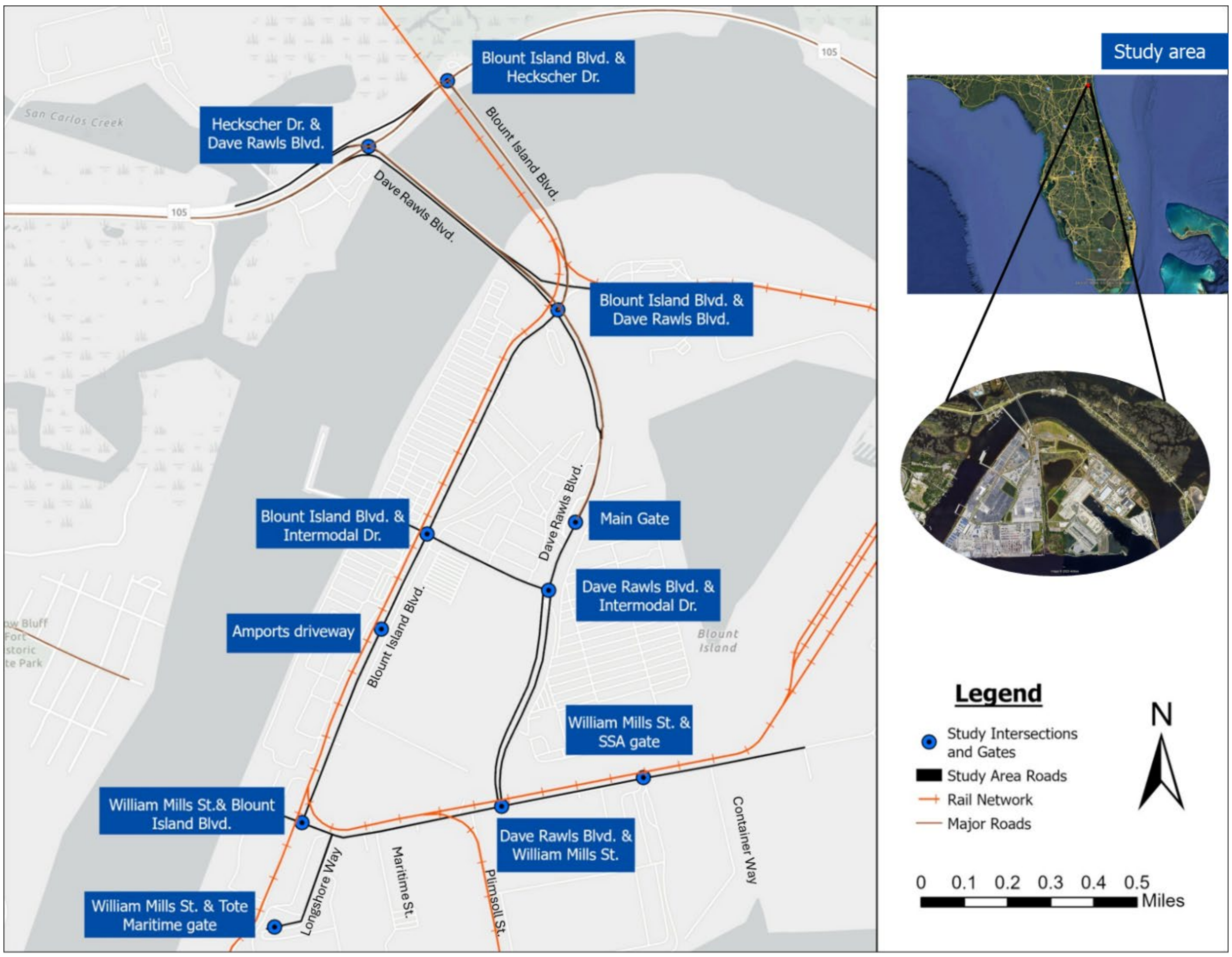


Figure 3-1 BIMT's roadway network and intersections of interest.

Congestion frequently occurs at critical points within the road network, including the main gate, the intersections, and specific tenant gates. To model this condition, data was collected at seven key intersections as well as the main gate and three tenant gates (Table 3-1). Most intersections are controlled by stop signs, except for Heckscher Drive and Dave Rawls Boulevard, which is controlled by traffic signals.

Table 3-1 Characteristics of the data collection locations

No.	Intersection Name	Type	Traffic Control
1	Blount Island Blvd./Heckscher Dr.	Three-leg intersection	Stop controlled
2	Heckscher Dr./Dave Rawls Blvd.	Three-leg intersection	Signalized controlled
3	Blount Island Blvd./Dave Rawls Blvd.	Four-leg intersection	Stop controlled
4	Dave Rawls Blvd./William Mills St.	Three-leg intersection	Stop controlled
5	Dave Rawls Blvd./Intermodal Dr.	Three-leg intersection	Stop controlled
6	William Mills St./SSA gate	Tenant Entrance/Exit	Gate
7	William Mills St./Tote Maritime gate	Tenant Entrance/Exit	Gate
8	William Mills St./Blount Island Blvd.	Three-leg intersection	Stop controlled
9	Blount Island Blvd./Intermodal Dr.	Four-leg intersection	Stop controlled
10	AMPORTS Driveway	Tenant Entrance/Exit	Gate
11	Main Gate	Tenant Entrance/Exit	Gate

3.2 Data collection

3.2.1 Data collection duration and method

The goal of data collection was to identify current traffic patterns and other road network characteristics, which would be used as input into the VISSIM microsimulation model. Given that the BIMT oversees a wide range of cargo types, including Roll-on/Roll-off (Ro-Ro) cargo, breakbulk, and containerized cargo, it was essential to identify days of peak activity to collect data representing the most severe congestion scenarios effectively. Coordinating with personnel at the port, these "high-traffic days" were identified based on arrival schedules at the berths. Traffic movement at intersections was captured using CCTV cameras located at or near the intersections. Data were collected over seven hours, from 9 a.m. to 4 p.m., on two consecutive days: one Ro-Ro operation day (Wednesday, May 8, 2024) and one containerized cargo operation day (Thursday, May 23, 2024). For the two intersections outside the terminal gates (Blount Island Boulevard and Heckscher Drive, and Heckscher Drive and Dave Rawls Boulevard), video recordings using GoPro cameras mounted on tripods at least 15 feet above ground were used for data collection. This height was sufficient to provide a clear view of all vehicle movements and traffic signal operations (Figure 3-2).

Figure 3-2 Screenshot of video camera footage taken at Heckscher Drive/Dave Rawls Boulevard

3.2.2 Data description

Data collected to analyze and subsequently develop the VISSIM microsimulation model are outlined below:

a. Road geometry and infrastructure data:

This data includes the number of lanes, lane widths, turn lanes, speed limits, traffic controls, and vehicle storage lengths. Preliminary data were collected using Google Earth software (Google Earth, 2024) before the initial site visit. During the site visit, data not retrievable from Google Earth was collected, and the previously gathered data was verified.

b. Demand data:

This data represents the total number of different classes of vehicles entering the study area and making each turn movement at the intersections. The data was extracted from the CCTV footage provided by JAXPORT and the video recorders installed on-site. Vehicle composition and turning movement counts at the peak hour of traffic flow were extracted and used as input for the model.

c. Vehicle destination data:

This data is required to identify the routes used by vehicles traveling inside the terminal. Origin-destination data was estimated from turning movement counts extracted from the recorded videos. Supplemental data were also collected using Bluetooth technology by installing Bluetooth Travel-

Time Origination and Destination (BlueTOAD) devices. BlueTOAD devices detect and capture the Media Access Control (MAC) addresses of Bluetooth-enabled devices in vehicles as they pass specific points in the road network where these devices are installed. By measuring the time it takes for these addresses to travel between detection points, the BlueTOAD devices can estimate vehicle speeds, travel times, and dwell times. The devices were installed at the locations shown in Figure 3-3. Travel time and speed data were collected from January 18 to February 11, 2025.

Figure 3-3 BlueTOAD device locations.

d. Vehicle characteristics:

The vehicle mix and characteristics were observed from the recorded video footage.

e. Traffic signal timing and phasing:

The traffic signal timing and phasing data for the signalized intersection were requested from the City of Jacksonville. For the railway network, this data was extracted from video footage. Similarly, data on the service time of the trucks at the gates was collected from the videos.

3.3 Analysis of traffic conditions

The collected traffic data was processed by manually counting the number of vehicles making each turn at the intersections and traveling through the network. The objective of the data extraction process was to determine the distribution of vehicles across different hours of the day, the periods of peak traffic flow, congestion hotspots, vehicle mix, and the routes used by traffic in the network.

3.3.1 Traffic distribution across different hours of the day

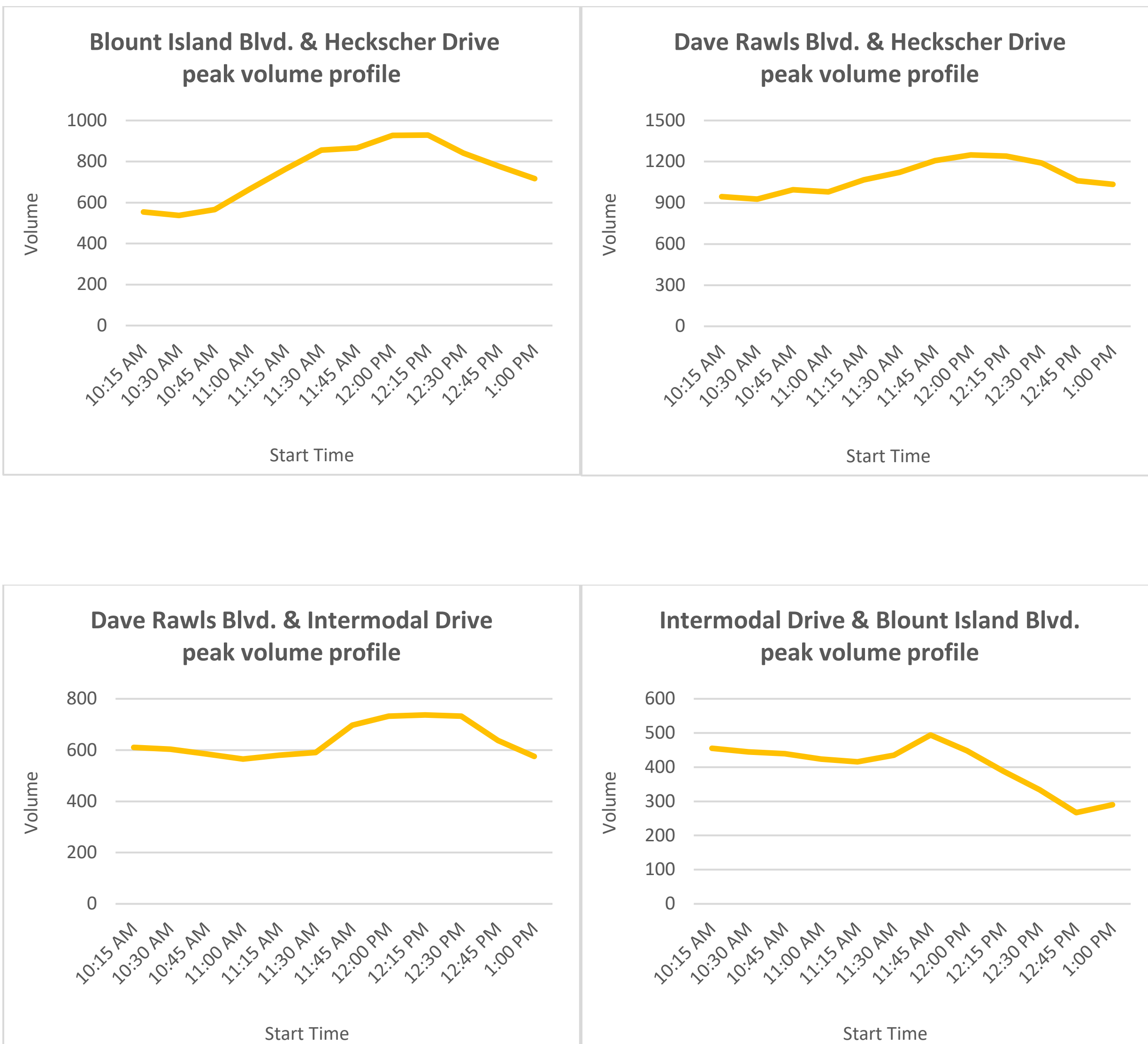
The traffic distribution across the data collection hours is illustrated in the heat map in Figure 3-4. Traffic volumes were observed to be relatively lower in the early morning hours, gradually increasing to peak levels by mid-morning when cargo loading and unloading are likely in full operation. In the early afternoon, traffic volumes slightly declined before reaching a secondary peak in the late afternoon, coinciding with the end of the workday for many employees.

Start of the hour	Heckscher Dr./Dave Rawls Blvd.	Blount Island Blvd./Heckscher Dr	Dave Rawls Blvd/Intermodal Dr.	Intermodal Dr./Blount Island Blvd.	Blount Island Blvd./Dave Rawls Blvd.	Dave Rawls Blvd./William Mills St.	William Mills St./Blount Island Blvd.
9:00 AM	964	692	623	260	653	496	184
9:15 AM	961	630	629	272	679	496	174
9:30 AM	934	554	611	287	661	510	185
9:45 AM	913	537	604	283	675	511	190
10:00 AM	947	566	585	272	689	517	230
10:15 AM	962	666	565	271	671	558	256
10:30 AM	1043	764	580	289	722	516	259
10:45 AM	1111	855	590	317	749	562	237
11:00 AM	1199	866	697	375	821	634	238
11:15 AM	1205	927	732	364	876	603	204
11:30 AM	1187	929	737	329	854	655	176
11:45 AM	1152	841	732	307	843	606	153
12:00 PM	1043	777	637	290	746	541	138
12:15 PM	1013	717	575	317	659	540	144
12:30 PM	914	694	524	344	617	514	149
12:45 PM	886	760	498	352	572	497	155
1:00 PM	853	787	463	345	581	475	129
1:15 PM	851	805	465	350	603	487	107
1:30 PM	968	825	501	364	672	496	95
1:45 PM	1089	819	487	398	807	531	100
2:00 PM	1165	812	485	397	832	567	97
2:15 PM	1213	802	501	400	912	548	94
2:30 PM	1245	860	539	448	935	488	93
2:45 PM	1178	917	544	455	865	445	82
3:00 PM	988	858	507	410	764	356	83

Figure 3-4 Heat map of traffic volume distribution across the data collection hours

3.3.2 Peak hour of traffic flow and congestion hotspots

The peak traffic hour was identified as 11:15 a.m. to 12:15 p.m., likely due to the convergence of multiple operational activities during this period. Figure 3-5 illustrates the peak volume profile for the intersections studied, indicating the pre-peak, peak, and post-peak hours of traffic flow. Identifying the peak hour of traffic flow is crucial to develop the VISSIM model, as it allows replicating traffic conditions during the most congested times.



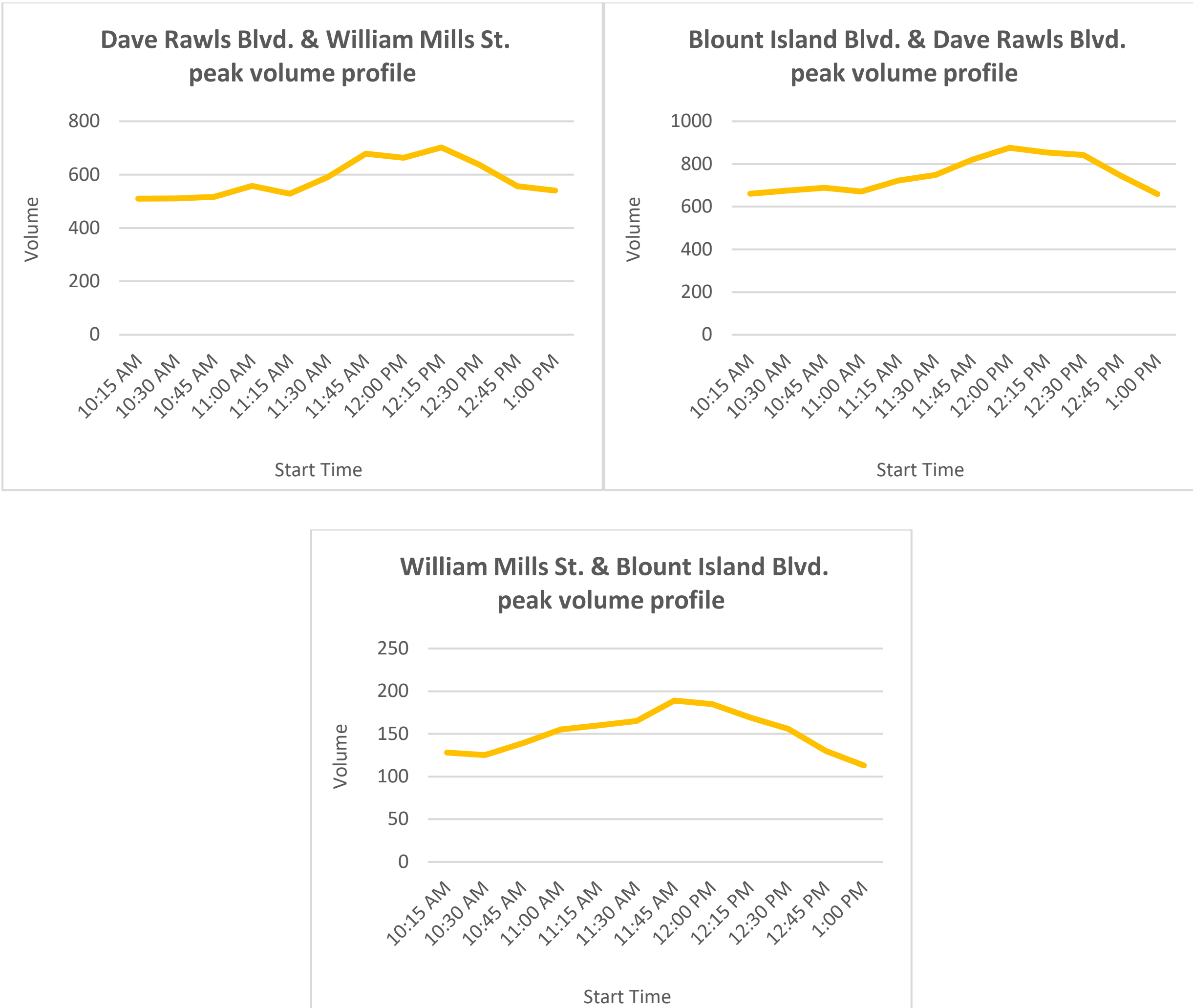
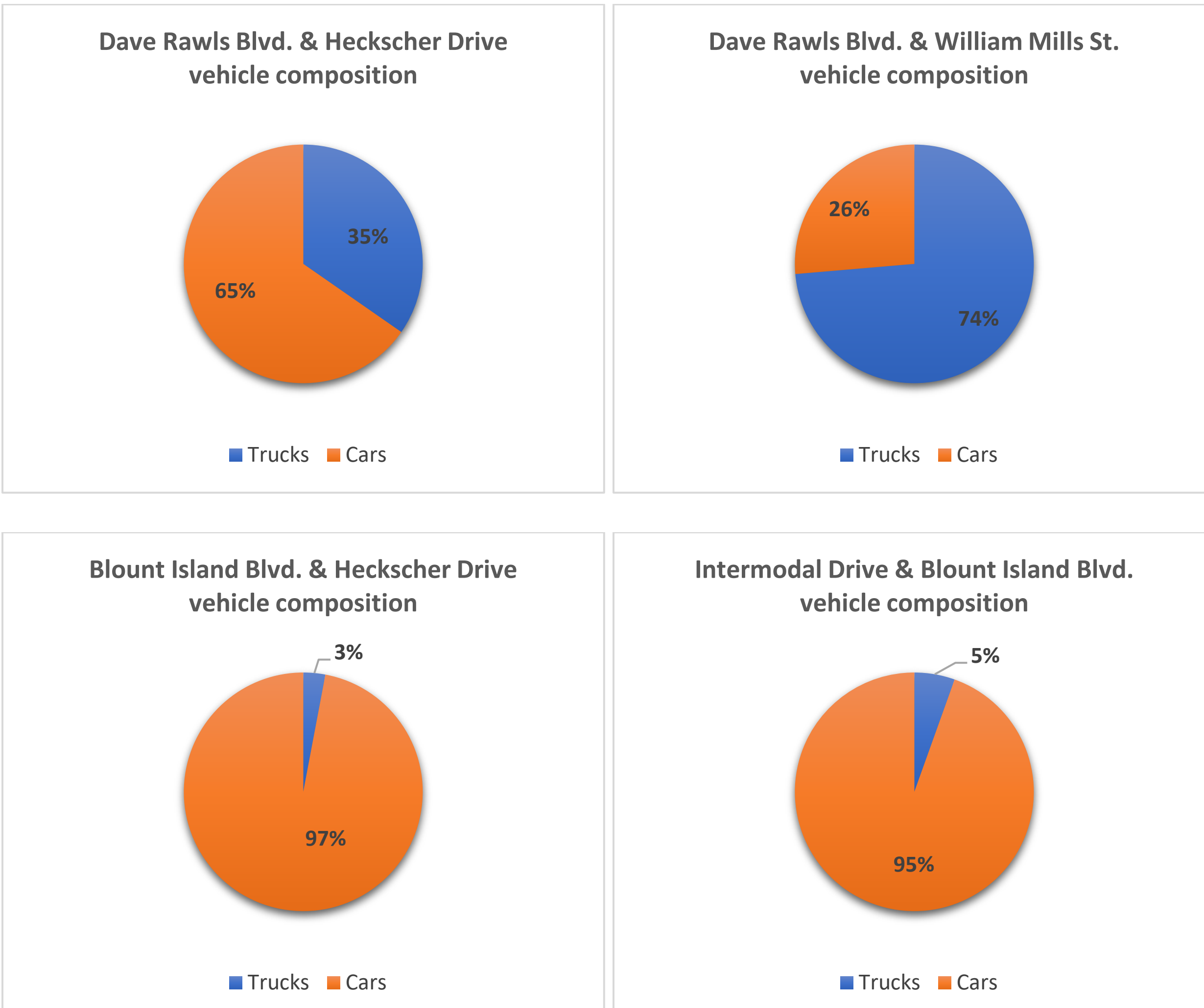


Figure 3-5 Peak hour traffic volumes at critical intersections.

Observing the video footage revealed that congestion was highest on the roads leading to the two tenant gate locations, the SSA Atlantic gate and the Tote Maritime gate. This is likely due to the gate operations at these locations, as evidenced by the long dwell times of trucks at the gates. The extended wait times indicate bottlenecks in the processing and clearance procedures, which can be attributed to several factors including gate closure for breaks, limited gate capacity and inefficient administrative processes (Ezzahra et al., 2023; Heilig and Voß, 2017). The footage also highlighted the impact of these delays on overall traffic flow, causing queues that extended beyond the immediate vicinity of the gates, disrupting the smooth movement of traffic.

3.3.3 Vehicle composition

The vehicles observed in the terminal's road network were classified into two broad categories: cars and trucks. The truck category included single-unit trucks, combination trailer trucks, and multi-trailer trucks. Figure 3-6 illustrates the vehicle composition as a percentage of the total volume at key intersections.



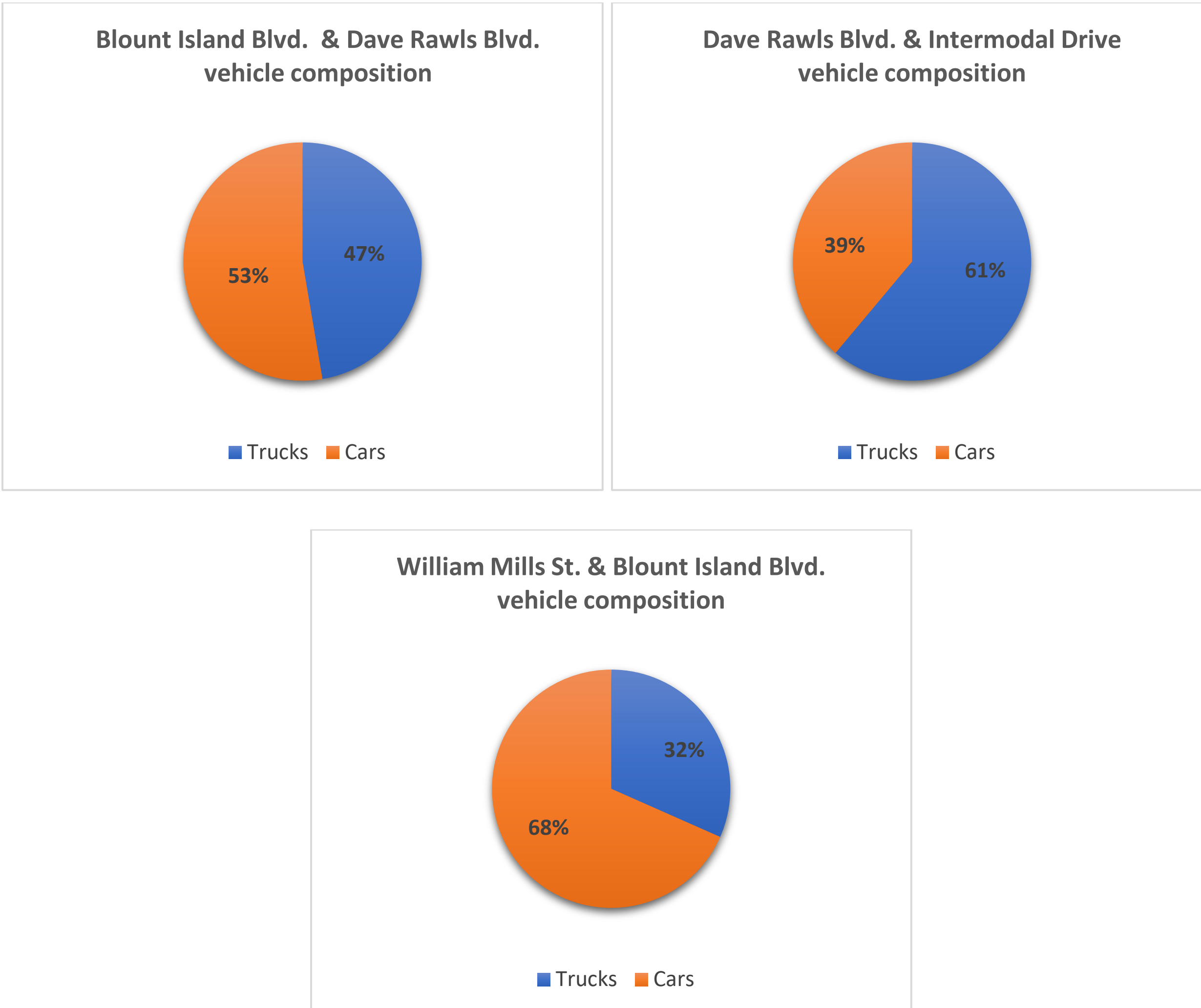


Figure 3-6 Vehicle classification by volume at critical intersections.

The vehicle composition during the peak hour was also determined for use in coding traffic demand data in VISSIM. Vehicle classification is necessary to accurately simulate real-world conditions, as operational characteristics such as acceleration, deceleration, and stopping behaviors, and vehicle lengths, vary significantly between different vehicles.

Four sub-categories of trucks were observed: container trucks, chassis trucks, bobtail trucks, and others. Visual representation of the subgroups is shown in Figure 3-7, and Figure 3-8 illustrates the peak hour volumes of the different truck categories at the seven key intersections.

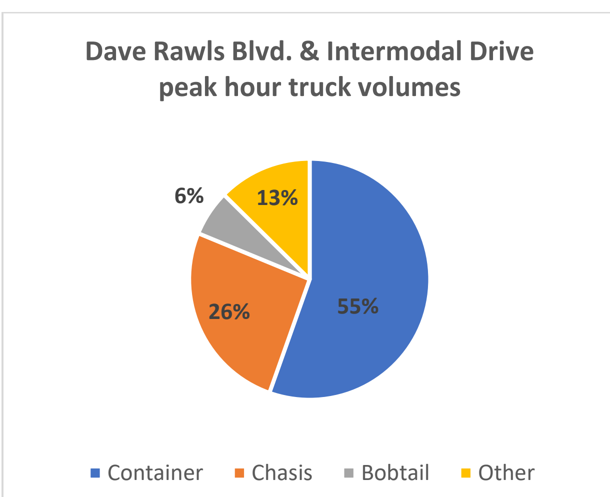
a) Container truck

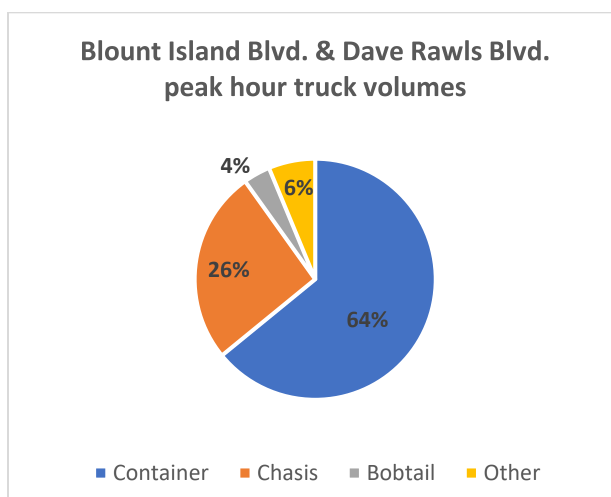
b) Chassis truck

c) Bobtail truck

d) Other Trucks

Figure 3-7 Different truck categories





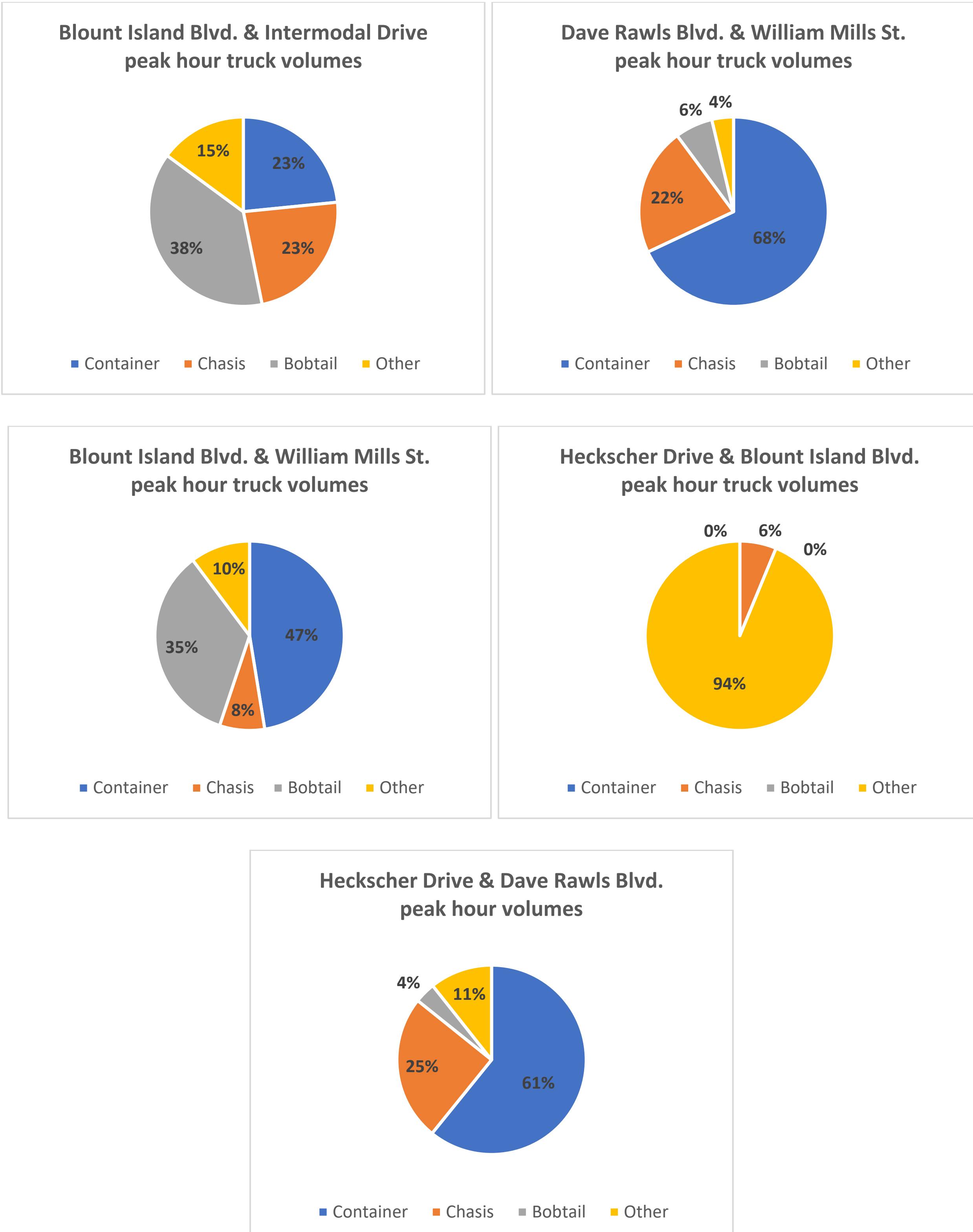


Figure 3-8 Peak hour volumes of the different truck categories at key intersections

The proportion of container trucks at each intersection is further illustrated in Figure 3-9

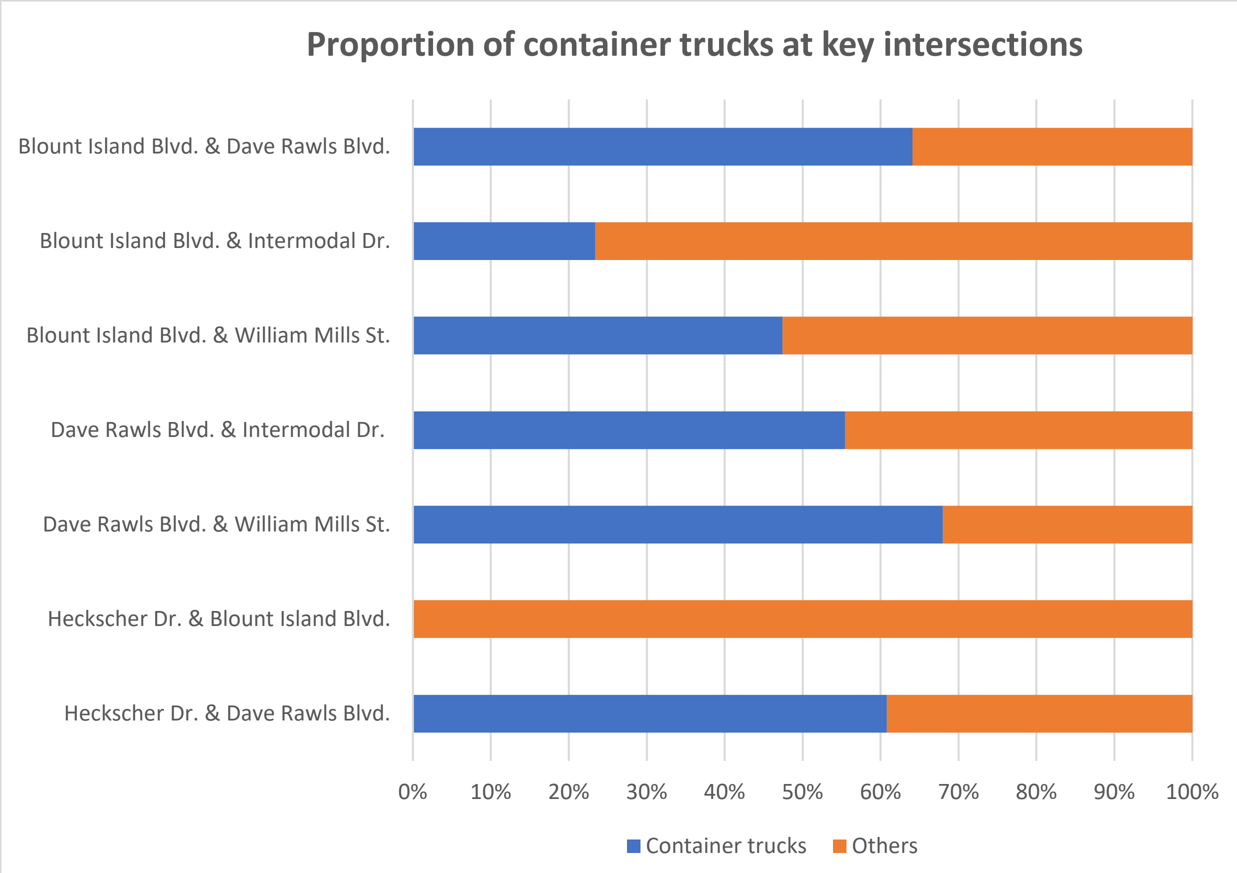


Figure 3-9 Proportion of container trucks relative to other trucks at each intersection.

Additionally, cargo trains using the rail network were noted for inclusion in the model. This is necessary because the interaction between road and rail traffic can significantly impact overall network efficiency.

3.3.4 Vehicle routes

Vehicle routes within the terminal were observed from recorded video footage. POVs accessed the terminal via a designated gate, separate from the main gate used primarily by trucks and port security vehicles. Inside the terminal, cargo trucks were routed to specific container yards, including the SSA Atlantic and Tote Maritime yards, while cars arriving by Ro-Ro ships were driven off the vessels to designated parking areas. Both trucks and cars exited the terminal through the main gate. However, POVs used a designated lane separate from trucks.

4 VISSIM MICROSCOPIC SIMULATION MODEL

4.1 Overview

VISSIM is a microscopic traffic simulation tool designed to model various road layouts, traffic patterns, road user characteristics and vehicle types. Widely utilized for analyzing the flow of vehicles, transit and pedestrians, VISSIM is capable of modeling complex traffic scenarios, including light rail operations and congested networks (ODOT, 2011). It uses a time-step and behavior-based logic to simulate traffic flow, enabling accurate replication of real-world traffic conditions.

VISSIM was chosen for this study due to its flexibility, robustness and minimal coding requirements, along with its numerous other capabilities (Nyame-Baafi et al., 2018). The steps involved in developing the microscopic simulation model include the following:

- Creating a base model to replicate current traffic conditions.
- Reviewing the model to identify and address any existing errors.
- Calibrating and validating the model to accurately represent real-world conditions.
- Evaluating the network's performance using predefined measures of effectiveness.

The following sections outline the methods used to achieve this.

4.1.1 Base model development

4.1.1.1 Network geometry

The first step in developing the base model involved coding the road and railway network geometry. High-resolution aerial imagery of the road network was obtained from NearMap and stitched together in ArcGIS Pro to create a background image. This image was then imported into VISSIM, where it was scaled and used as a basemap for the network (Figure 4-1). This ensured that the lane geometry and dimensions were accurately represented, allowing for precise alignment of the network geometry with real-world lane schematics. The link behavior type was set to

VISSIM's default "urban (motorized)" link behavior type since the study site comprised an arterial road network.

(a) (b)

Figure 4-1 (a) Stitched aerial image of the study area; (b) VISSIM baseline model.

4.1.1.2 Desired speed

Next, the speeds for right and left turn movements at intersections, as well as mainline speeds, were coded into the network using empirical speed distributions. The desired speed distribution was coded as ± 5 mph from the posted speed limit in the field, with the speed limit set as the 85th percentile speed (Figure 4-2). This speed distribution was used because the network consisted of relatively closely spaced intersections, which did not allow for free-flow conditions. The turn movement speeds were coded according to Synchro defaults, with right turns coded as ±1 mph from 9 mph and left turns as ±1 mph from 15 mph.

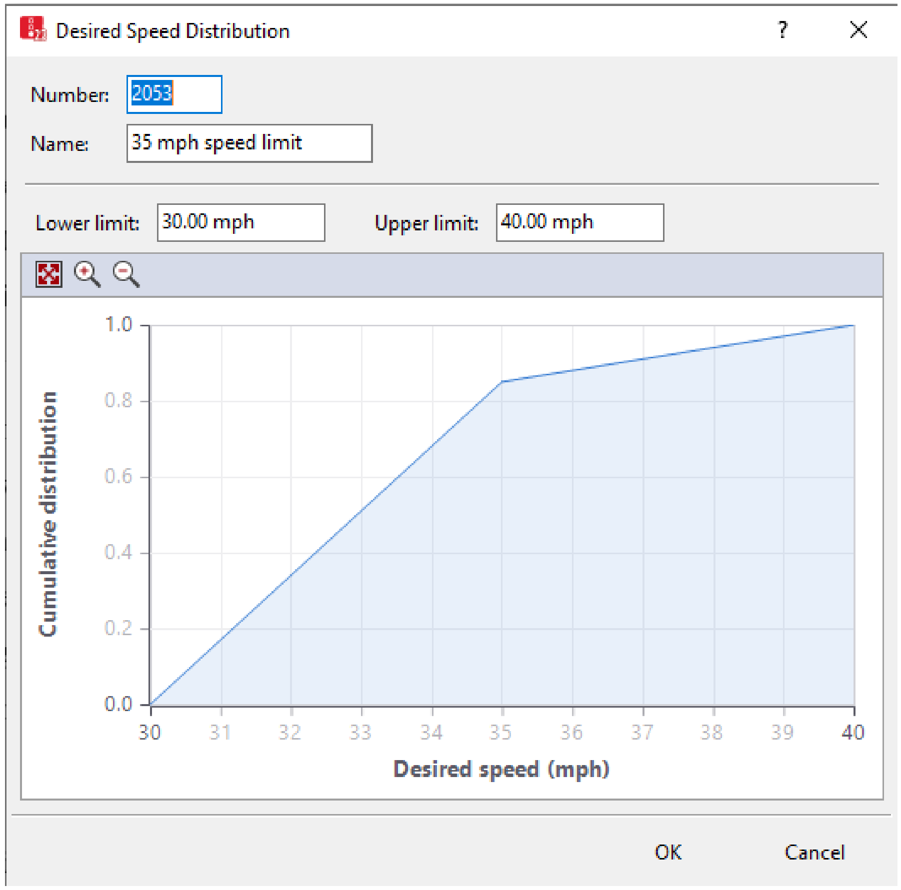


Figure 4-2 Desired speed distribution for 35 mph posted speed limit

4.1.1.3 Conflict areas and priority rules

Afterwards, priority rules for conflicting traffic flows, including merging and diverging conflicts, were coded using conflict areas and priority rules. Priority rules were employed to model "do not block" areas at road intersections, while conflict areas were used to model the right-of-way for each movement. The minimum clearance and speed parameters for the priority rules were set according to guidelines from (PTV GROUP, 2022) based on field observations.

4.1.1.4 Traffic control devices and railway crossing

Intersection traffic control was coded next. A ring barrier controller (RBC) was used to control the traffic signal at the signalized intersection, utilizing signal timing plan data received from the City of Jacksonville. Signal timing for the railroad crossings was extracted from videos recorded on site by analyzing the footage frame by frame to identify and log the railway clearance and green times. This data was used to configure the signal control for the railroad crossings.

Signal settings for railroad crossings are configured in VISSIM using combined signal detectors and signal heads. The signal detectors communicate with signal controllers to initiate phase changes when trains are detected. This is achieved by coding two signal detectors along the railroad tracks. The call detector senses when the train is about to enter the crossing. Upon train detection, it causes the railroad crossing gates to close; that is, vehicles on the road are given a red signal prompting them to stop and allow the train to pass safely. Once the train has cleared the tracks, the check-out detector signals the system to change the traffic signal light to green to permit the vehicles to proceed across the tracks.

Rail crossing delays were explicitly modeled in VISSIM based on observed train frequency and gate closure durations. The train blockage duration at the intersection of Heckscher Drive and Blount Island Blvd. was determined from video footage and validated using TRAINFO data. This time was also used to estimate the train's speed by measuring the distance it traveled across the intersection. The length of the trains and the duration of rail crossing closures at other intersections were also obtained from the video footage.

Given that one of the railroad crossings is located less than 1000 feet from the signalized intersection, queues forming at the crossing can potentially extend back and block the intersection. Therefore, the railroad preemption logic included in the RBC controller was applied while coding the railroad signal. Upon train detection, the preemption logic adjusts the signal timing at the intersection to clear any vehicles from the tracks and prevent additional vehicles from approaching the crossing. This measure ensures that the intersection remains operational and safe during train crossings. Stop signs at stop-controlled intersections were coded using VISSIM's default parameters.

4.1.1.5 Gate processing time

Stop signs were placed at the entrances and exits of gates to represent security checkpoints. Each vehicle at the gates was assigned a specific dwell time based on an empirical time distribution derived from field observed service times. Service time or gate processing time refers to the duration a vehicle spends completing the check-in or check-out process at the gate. This time does not include the time spent waiting in the queue before arriving at the gate (Mahdi et al., 2019).

Gate processing time was measured by recording the timestamp when a vehicle came to a complete stop at the gate and subtracting it from the timestamp when the vehicle resumed movement. Service time data was collected for a representative sample of vehicles, determined using the statistical sampling formula shown in Equation (1).

$$Sample\ size = \frac{\frac{z^2 \times p(1-p)}{E^2}}{1 + (\frac{z^2 \times p(1-p)}{E^2 N})} \qquad (1)$$

Where:

- z = z-score
- p = estimated population proportion (use 0.5 if unknown)
- E = margin of error
- N = population size

The sample size was calculated assuming a 95% confidence level, a 5% margin of error, an assumed population proportion of 0.5 and the volume of vehicles using the gate at the peak hour of traffic flow as the population size (Table 4-1). Plots of frequency and cumulative percentage of service time at the gates, as well as the vehicle dwell time distribution applied in VISSIM, are shown in Figures 4-3 to 4-5.

Table 4-1 Minimum sample size estimation

Gate	Peak hour volume	Minimum Sample Size
Main Gate	307	171
SSA Gate	107	84
Tote Maritime Gate	84	69

To simulate vehicles slowing down as they approached the gates, a speed reduction section was applied at these locations.

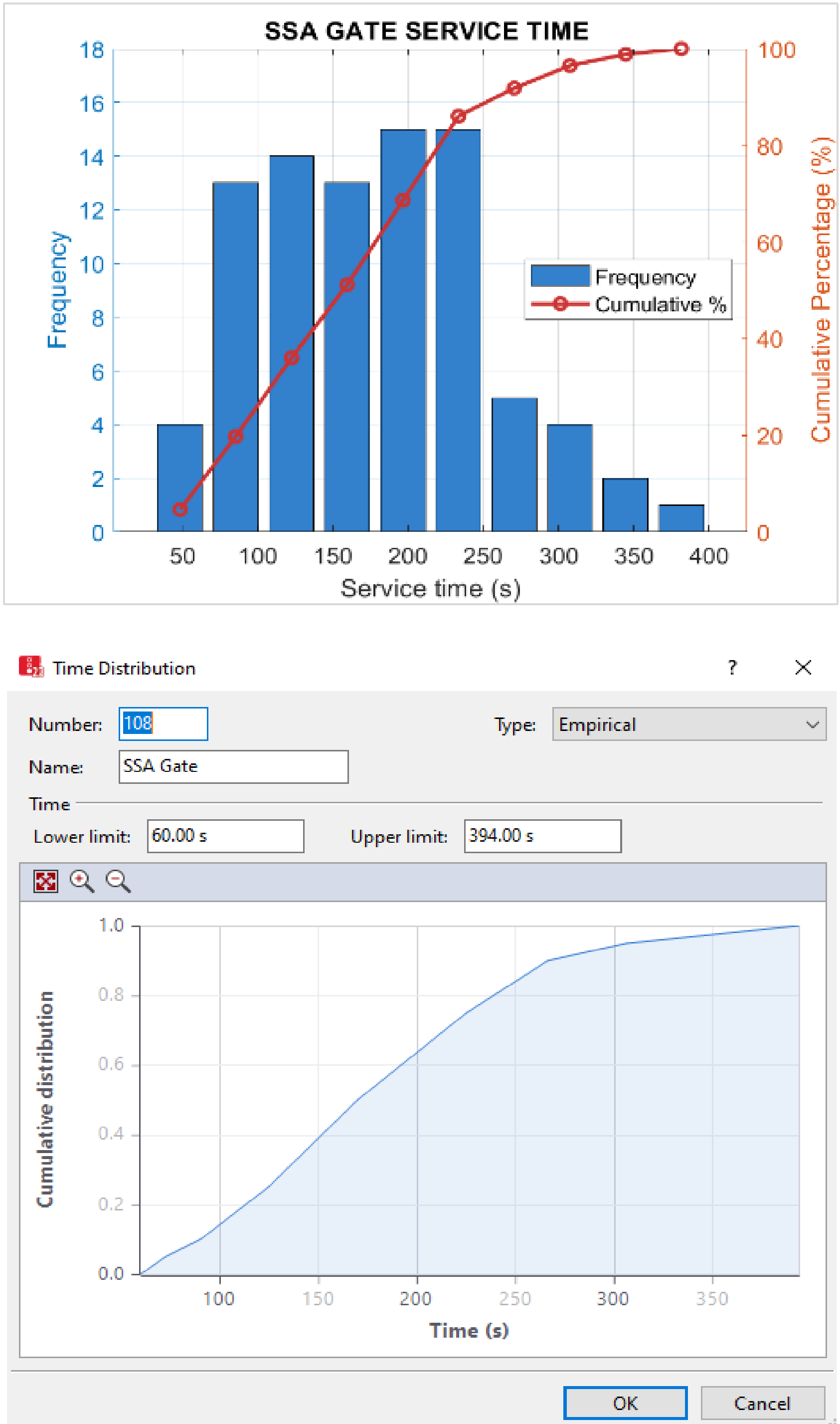


Figure 4-3 Frequencies and cumulative curves of service times at SSA Gate.

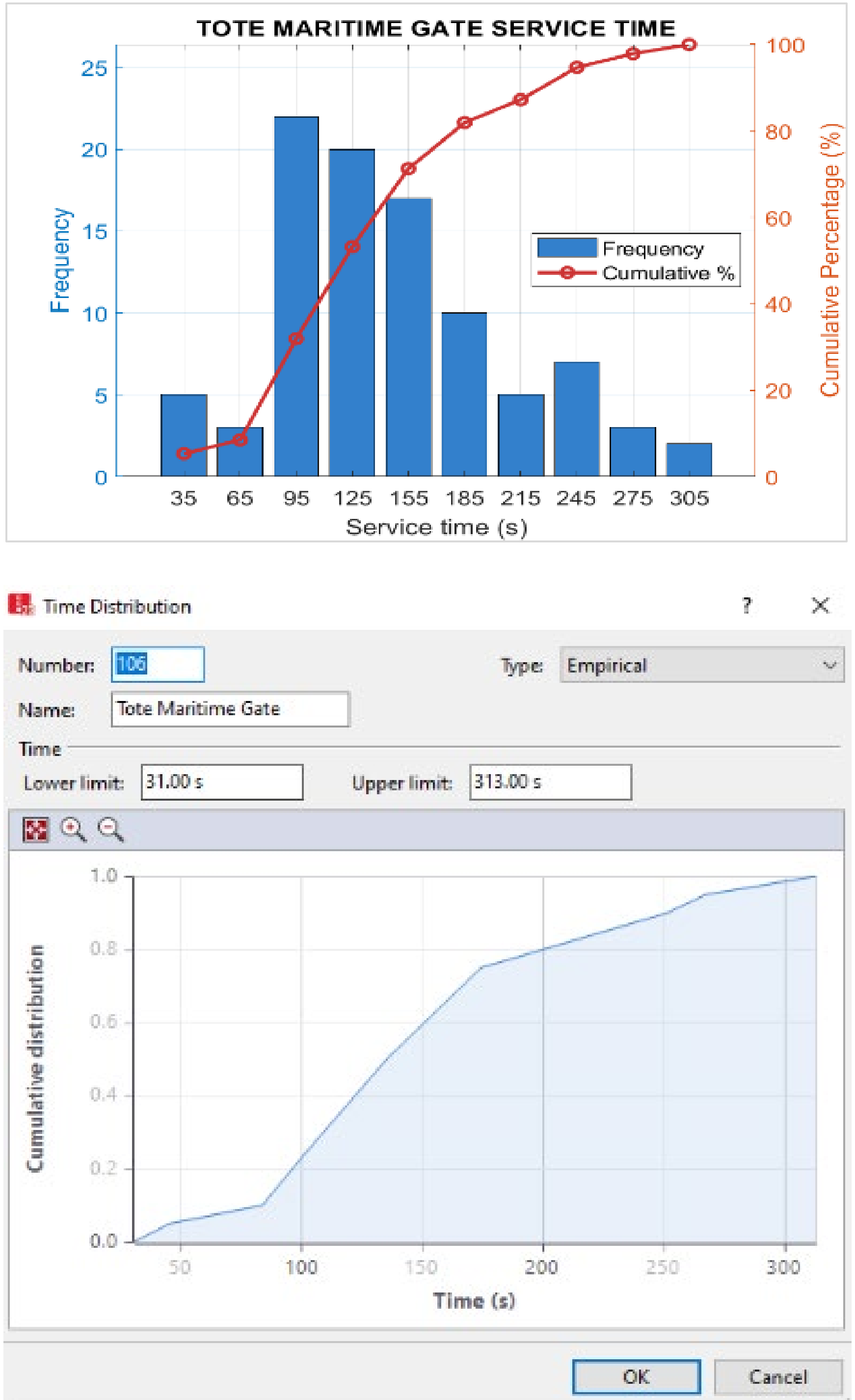
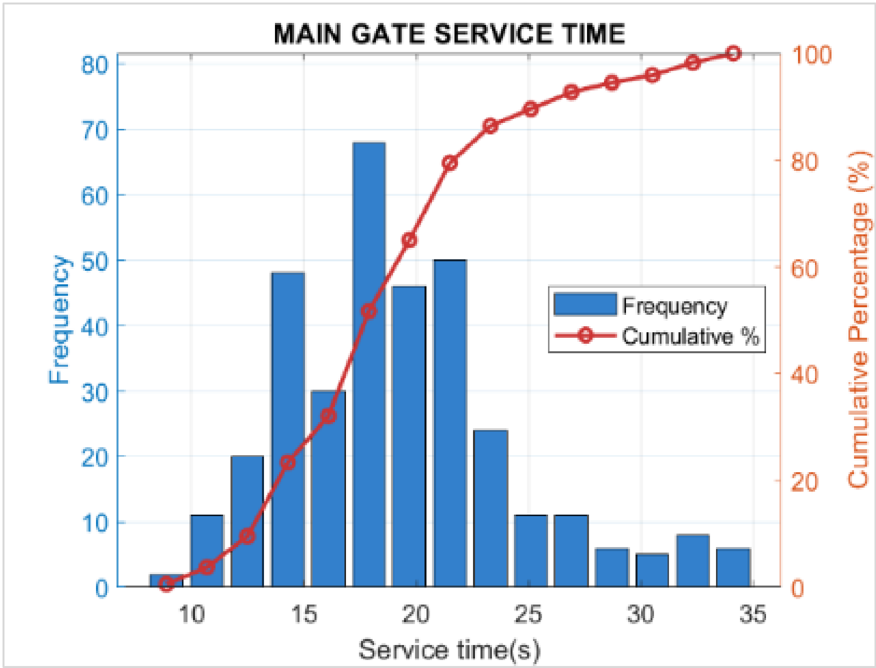


Figure 4-4 Frequencies and cumulative curves of service times at Tote Maritime Gate



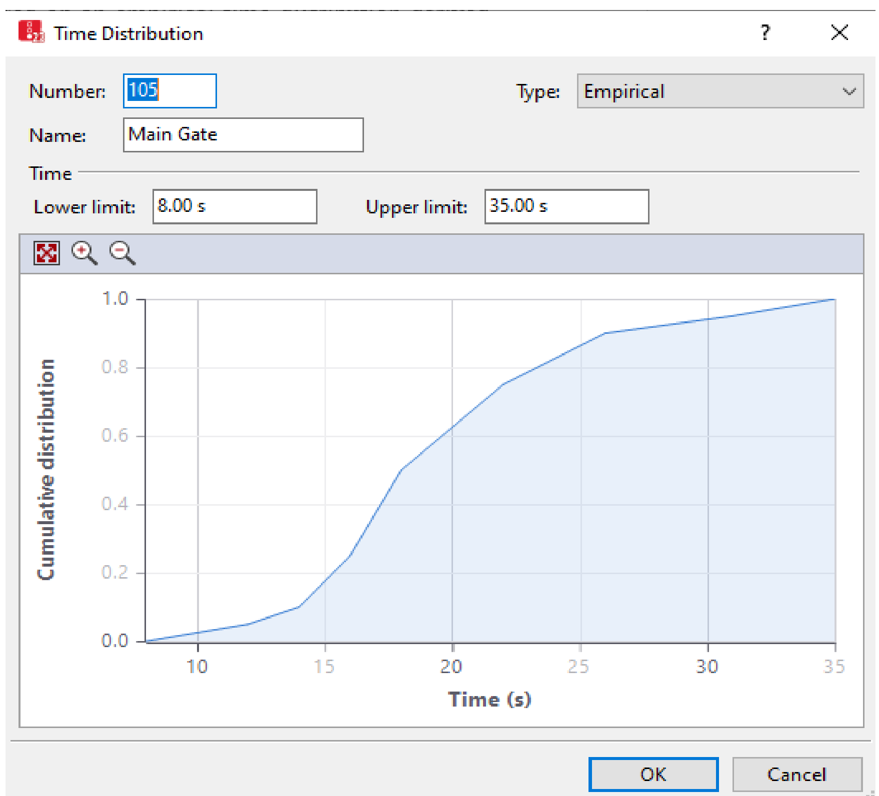


Figure 4-5 Frequencies and cumulative curves of service times at the Main Gate

4.1.1.6 Traffic demand

The next stage involved loading traffic volumes into the model using VISSIM's vehicle input and vehicle composition features. Fifteen-minute volumes, derived from a profile of the balanced peak hour volumes, were coded according to Department recommendations (FDOT, 2021). To ensure the model depicted the buildup, presence, and dissipated congestion, a one-hour pre-peak and post-peak period was added to the simulation, along with a thirty-minute warm-up period to allow vehicles to be fed into the network. This brought the total simulation period to 3.5 hours.

Loading factors were used to convert the balanced peak-hour volumes into pre-peak, peak, and post-peak hour volumes (Table 4-2). These loading factors were developed based on time-slicing factors obtained from distributing hourly traffic volumes observed in the field (Florida Traffic Online).

Table 4-2 Hourly volume conversion factor

	Simulation Time (Seconds)	15 minutes	Hourly
Seed Time	0-900	18.0%	41.5%
	900-1800	23.5%	
Pre-peak Hour	1800-2700	19.3%	71.8%
	2700-3600	14.0%	
	3600-4500	19.0%	
	4500-5400	19.6%	
Peak Hour	5400-6300	19.7%	100.0%
	6300-7200	24.4%	
	7200-8100	31.2%	
	8100-9000	24.8%	
Post-peak Hour	9000-9900	15.4%	67.8%
	9900-10800	20.5%	
	10800-11700	16.3%	
	11700-12600	15.6%	

The traffic demand volumes used as inputs for the model are detailed in the appendix. Since the network included several access points in addition to the intersections of interest, traffic volumes for these access points were also taken into account. Vehicle compositions were coded based on the observed vehicle mix in the terminal, including heavy goods vehicles (HGV), passenger cars, and freight trains. The North American Default.inpx was used to accurately reflect the composition of vehicle fleets, including the make and model composition. HGVs were coded using the North American fleet model, with adjustments made based on field observations. The freight train was modelled using an imported 2D/3D rail model.

4.1.1.7 Vehicle routes

Static routes were defined to establish vehicle routes in the network. The traffic volumes were coded as traditional intersection-to-intersection turning movement routing decisions. However, at closely spaced intersections, static routes were combined to create more realistic turning movements. Each routing decision was positioned as far upstream on the link as possible to allow vehicles to adjust their paths sooner, reducing the likelihood of sudden lane changes or last-minute maneuvers. The directional split between various destinations was determined based on turn movement counts.

To simulate unique port operations not explicitly included in VISSIM, such as gate closures during breaks and specific vehicular maneuvers, VISSIM's COM API was utilized. A traffic signal was set up at the gate location, and a signal state control algorithm was developed in Python and applied using event-based scripts. At certain locations, drivers were observed to queue along the two-way left-turn lane to avoid obstructing the flow of traffic on the main road. These behaviors were simulated by coding a vehicle routing decision change algorithm using the COM interface.

4.2 Base model verification

Base model verification or error checking followed base model development. This was done to identify and eliminate any errors in the network coding before proceeding with calibration. The verification process was performed as per the guidelines provided in the VISSIM verification checklist detailed in Table 4-3 (FDOT, 2021).

4.2.1 Software verification

The software was reviewed to identify and resolve any runtime or RBC warnings and errors. Any detected errors were systematically addressed.

Table 4-3 Model verification (error checking) process checklist (FDOT, 2021)

Error Type	**Description**	**Check**
Software	Verify no runtime or syntax error occurs in the Protocol Window	
	Review the error file (.err) for any errors or runtime warnings that affect simulation results	
	Review RBC errors or warnings	
Model run parameters	Review the temporal boundary limit to confirm it matches the approved methodology	
	Verify initialization period is at least equal to twice the time to travel the entire network	
Network	Verify the spatial boundary limit against the approved methodology	
	Check basic network connectivity.	
	Verify the background image has been properly scaled	
	Verify link geometry matches lane schematics	
	Check link types for appropriate behavior parameters	
	Check for prohibited turns, lane closures and lane restrictions at intersections and on links	
	Check and verify traffic characteristics on special use lanes against general use lanes	
Demand and routing	Verify coded volume and vehicle mix/traffic composition	
	Check HOV vehicle type and occupancy distribution as appropriate	
	Check routing decision including connector look back distances	
	Verify O-D matrices and their placement in the network	
Control	Check and verify the intersection control type and data are properly coded. Verify vehicles are reacting properly to the controls	
	Check ramp meter control type and data	
	Check conflict area settings	
Traffic operations and management data	Verify bus operations—routes, dwell time	
	Check parking operations	
	Verify pedestrian operations and delays	
Driver and Vehicle characteristics	Check if driver behavior adjustments are necessary in saturated conditions	
	Verify no lane changes occur in unrealistic locations and vehicles make necessary lane changes upstream in the appropriate location	
	Verify average travel speed reasonably match field conditions	
Animation	Review network animation with the model run at low demand levels—check for unrealistic operational characteristics such as congestion and erratic vehicle behaviors	
	Review reasonableness of the model against data coding, route assignment and lane utilization	
	Compare model animation to field characteristics	
	Verify all turn bays are fully utilized and they are not blocked by through vehicles	
	Verify there are no vehicles turning at inappropriate time or locations	

4.2.2 Network verification

The background image used for coding network geometry was verified to ensure it was scaled correctly. All links were examined to confirm that the geometry aligned with lane schematics and that appropriate link behavior parameters had been set. Additionally, checks were conducted to ensure that any lane change restrictions, closures, or prohibited turns at intersections and links were incorporated into the network

The coded data — including traffic demand volume, vehicle composition, vehicle types, and routing decisions — were reviewed and any errors identified were addressed. Additionally, the network was checked to verify that vehicles executed necessary lane changes upstream at the appropriate locations.

4.2.3 Animation verification

The simulation animation was reviewed to ensure that conflict handling and signal controls were operating as intended. Any errors identified were corrected.

4.3 Base model calibration and validation

After completing error checking, the next stage was model calibration. Base model calibration ensures that the traffic simulation accurately reflects real-world observations. This process involves comparing simulated values for selected measures of effectiveness (MOEs) with corresponding field values and making necessary adjustments to model parameters to replicate field conditions. The MOEs chosen for this study were speed, travel time, and volume.

VISSIM uses random seed numbers in simulations to reflect the stochastic nature of traffic flow. The random seed number influences several properties in the simulation, including the type of vehicle entering the simulation, lane usage, driver aggressiveness, and vehicle interactions in the network (Russo, 2008). To minimize the impact of randomness on the results, simulations are run multiple times with different random seed numbers, and the average results are reported.

The minimum number of simulation runs needed to reach a specific confidence level for the mean of the performance measure is calculated using Equation (2) (FDOT, 2021)

$$n = \left[\frac{s * t_{\propto/2}}{\mu * \varepsilon}\right]^2 \tag{2}$$

Where:

n is the required number of simulations runs,

s is the standard deviation of the traffic performance measure based on previously conducted simulation runs,

$t_{\alpha/2}$ is the critical value of a two-sided Student's t-statistic, at the level of confidence α and n-1 degrees of freedom,

ε is the tolerable error, specified as a fraction of the μ and

μ is the mean of the system performance measure.

To obtain a sample mean and standard deviation for use in equation 2, simulation results from ten preliminary runs, each with a different seed number were used. The results from the ten simulation runs are shown in Table 4-4.

Table 4-4 Average value of MOEs for preliminary analysis.

Simulation Run	Seed Number	Average		
		Density (Veh/mi/ln)	Speed (mph)	Volume (vph)
1	42	10.14	34.97	354.73
2	43	10.49	33.73	353.81
3	44	10.79	34.53	372.63
4	45	10.24	34.03	348.36
5	46	10.88	33.58	365.37
6	47	10.57	33.01	348.86
7	48	11.17	33.16	370.45
8	49	9.73	35.49	345.17
9	50	12.55	32.53	408.26
10	51	11.66	33.17	386.81
Average		10.82	33.82	365.44
Standard deviation		0.82	0.94	19.98
Minimum		9.73	32.53	345.17
Maximum		12.55	35.49	408.26

Traffic volume was chosen as the traffic performance measure for this preliminary analysis. At a 95% confidence level (α = 0.05) with 9 degrees of freedom (n-1), the critical value of the two-sided t-statistic ($t\alpha/2$) was determined to be 2.262. Using a recommended tolerable error (ε) of 10% (FDOT, 2021), a mean value (μ) of 365.44, and a standard deviation (s) of 19.98, the minimum number of simulation runs (n) required was 2. However, ten simulation runs were adopted as recommended by the FDOT Traffic Analysis Handbook.

Before adjusting the default parameters, traffic volume and speed data were collected from VISSIM and compared to field conditions. Not all calibration targets, as outlined in the FDOT Traffic Analysis Handbook (Table 4-5), were achieved with the default parameters. Therefore, calibration was performed by iteratively adjusting default parameters, including car-following and lane change behavior parameters.

Table 4-5: Calibration targets (FDOT, 2021)

Calibration item	**Calibration Target/Goal**
Capacity	Simulated capacity to be within 10% of the field measurements.
Traffic Volume	Simulated and measured link volumes for more than 85% of the links to be: Within 100 vph for volumes less than 700 vph Within 15% for volumes between 700 vph and 2700 vph Within 400 vph for volumes greater than 2700 vph.
	Simulated and measured link volumes for more than 85% of links to have a GEH statistic value of five (5) or lower.
	Sum of link volumes within the calibration area to be within 5%.
	Sum of link volumes to have a GEH statistic value of five (5) or lower.
Travel Time (includes Transit)	Simulated travel time within ±1 minute for routes with observed travel times less than seven (7) minutes for the routes identified in the data collection plan.
	Simulated travel time within ±15% for routes with observed travel times greater than seven (7) minutes for the routes identified in the data collection plan.
Speed	Modeled average link speeds to be within the ±10 mph of field-measured speeds on at least 85% of the network links.
Intersection Delay	Simulated and field-measured link delay times to be within 15% for more than 85% of cases.
Queue Length	The difference between simulated and observed queue lengths to be within 20%.
Visualization	Check consistency with field conditions of the following: on-ramp and off-ramp queuing; weaving maneuvers; patterns and extent of queue at intersection and congested links; lane utilization/choice; locations of bottlenecks; etc.
	Verify there are no unrealistic U-turns or vehicles exiting and reentering the network.

4.3.1 Lane change distance

Lane change distance is the distance at which vehicles begin to change into the lane(s) leading to their designated connector. Increasing this value gives vehicles more time to process and execute the lane change smoothly. If the lane change distance is too low, vehicles may not have sufficient time to switch lanes into the connector before reaching the emergency stop distance (distance before the connector at which a vehicle stops if it cannot reach the lane before the connector). By default, the lane change distance in VISSIM is set to 200m (656.2 feet). In real-world driving conditions, a vehicle driving on a motorway under normal traffic flow typically changes into the correct lane 500 to 6,560 feet (0.1 to 1.24 miles) before their exit, depending on the driver's familiarity with the road and the available road space (Karakikes et al., 2017). The lane change distance for all connectors within the network was set to 0.5 miles, allowing vehicles to initiate lane change decisions earlier, more accurately representing natural driving patterns.

4.3.2 Desired speed calibration

Although the desired speed of vehicles was set using the posted speed limit, the actual speed within the network, particularly on roadways with multiple entrances to parking lots and yards, could be lower due to frequent slowdowns caused by vehicles entering and exiting these areas. Thus, using the observed average field speed to set the link speed was more reasonable at Intermodal Drive/William Mills Street. A sample of individual vehicle speeds at the peak hour period was used to determine the average speed.

4.3.3 Car-following and lane change behavior calibration

VISSIM uses two car-following models, Wiedemann 99 and Wiedemann 74. The Wiedemann 74 car-following model, which is commonly used for modeling arterial traffic, was selected for this study.

The Wiedemann 74 car-following model is represented by Equation (3).

$$d = a_x + b_x \tag{3}$$

Where:

- d = Desired safety distance
- a_x = Average standstill distance

- $b_x = (b_{x_{add}} + b_{x_{mult}} \times z)\sqrt{v}$
- v = Vehicle speed
- $0 \le z \ \le 1,\ z \sim N(0.5, 0.15^2)$

The average standstill distance defines the average desired distance between two vehicles, while the additive and multiplicative part of the safety distance are used to compute the desired safety distance, which is the distance from the front edge of a vehicle to the rear edge of the vehicle directly ahead (PTV GROUP, 2022). Adjustable parameters selected for calibration, their acceptable ranges according to the FDOT Traffic Analysis Handbook, and calibration parameters adopted are shown in Table 4-6.

Table 4-6 Calibrated parameters and suggested Range - FDOT traffic analysis handbook

Calibration Parameter	**Default Value**	**Suggested Range**	**Calibrated value**
Car-following			
Average Standstill distance	6.56 ft	> 3.28 ft	8ft
Additive part of Safety distance	2.0	1.0 to 3.5	2
Multiplicative part of safety distance	3.00	2.00 to 4.50	3
Lane Change			
Maximum deceleration	-13.12 ft/s2 (Own) -9.84 ft/s2 (Trail)	-15 to -12 ft/s2 -12 to -8 ft/s2	-13.12 ft/s2 -9.84 ft/s2
-1 ft/s2 per distance	200 ft (Freeway) 100 ft (Arterial)	> 100 ft > 50 ft	100ft
Accepted deceleration	-3.28 ft/s2 (Own) -1.64 ft/s2 (Trail)	-2.5 to -4 ft/s2 -1.5 to -2.5 ft/s2	-3.28 ft/s2 -1.64 ft/s2
Waiting time before diffusion	60s	> 60s	300s
Minimum headway (front/rear)	1.64 ft	1.5 to 6 ft	1.64ft
Safety distance reduction factor	0.6	0.1 to 0.9	0.6
Lane Change	656.2 ft	Depends on field observations	2640-3000ft
Emergency stop	16.4 ft	Depends on field observations	16.4ft
Vehicle routing decisions look ahead	Unchecked	Checked	Checked

4.3.4 Calibration results

4.3.4.1 Volume

The Geoffrey E. Havers (GEH) statistic was used to compare simulated volumes to field-collected volumes. The GEH statistic is calculated using Equation (4).

$$GEH = \sqrt{2 * \frac{(\mathrm{M} - \mathrm{C})^2}{\mathrm{M} + \mathrm{C}}} \tag{4}$$

Where M is the simulation model volume, and C is the field counted volume. According to the FDOT Traffic Analysis Handbook, the simulated and the measured link volumes for more than 85 percent of links should have a GEH statistical value of 5 or lower. Additionally, the sum of link volumes within the calibration area should be within 5% and the sum of link volumes should have a GEH statistic value of 5 or lower.

The simulated and measured link volumes for all the links had a GEH statistic lower than 5. The overall GEH for all link volumes was 1.93, with a difference of 1.0% between the simulated and measured volumes (Table 4-7).

Table 4-7 Volume calibration results summary

All links volume	**Total input volume**	**Total simulated volume**	**Difference**
	31116	30777	-338.71
Percent Difference	-1%	GEH	1.93
Sum of Link volumes within 5% and GEH < 5	Yes		
Target	Volume <700 vph (±100vph)	700 < Volume < 2700 (±15%)	GEH <5
Percent of links meeting target	100%	100%	100%
Volume target met for > 85% of links and GEH for >85% of links <5	Yes		

4.3.4.2 Travel time

Vehicle travel time segments were established along the main routes in both directions to assess travel time. After calibration, the obtained travel times were compared to the average travel times obtained from a sample of vehicle travel times recorded by the BlueTOAD devices. In areas with limited matches, travel time information was extracted from CCTV footage recorded on-site. According to the FDOT Traffic Analysis Handbook, for routes with observed travel times of less than seven minutes, the simulated travel times should be within one minute of the observed value. For routes with observed travel times exceeding seven minutes, the simulated travel time should be within 15% of the observed travel time.

The travel times for the primary routes were within the ±1 minute threshold specified in the handbook (Table 4-8, Table 4-9). Figures 4-6 and 4-7 present the field and simulated travel times, with the upper and lower boundaries determined by one standard deviation from the mean field travel time.

Table 4-8 Travel time results for direction 1

Segment	Distance [mi]	Field TT [sec]	1SD		Simulation TT [sec]	Threshold met
			Upper	Lower		
Intermodal Dr./Blount Island Blvd. to Dave Rawls Blvd.	0.16	35	47	23	20.30	Yes
Heckscher Dr. to Dave Rawls Blvd./Blount Island Blvd.	0.46	46	58	34	49.10	Yes
Blount Island Blvd./Dave Rawls Blvd. to Gate	0.49	161	233	89	179.90	Yes
Gate to SSA Atlantic	0.78	191	268	114	222.97	Yes
Blount Island Blvd./Intermodal Dr. to William Mills St.	0.23	27	30	24	26.25	Yes
William Mills St. Eastbound	0.23	32	41	23	25.11	Yes

Table 4-9 Travel time results for the opposite direction

Segment	Distance [mi]	Field TT [sec]	1SD		Simulation TT [sec]	Threshold met
			Upper	Lower		
Dave Rawls Blvd. to Intermodal Dr./Blount Island Blvd.	0.16	37	53	21	30.59	Yes
Dave Rawls Blvd./Blount Island Blvd. to Heckscher Dr.	0.46	45	53	37	48.37	Yes
Gate to Blount Island Blvd. /Dave Rawls Blvd.	0.49	115	138	92	99.40	Yes
SSA Atlantic to Gate	0.78	103	130	76	102.01	Yes
Blount Island Blvd./William Mills St. to Intermodal Dr.	0.23	29	35	23	33.33	Yes
William Mills St. Westbound	0.23	32	39	25	29.47	Yes

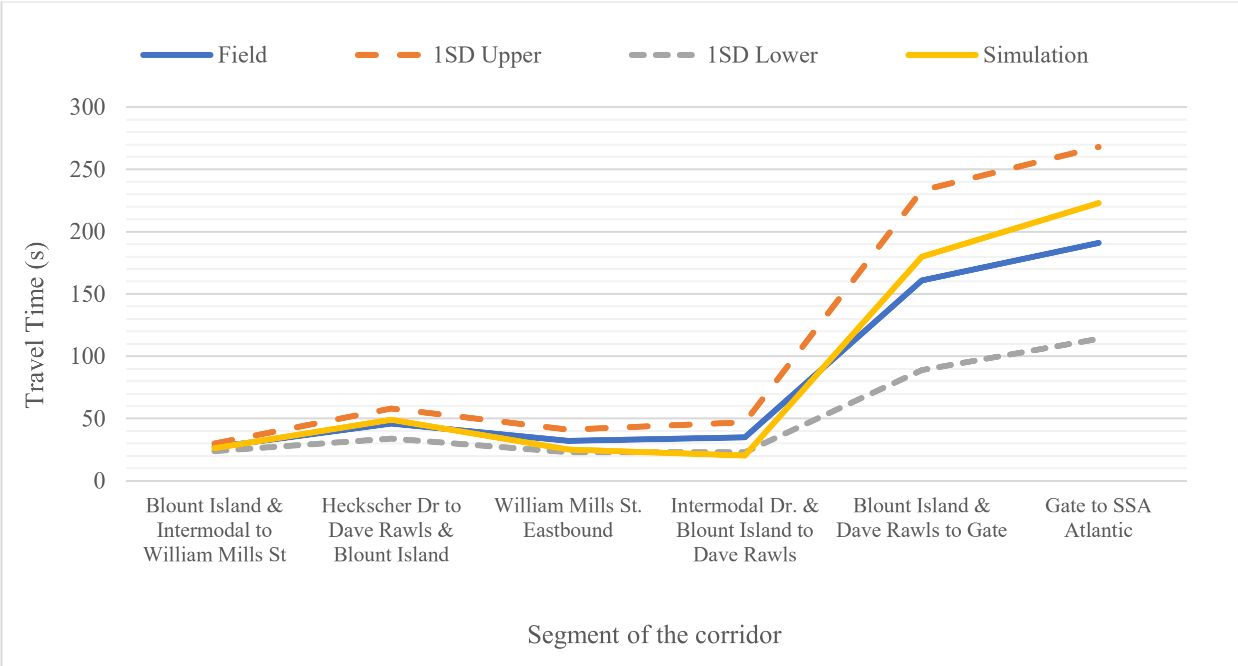


Figure 4-6 Travel time results for direction 1

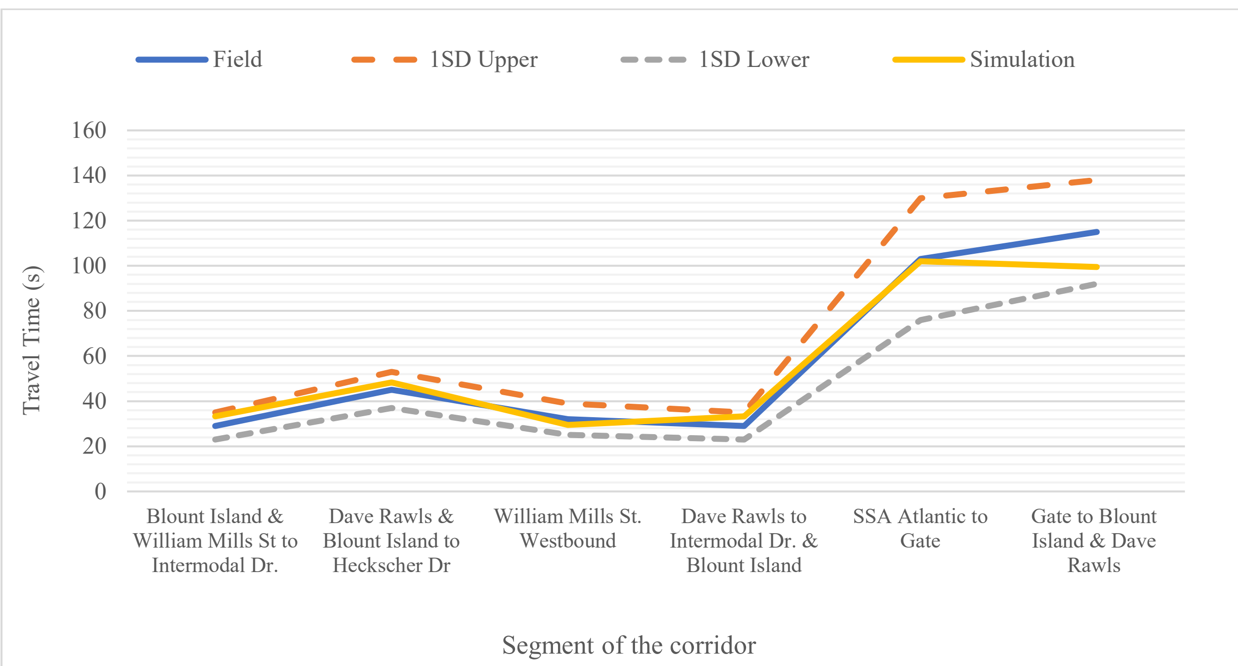


Figure 4-7 Travel time results for the opposite direction

4.3.4.3 Speed

According to the FDOT Traffic Analysis Handbook, the average link speed of at least 85% of the network links should be within 10 mph of the speeds measured using BlueTOAD devices and CCTV footage. Tables 4-10 and 4-11 compare the simulated and field-measured speeds for the road segments. All the speeds in the segments are within the specified threshold. Figures 4-8 and 4-9 present the field and simulated speeds with the upper and lower boundaries determined by one standard deviation from the average field speed.

Table 4-10 Speed results summary for direction 1

Segment	**Field (mph)**	**(+/-) 10mph**		**1SD**		**Simulation (mph)**	**Threshold met**
		Upper	Lower	Upper	Lower		
Intermodal Dr./Blount Island Blvd. to Dave Rawls Blvd.	19	29	9	27	11	24.92	Yes
Heckscher Dr. to Dave Rawls Blvd./Blount Island Blvd.	38	48	28	47	29	37.09	Yes
Blount Island Blvd./Dave Rawls Blvd. to Gate	19	29	9	27	11	18.87	Yes
Gate to SSA Atlantic	21	31	11	31	11	20.10	Yes
Blount Island Blvd./Intermodal Dr. to William Mills St.	31	41	21	35	27	29.09	Yes
William Mills St. Eastbound	28	38	18	34	22	26.75	Yes

Table 4-11 Speed results summary for the opposite direction

Segment	**Field (mph)**	**(+/-) 10mph**		**1SD**		**Simulation (mph)**	**Threshold met**
		Upper	Lower	Upper	Lower		
Dave Rawls Blvd. to Intermodal Dr./Blount Island Blvd.	19	29	9	30	8	21.03	Yes
Dave Rawls Blvd./Blount Island Blvd. to Heckscher Dr.	38	48	28	45	31	35.15	Yes
Gate to Blount Island Blvd. /Dave Rawls Blvd.	19	29	9	24	14	23.57	Yes
SSA Atlantic to Gate	27	37	17	36	18	26.59	Yes
Blount Island Blvd./William Mills St. to Intermodal Dr.	30	40	20	36	24	24.97	Yes
William Mills St. Westbound	27	37	17	33	21	26.81	Yes

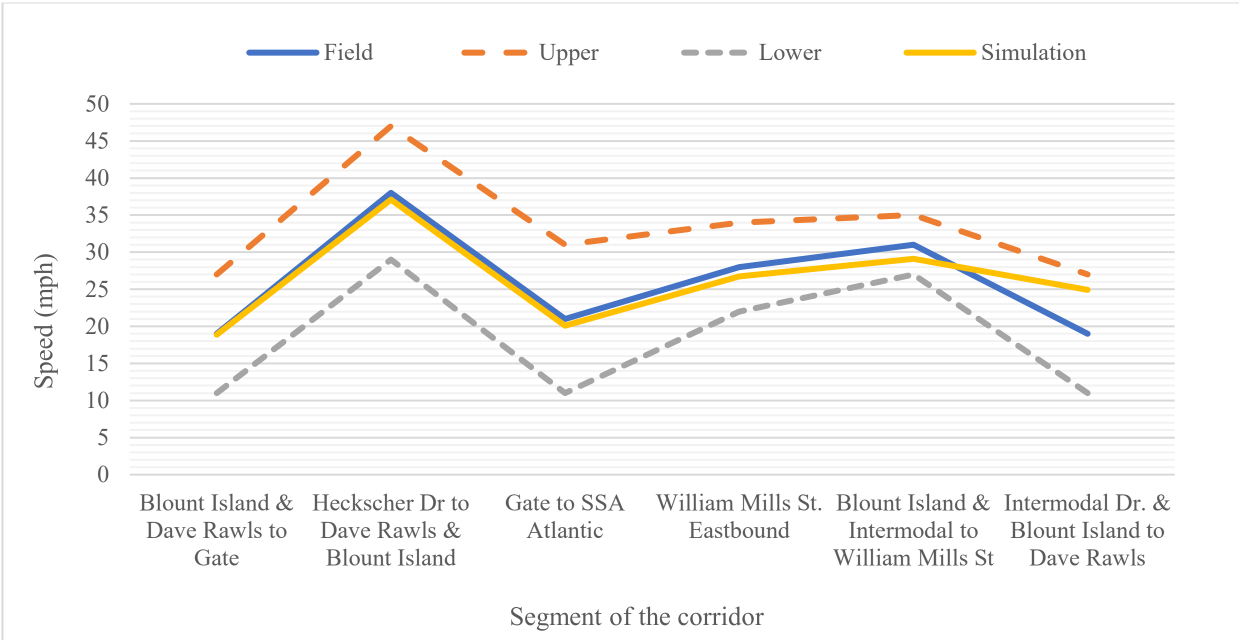


Figure 4-8 Speed results for direction 1

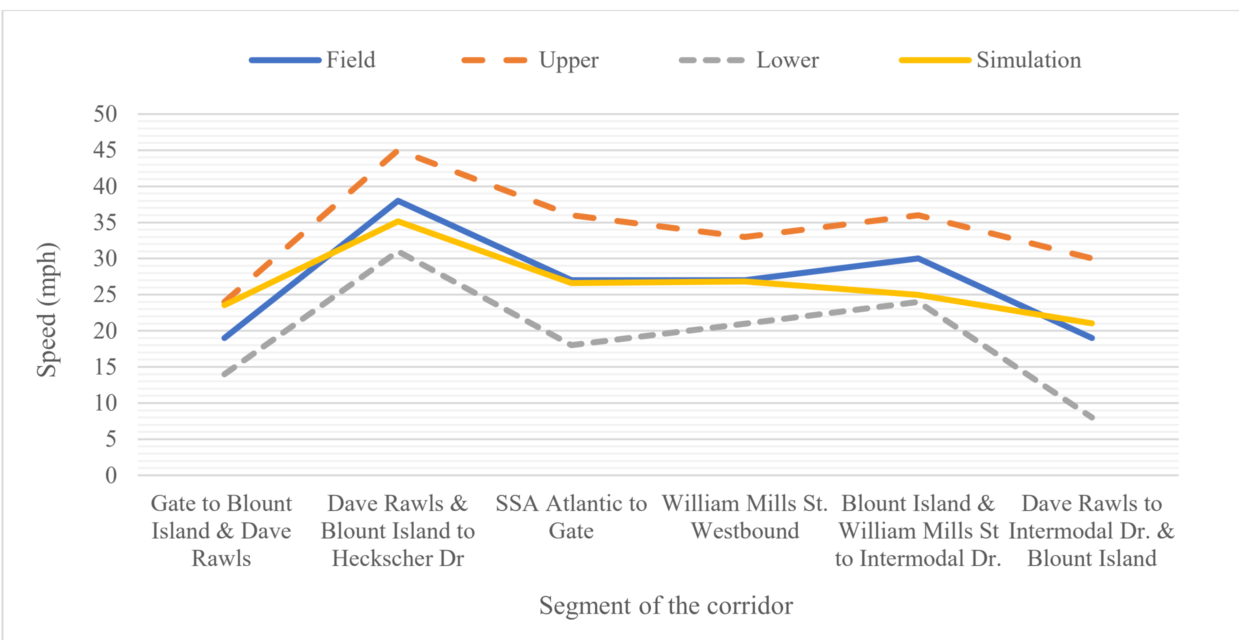


Figure 4-9 Speed results for the opposite direction

4.4 Existing conditions

After calibrating the model, ten simulation runs were performed, each run lasting 3 hours and 30 minutes (12,600 seconds). The MOEs for the existing condition were obtained from VISSSIM. VISSIM LOS is evaluated using total vehicle delay, which includes control delay, stopped delay, and additional delays from factors such as deceleration for turning movements. The HCM defines LOS based solely on control and stopped delays linked to traffic control devices. The delay values obtained from VISSIM were compared to the LOS thresholds as defined in the HCM and the HCM-Analogous LOS provided. Tables 4-12 and 4-13 illustrate the HCM thresholds for signalized and unsignalized intersections.

Table 4-12 Signalized intersection LOS

LOS	Signalized Intersection Average Delay (s/veh)
A	≤ 10
B	> 10–20
C	> 20–35
D	> 35–55
E	> 55–80
F	> 80

Table 4-13 Unsignalized intersection LOS

LOS	Unsignalized Intersection Average Delay (s/veh)
A	≤ 10
B	> 10–15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

Table 4-14 shows the existing conditions simulation-based delay and Highway Capacity Manual (HCM)-Analogous Level of Service (LOS) at the intersections.

Table 4-14 Existing condition intersection delay, queue length, and HCM-analogous LOS

Intersection	Vehicles	Average Delay (s/veh)	Average Queue Length (ft)	LOS	Movement	Average Delay (s/veh)	Average Queue Length (ft)	LOS
Heckscher Dr./Dave Rawls Blvd.	1294	24.04	115.48	C	Dave Rawls Blvd. NBT	8.07	13.23	A
					Dave Rawls Blvd. NBR	6.07	13.23	A
					Dave Rawls Blvd. SBT	0.58	0	A
					Heckscher Dr. EBT	74.48	333.22	E
Heckscher Dr./Blount Island Blvd.	858	3.7	4.83	A	Blount Island Blvd. NBL	11.61	0.7	B
					Blount Island Blvd. NBR	6.39	0.21	A
					Heckscher Dr. EBT	2.44	5.54	A
					Heckscher Dr. EBR	4.48	0	A
					Heckscher Dr. WBL	4.25	8.81	A
					Heckscher Dr. WBT	4.09	13.7	A
Dave Rawls Blvd./Blount Island Blvd.	969	8.33	6.07	A	Dave Rawls Blvd. SBT	6.41	19.84	A
					Dave Rawls Blvd. SBL	14.83	7.61	B
					Blount Island Blvd. SBR	20.08	5.12	C
					Blount Island Blvd. SBL	20.25	7.12	C
					Dave Rawls Blvd. NBT	5.37	11.29	A
					Dave Rawls Blvd. NBR	4.09	2.06	A
Dave Rawls Blvd./Intermodal Dr.	787	5.34	3.12	A	Dave Rawls Blvd. NBT	0.09	0	A
					Dave Rawls Blvd. NBL	3.02	0.29	A
					Dave Rawls Blvd. SBT	8.2	0	A
					Dave Rawls Blvd. SBR	0.81	0	A
					Intermodal Dr. EBR	9	3.72	A
					Intermodal Dr. EBL	10.45	11.59	B
Dave Rawls Blvd./William Mills St.	575	9.07	6.29	A	Dave Rawls Blvd. SBL	10.36	7.81	B
					Dave Rawls Blvd. SBR	10.83	8.43	B
					William Mills St. EBL	12.93	19.76	B
					William Mills St. EBT	0.76	1.72	A
					William Mills St. WBR	1.05	0	A
					William Mills St. WBT	7.99	0	A
Blount Island Blvd./William Mills St.	234	11.55	2.31	B	Blount Island Blvd. SBL	12.72	2.66	B
					Blount Island Blvd. SBR	10.36	4.51	B
					William Mills St. EBL	13.11	8.73	B
					William Mills St. EBT	12.03	8.73	B
					William Mills St. WBR	9.74	0.36	A
					William Mills St. WBT	10.84	0	B
Blount Island Blvd./Intermodal Dr.	449	9.32	3.95	A	Blount Island Blvd. NBR	10.08	0.38	B
					Blount Island Blvd. NBL	13.48	11.98	B
					Blount Island Blvd. NBT	12.95	15.58	B
					Blount Island Blvd. SBT	10.16	5.32	B
					Blount Island Blvd. SBL	7.94	5.26	A
					Blount Island Blvd. SBR	12.26	0.98	B
					Intermodal Dr. WBR	10.72	0.75	B
					Intermodal Dr. WBT	16.64	0.98	C
					Intermodal Dr. WBL	12.08	10.36	B
					Intermodal Dr. EBT	9.28	2.03	A
					Intermodal Dr. EBR	4.94	2.03	A
					Intermodal Dr. EBL	4.25	2.03	A

5 TRAFFIC FORECASTING

5.1 Historic data

Historic data on container volumes (TEUs) handled at JAXPORT from year 2004 to 2024 were retrieved from JAXPORT's annual reports and analyzed to project future truck traffic. This analysis was conducted under the assumption of a positive correlation between container volume growth and increased truck traffic. A time-series plot of container volumes by year is shown in Figure 5-1. The growth pattern showed a strong linear relationship, with a coefficient of determination (R^2) value of 0.88. The R^2 indicates how well the linear regression model explains the variation in container volumes over time. An R^2 of 0.88 indicates that 88% of the variation in container volumes over time is explained by the linear growth model, while only 12% is due to other factors or randomness.

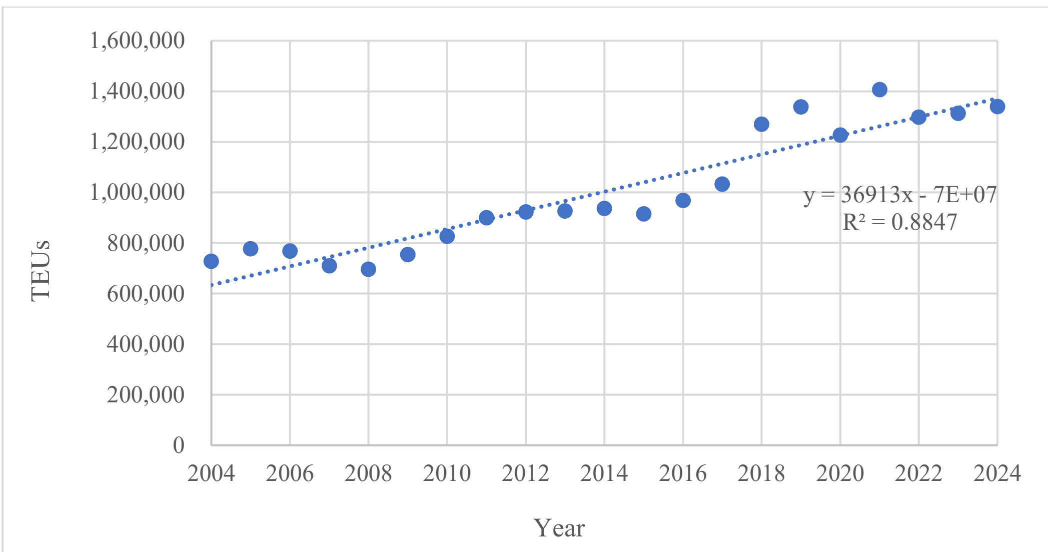


Figure 5-1 Container volumes moved through the port in 20 years

Based on the observed trend, the annual growth factor was calculated as 1.84, corresponding to a yearly growth rate of 0.042, or 4.2% as shown in Equation (5).

$$Growth\ Factor = 1 + (Growth\ Rate\ x\ Number\ of\ Years). \tag{5}$$

This growth rate was compared to the growth rate determined from an analysis of historic Annual Average Daily Traffic (AADT) obtained from Florida Traffic Online. Figure 5-2 shows a plot of AADT by year along the terminal's primary access road, Dave Rawls Boulevard. POV volumes have remained consistent over the past 16 years. However, truck traffic shows a significant increase from 2008 to 2024.

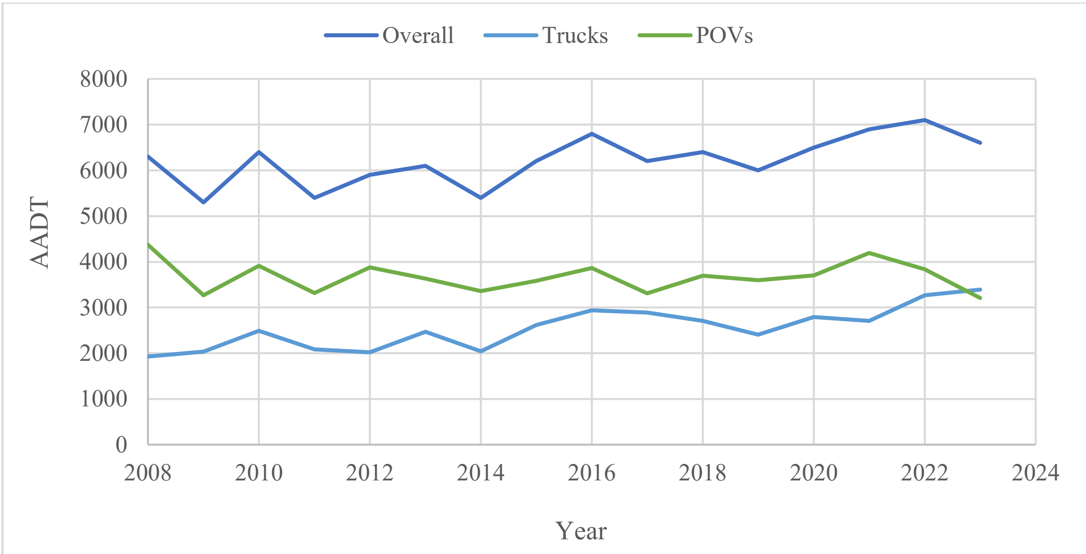


Figure 5-2 Historic AADT along Dave Rawls Blvd.

The FDOT Traffic Trends Analysis Tool was used to calculate the corresponding growth rate for trucks and POVs (Table 5-1).

Table 5-1 Historical AADT trends analysis for (a) trucks and (b) POVs

(a) Historical Trends Analysis (Trucks)

FDOT Site	Location	Years of Historical AADT	Historic Trend Analysis		
			Type	R Square	Annual Growth Rate
#102022	Dave Rawls Blvd.	2008 to 2023	Linear	84.42%	4.12%
			Exponential	86.21%	3.18%
			Decaying Exponential	71.40%	3.68%

(b) Historical Trends Analysis (POVs)

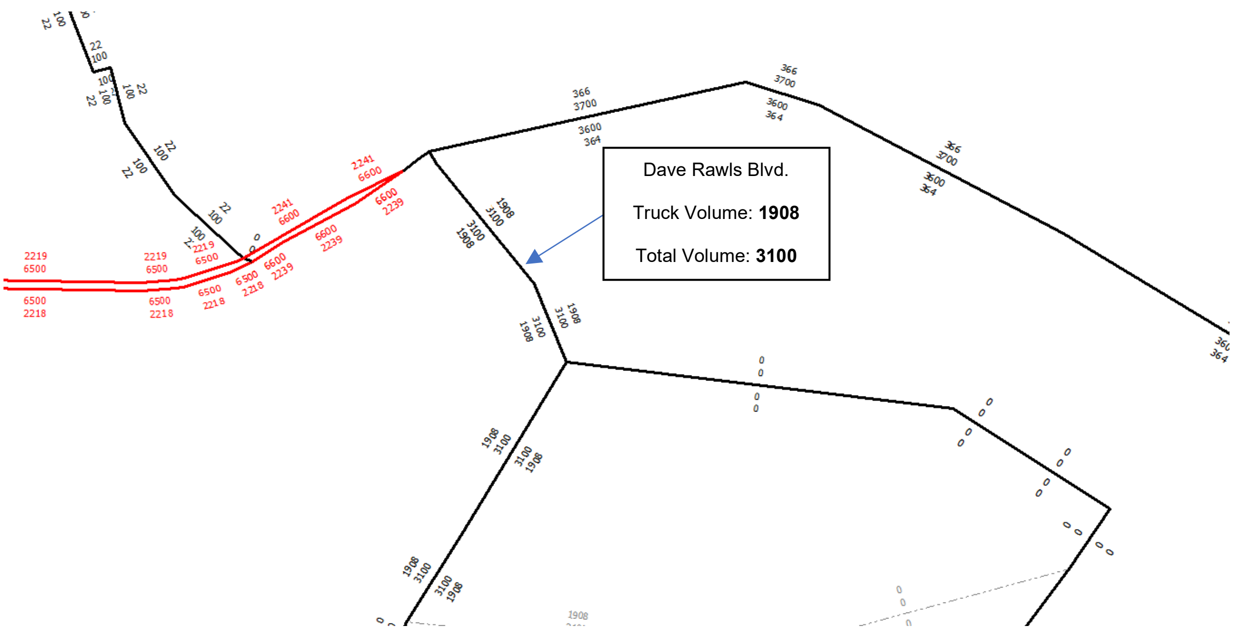
FDOT Site	Location	Years of Historical AADT	Historic Trend Analysis		
			Type	R Square	Annual Growth Rate
#102022	Dave Rawls Blvd.	2008 to 2023	Linear	11.15%	-0.47%
			Exponential	11.04%	-0.47%
			Decaying Exponential	27.58%	-0.83%

Using a linear growth trend, the growth factor for trucks was determined as 4.12%. POVs had a negligible growth rate.

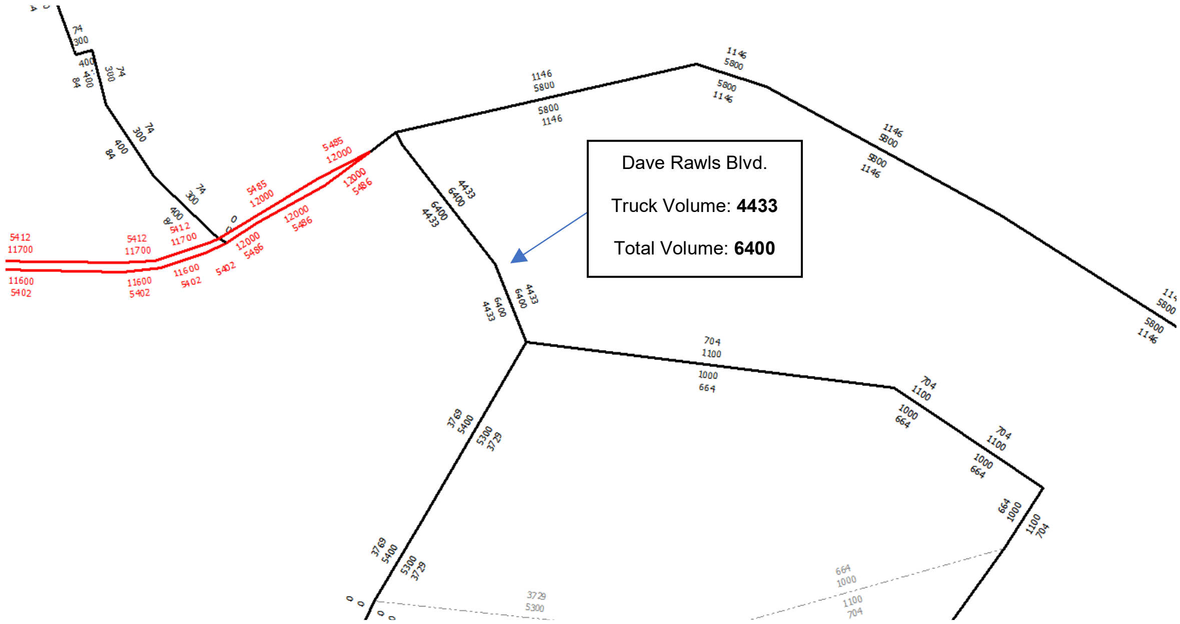
5.2 Future growth and expansion plans

In addition to analyzing historical data, anticipated traffic growth at the regional level and expansion plans at the terminal were also considered. The Northeast Florida Regional Planning Model (NERPM) was utilized to forecast anticipated traffic growth resulting from projected population growth, land use changes, economic activity, and infrastructure development. This travel demand forecasting model was developed to support transportation planning and policymaking across northeast Florida.

Figure 5-3 presents a screenshot of daily truck and total traffic volumes by network link and travel direction, as obtained from the model for the base year 2015 and the horizon year 2045. The traffic volumes along Dave Rawls Boulevard were used to calculate the annual growth rate for trucks and POVs. Using linear growth, the projected future growth rates were determined to be 4.4% for trucks and 2.17% for POVs.



(a) 2015.



(b) 2045

Figure 5-3 Daily traffic volume for (a) base year 2015 and (b) horizon year 2045.

Because the terminal's expansion plans were not accounted for in the regional planning model, the anticipated number of vehicle trips to be generated by the new 340,000 sq ft auto processing facility was estimated using trip generation rates from the ITE Trip Generation Manual (11th Edition) (ITE 2021), under Land Use Code 030 - Intermodal Truck Terminal.

The average rate of 1.97 vehicle trips per 1,000 sq ft during the AM peak hour of adjacent street traffic was assumed. The facility was projected to generate 670 vehicle trips (Table 5-2).

Table 5-2 ITE vehicle trip generation

Land Use Code	Land Use Type	Facility size	Vehicle Trip Ends		
			AM Peak		
			IN	OUT	TOTAL
030	Intermodal Truck Terminal	340,000 sq ft	315	355	670

However, initial projections based on these vehicle trips resulted in unrealistically high traffic volumes on roads directly serving the facility. To address this, historical AADT data from access roads to the current Southeast Toyota facility at the Talleyrand Marine Terminal were analyzed. Based on this comparison, the trip generation estimates from the ITE Trip Generation Manual were adjusted – reduced by 50% – to better reflect observed traffic volumes. This adjustment also accounted for the anticipated increase in facility size following its relocation to BIMT.

The generated trips were manually distributed using existing turning movement counts, with the primary access points being the main gate and the two vehicle berths. Trip generation and distribution were kept constant across all future scenarios.

5.3 Future year "No Build" condition

The conservative values of 4.4% for trucks and 2.17% for POVs and auto-units derived from the travel demand model were applied to establish background traffic growth using Equation (6).

$$p_n = p_o x\ i \tag{6}$$

Where:

- p_n : number of trucks in the future year
- p_o: number of trucks in the base year
- *i*: growth factor = 1+ (G X N)
- *G*: linear annual growth rate, expressed as a decimal
- *N*: number of years beyond the base year

The traffic volume generated by the auto processing facility was added to the forecasted traffic to estimate future year volumes for the years 2030 and 2035. These projected volumes were then applied to the baseline model to develop the future "No-Build" scenario, which served as the new baseline to evaluate potential traffic flow improvement strategies.

The existing roadway geometrics and traffic control features from the baseline model were maintained. Automobile traffic accessing the auto processing facility was assumed to use the overpass located off Intermodal Drive, which was coded in VISSIM as a two-lane, two-way road. In VISSIM, overpasses are created by defining road elevation using the z-coordinate. The z-coordinate for the base level network is zero. To model the overpass, the z-coordinate was set to 18ft. The simulation was run for three and a half hours, and the operational performance of the intersections is presented in Tables 5-3 and 5-4. Under the "No Build" conditions, two intersections

– Dave Rawls Boulevard/Intermodal Drive and Dave Rawls Boulevard/William Mills Street – will operate at LOS F.

Table 5-3 Overall intersection results for existing vs 2030 "No Build vs 2035 "No Build"

Intersection	Existing				2030 "No Build"				2035 "No Build"			
	Vehicles	Average Delay (s/veh)	Average Queue length (ft)	LOS	Vehicles	Average Delay (s/veh)	Average Queue length (ft)	LOS	Vehicles	Average Delay (s/veh)	Average Queue length (ft)	LOS
Heckscher Dr./Dave Rawls Blvd.	1294	24.04	115.48	C	1586	21.17	118.38	C	1668	20.46	118.84	C
Heckscher Dr./Blount Island Blvd.	858	3.7	4.83	A	856	3.79	5.11	A	864	3.97	5.49	A
Dave Rawls Blvd./Blount Island Blvd.	969	8.33	6.07	A	1257	8.47	8.44	A	1297	15.87	26.55	B
Dave Rawls Blvd./Intermodal Dr.	787	5.34	3.12	A	1025	61.28	101.73	F	979	151.79	287.95	F
Dave Rawls Blvd./William Mills St.	575	9.07	6.29	A	604	86.88	300.88	F	577	155.64	632.33	F
Blount Island Blvd./William Mills St.	234	11.55	2.31	B	318	14.19	5.38	B	334	16.07	7.09	C
Blount Island Blvd./Intermodal Dr.	449	9.32	3.95	A	632	10.84	5.21	B	650	21.98	21.55	C

(green)	Light to Moderate Traffic (LOS A – C)
(light yellow)	Heavy Traffic (LOS D)
(orange)	High Congestion (LOS E)
(red)	Severe Congestion (LOS F)

Table 5-4 Intersection results by movement for existing vs 2030 “No Build vs 2035 “No Build”

Intersection	Movement	Existing			2030 “No Build”			2035 “No Build”		
		Average Delay (s/veh)	Average Queue length (ft)	LOS	Average Delay (s/veh)	Average Queue length (ft)	LOS	Average Delay (s/veh)	Average Queue length (ft)	LOS
Heckscher Dr./Dave Rawls Blvd.	Dave Rawls Blvd. NBT	8.07	13.23	A	9.2	22.64	A	9.34	23.77	A
	Dave Rawls Blvd. NBR	6.07	13.23	A	8.49	22.64	A	7.76	23.77	A
	Dave Rawls Blvd. SBT	0.58	0	A	0.68	0	A	1.19	0.24	A
	Heckscher Dr. EBT	74.48	333.22	E	75.35	332.51	E	75.35	332.49	E
Heckscher Dr./Blount Island Blvd.	Blount Island Blvd. NBL	11.61	0.7	B	9.77	0.25	A	10.48	0.36	B
	Blount Island Blvd. NBR	6.39	0.21	A	5.85	0.02	A	6.15	0.05	A
	Heckscher Dr. EBT	2.44	5.54	A	2.29	4.93	A	2.3	4.84	A
	Heckscher Dr. EBR	4.48	0	A	5.03	0	A	5.02	0	A
	Heckscher Dr. WBL	4.25	8.81	A	4.82	10.12	A	5.29	11.04	A
	Heckscher Dr. WBT	4.09	13.7	A	4.54	15.34	A	4.75	16.64	A
Dave Rawls Blvd./Blount Island Blvd.	Dave Rawls Blvd. SBT	6.41	19.84	A	6.61	33.26	A	23.91	164.88	C
	Dave Rawls Blvd. SBL	14.83	7.61	B	15.69	8.96	C	19.22	37.82	C
	Blount Island Blvd. SBR	20.08	5.12	C	21.84	6.2	C	23.63	10.44	C
	Blount Island Blvd. SBL	20.25	7.12	C	22.14	9.37	C	41.01	11.82	E
	Dave Rawls Blvd. NBT	5.37	11.29	A	5.77	9	A	5.87	20.41	A
	Dave Rawls Blvd. NBR	4.09	2.06	A	3.35	7.66	A	4.32	7.85	A
Dave Rawls Blvd./Intermodal Dr.	Dave Rawls Blvd. NBT	0.09	0	A	144.89	522.59	F	240.95	894.93	F
	Dave Rawls Blvd. NBL	3.02	0.29	A	64.34	0.42	F	106.52	2.13	F
	Dave Rawls Blvd. SBT	8.2	0	A	20.89	22.35	C	154.09	256.17	F
	Dave Rawls Blvd. SBL	0.81	0	A	1.59	22.35	A	30.91	256.17	D
	Intermodal Dr. EBR	9	3.72	A	16.78	24.23	C	200.38	282.66	F
	Intermodal Dr. EBL	10.45	11.59	B	22.17	40.8	C	77.91	291.82	F
Dave Rawls Blvd./William Mills St.	Dave Rawls Blvd. SBL	10.36	7.81	B	324.38	634.22	F	548.87	1303.29	F
	Dave Rawls Blvd. SBR	10.83	8.43	B	29.99	280.34	D	51.68	499.24	F
	William Mills St. EBL	12.93	19.76	B	21.26	39.33	C	53.95	150.62	F

	William Mills St. EBT	0.76	1.72	A	55.92	766.41	F	81.16	1380.88	F
	William Mills St. WBR	1.05	0	A	11.76	46.46	B	45.03	242.09	E
	William Mills St. WBT	7.99	0	A	18.44	38.5	C	47.94	217.86	E
Blount Island Blvd./William Mills St.	Blount Island SBL	12.72	2.66	B	20.24	5.09	C	17.19	4.77	C
	Blount Island SBR	10.36	4.51	B	11.05	7.18	B	13.7	6.94	B
	William Mills St. EBL	13.11	8.73	B	15.7	20.38	C	17.69	27.9	C
	William Mills St. EBT	12.03	8.73	B	13.98	20.38	B	17.35	27.9	C
	William Mills St. WBR	9.74	0.36	A	10.84	0.77	B	15.34	2.82	C
	William Mills St. WBT	10.84	0	B	11.42	0	B	13.76	0	B
Blount Island Blvd./Intermodal Dr.	Blount Island NBR	10.08	0.38	A	15.32	11.17	C	30.6	65.05	D
	Blount Island NBL	13.48	11.98	B	17.69	30.56	C	40.15	86.14	E
	Blount Island NBT	12.95	15.58	B	17.27	9.1	C	24.44	56.83	C
	Blount Island SBT	10.16	5.32	B	10.82	6.61	B	25.7	27.11	D
	Blount Island SBL	7.94	5.26	A	9.03	6.64	A	26.03	27.46	D
	Blount Island SBR	12.26	0.98	B	10.07	0.32	B	26.01	3.46	D
	Intermodal Dr. WBR	10.72	0.75	B	9.45	0.11	A	12.44	3.11	B
	Intermodal Dr. WBT	16.64	0.98	C	12.59	0.32	B	14.37	3.46	B
	Intermodal Dr. WBL	12.08	10.36	B	11.34	2.73	B	14.48	9.84	B
	Intermodal Dr. EBT	9.28	2.03	B	4.41	3.68	A	23.32	13.24	C
	Intermodal Dr. EBR	4.94	2.03	A	6.24	3.68	A	4.89	13.24	A
	Intermodal Dr. EBL	4.25	2.03	A	4.12	3.68	A	21.03	13.24	C

(green)	Light to Moderate Traffic (LOS A – C)
(light yellow)	Heavy Traffic (LOS D)
(orange)	High Congestion (LOS E)
(red)	Severe Congestion (LOS F)

a. At Dave Rawls Boulevard/Intermodal Drive, the northbound approach will operate at LOS F under both future conditions (Table 5-4). This is attributed to the higher outbound truck traffic leaving the new Southeast Toyota facility, which creates long queues that, in turn, affect the northbound and eastbound left-turn movements. At the 2035 "No Build" condition, the southbound through movement and the eastbound right movement will operate at LOS F due to spillback from Dave Rawls Boulevard/William Mills Street.
b. At Dave Rawls Boulevard/William Mills Street, the southbound left and eastbound through movements will operate at failing conditions with significant delays and queues observed for both movements in the 2030 and 2035 "No Build" conditions. Most of the traffic using the southbound left movement is truck traffic accessing the SSA Atlantic terminal. Heavy traffic demand coupled with long dwell times at the gate resulted in queue spillback that affected the eastbound through movement.
c. All other intersections were observed to operate at LOS C or better (Table 5-3).

Based on these observations, targeted geometric and operational improvements were proposed to enhance network performance. Each proposed alternative was simulated and assessed individually in VISSIM. Subsequently, a combined scenario incorporating the best performing strategies was developed and assessed to determine cumulative effects. A detailed description of each alternative scenario is provided in the following section.

6 SCENARIO DEVELOPMENT

6.1 Scenario 1 – Alternative security plaza entrance

In this scenario, a new security plaza entrance and an additional inbound lane are introduced from Dave Rawls Boulevard. JAXPORT is currently in the design phase of a project to construct a new security plaza at BIMT, with construction expected to begin in early 2026 (JAXPORT, 2025). The new gate will serve POVs and truck haulers accessing the AMPORTS vehicle transfer yard. The port is also in the construction phase of an additional lane to Dave Rawls Boulevard.

The gate is modeled in VISSIM by coding its geometry and configuration based on JAXPORT's proposed design drawings and operational characteristics of the existing main entrance. A revised vehicle routing decision is implemented to redirect vehicles currently using the existing gate to access the vehicle transfer yard to the new gate. The simulation was run for $3\frac{1}{2}$ hours, and the results were evaluated against the "No Build" scenario.

Figure 6-1 Alternate gate location.

6.2 Scenario 2 – Inbound gate expansion

This scenario involves adding an extra service lane at the main gate for security vehicles, thereby reserving all remaining lanes exclusively for trucks. The existing gate processing time is maintained. The model was run 10 times, each for $3\frac{1}{2}$ hours, and the results were compared to the "No Build" scenario.

Figure 6-2 Additional inbound service gate.

6.3 Scenario 3 – Additional outbound lane and service gate

In this scenario, an additional outbound lane and service gate are introduced along Dave Rawls Boulevard, extending from the southern entrance to the northern entrance of the new Southeast Toyota facility. As with previous scenarios, 10 simulation runs each lasting $3\frac{1}{2}$ hours were performed, and the results compared to the "No Build" scenario.

Figure 6-3 Additional outbound lane and service gate.

6.4 Scenario 4 – SSA Atlantic gate expansion

This scenario incorporates an additional service gate at the SSA Atlantic terminal. The SSA Atlantic gate currently has six inbound gates. Widening the gate was evaluated as a means to reduce queues and delays on the roadways leading to the gate. Ten simulation runs were performed, each lasting $3\frac{1}{2}$ hours, and the results were compared to the "No Build" scenario.

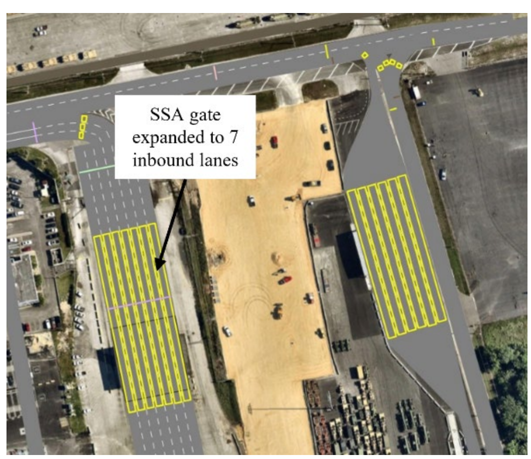


Figure 6-4 SSA gate expanded to seven lanes.

6.5 Scenario 5 – Improved gate processing

This scenario examines how reducing processing times at the SSA and Tote Maritime gates can alleviate long queues caused by vehicles waiting to access the tenant yards. Currently, the average service times are 175 seconds at SSA and 146 seconds at Tote Maritime. Studies have shown that proper documentation, truck appointment systems and automated identification technologies – such as Radio Frequency Identification (RFID), Optical Character Recognition (OCR), License Plate Recognition (LPR), and intelligent gate systems - can reduce average dwell time at gates by up to 75% (4 minutes to as low as 1 minute) (Motono et al., 2016; PORTIC, 2015) . This is because the use of automation eliminates the need for manual document checks and minimizes delay caused by incomplete or erroneous documentation that would otherwise require correction by drivers on-site. Improved gate processing is represented in the model by a 30% reduction in dwell time at the tenant gates. This percentage was selected as a conservative estimate of potential decreases in dwell time, based on the anticipated feasibility of implementing these strategies within the analysis period. Comparable reductions have been observed at other major ports following targeted interventions. For instance, at the Port of Savannah, by introducing a real-time online system that allows customers 24-hour access to update container shipment data resulted in a 30% reduction in truck processing times (Maguire et al., 2010). Similarly, at the YTI terminal in the Port of Los Angeles, implementing Optical Character Recognition (OCR) technology and automated gate kiosks integrated with the Terminal Operating System (TOS) resulted in a 50% decrease in gate processing times (Linbins, n.d.).

6.6 Scenario 6 - Combined interventions

This scenario represents a combined implementation of the best performing, previously discussed geometric and operational improvements. Ten simulation runs, each with a duration of $3\frac{1}{2}$ hours, were performed, and the results analyzed in comparison to the "No Build" conditions.

7 ANALYSIS RESULTS

This section presents the results of the simulations performed on the various alternative scenarios. The basis for comparing the results is travel time, vehicle delay, queue length, and Level of Service (LOS). Vehicle delay represents the difference between the actual travel time experienced by a vehicle and the ideal or expected travel time under free-flow conditions. Queue length refers to the number of vehicles waiting at a stop line or other network facility. The LOS is a qualitative measure that characterizes operational conditions in a traffic stream, including traffic performance measures related to speed, travel time, freedom to maneuver, and traffic interruptions. LOS A represents the best operating conditions (i.e., free flow), while LOS F represents the worst operating conditions.

The results were collected for the peak hour of traffic flow. The exact sequence of random seeds was applied across all scenarios, each of which was run for the same number of times and for an identical duration of time. During the simulation, some vehicles were diffused from the network. Diffusion typically occurs in VISSIM when vehicles encounter excessive congestion, unresolved routing, or configuration gaps. Locations in which diffusion occurred in the network were checked to ensure that the diffusion was not caused by a coding error. Only vehicles that completed their trips were included in the performance analysis.

7.1 Overall network performance analysis

The overall network performance measures were compared between the future "No Build" condition and the proposed alternative scenarios. A summary of the network performance results is presented in Table 7-1 and Table 7-2. Vehicles arrived refers to the total number of vehicles that completed their trips and exited the network by the end of the simulation, while total stops are the number of full vehicle stops at stop-controlled or signalized intersections. Latent demand refers to the number of vehicles unable to enter the network at the end of the simulation period due to capacity constraints. Latent delay is the total waiting time for vehicles that, since the start of the simulation, were unable to enter the network from each origin (FDOT, 2021)

Most scenarios outperformed the no-build baseline, indicating efficiency gains through infrastructure and operational improvements. Improved gate processing resulted in the highest increase in network speed and the most significant reduction in travel time and network delay, highlighting the effectiveness of efficient gate operations in enhancing traffic flow and reducing congestion in the terminal. Adding an outbound lane and gate had the second-highest improvement in network performance among the scenarios. This is likely because the expanded gate facility accommodates the additional traffic generated by the new auto processing facility, thereby easing congestion within the overall network.

Table 7-1 Overall network performance results across alternative scenarios compared to the 2030 "No Build" condition.

MOE (Peak hour)	2030 "No Build"	Scenario 1 Alternative Gate	Scenario 2 Inbound Gate Expansion	Scenario 3 Additional Outbound Lane	Scenario 4 SSA Gate Expansion	Scenario 5 Improved Gate Processing
Average speed (mph)	13.3	11.8	13.1	14.8	14.4	15.8
Total Delay (hr.)	240	274	243	205	210	177
Latent Delay (hr.)	0.087	0.088	0.087	0.087	0.087	0.087
Latent Demand	0.0	0.0	0.0	0.0	0.0	0.0
Total Travel Time (hr.)	395	420	397	365	366	334
Total Stops	25,923	22,742	26,076	17,315	24,340	23,938
Vehicles Arrived	2,516	2,476	2,509	2,603	2,544	2,580

Table 7-2 Overall network performance results across alternative scenarios compared to the 2035 "No Build" condition.

MOE (Peak hour)	2035 "No Build"	Scenario 1 Alternative Gate	Scenario 2 Inbound Gate Expansion	Scenario 3 Additional Outbound Lane	Scenario 4 SSA Gate Expansion	Scenario 5 Improved Gate Processing
Average speed (mph)	10.2	10.8	10.2	12.2	11.3	12.7
Total Delay (hr.)	370	325	368	299	325	273
Latent Delay (hr.)	0.128	0.204	0.169	0.110	0.289	0.340
Latent Demand	0.2	0.8	0.3	0.2	0.7	0.8
Total Travel Time (hr.)	528	478	527	466	487	437
Total Stops	41,131	26,609	39,992	25,715	39,657	37,414
Vehicles Arrived	2,542	2,547	2,539	2,666	2,601	2,652

Figures 7-1 and 7-2 illustrate the percentage change in the specific MOEs compared to the 2030 “No Build” and 2035 “No Build” conditions.

- Scenario 1 - Introducing an alternative security plaza entrance improved overall network speed with a 12% reduced delay and a 10% decrease in travel time compared to the 2035 “No Build” condition (Figure 7-2). By diverting a portion of the inbound traffic away from the main gate, the new entrance minimized spillbacks onto adjacent roadways, thereby improving flow throughout the network.
- Scenario 2 -Expanding the inbound gate facility by opening a lane for POVs resulted in marginal improvements in network speed, travel time, and delay when compared to the baseline conditions. This is likely because while the extra lane allowed for faster vehicle entry, internal circulation and downstream network flow only improved slightly.
- Scenario 3 - Adding an outbound lane and gate resulted in a 12% increase in network speed, 7% reduced travel time, and 15% reduced overall delay compared to the 2030 “No Build” condition (Figure 7-1). Compared to the 2035 “No Build” scenario, this alternative resulted in a 19% increase in network speed and a 12% and 19% reduction in travel time and delay, respectively (Figure 7-2).
- Scenario 4 - Adding an extra service lane at the SSA Atlantic gate yielded notable performance measure improvements when compared to the baseline scenarios, i.e., 8% increased network speed, 7% reduced travel time, and 12% decreased delay compared to the 2030 “No Build” condition and 11% increased network speed, 8% reduced travel time, and 12% decreased delay compared to the 2035 “No Build” condition. This is due to the increased gate processing capacity, which allows more trucks to be processed simultaneously, thereby minimizing upstream queues.
- Scenario 5 - Improved gate processing resulted in 19% increased network speed, 15% reduced travel time, and 26% reduced overall delay compared to the 2030 “No Build” condition (Figure 7-1). Compared to the 2035 “No Build” scenario, this alternative resulted in 24% increased network speed and 17% and 26% reduced travel time and delay, respectively (Figure 7-2).

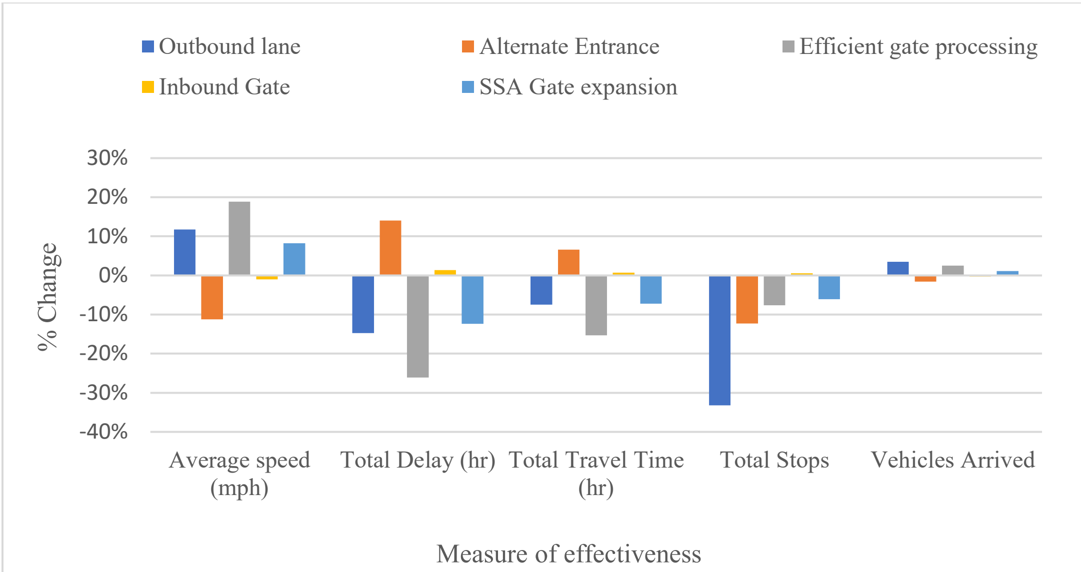


Figure 7-1 Percent change in overall network performance measures compared to the 2030 “No Build” scenario.

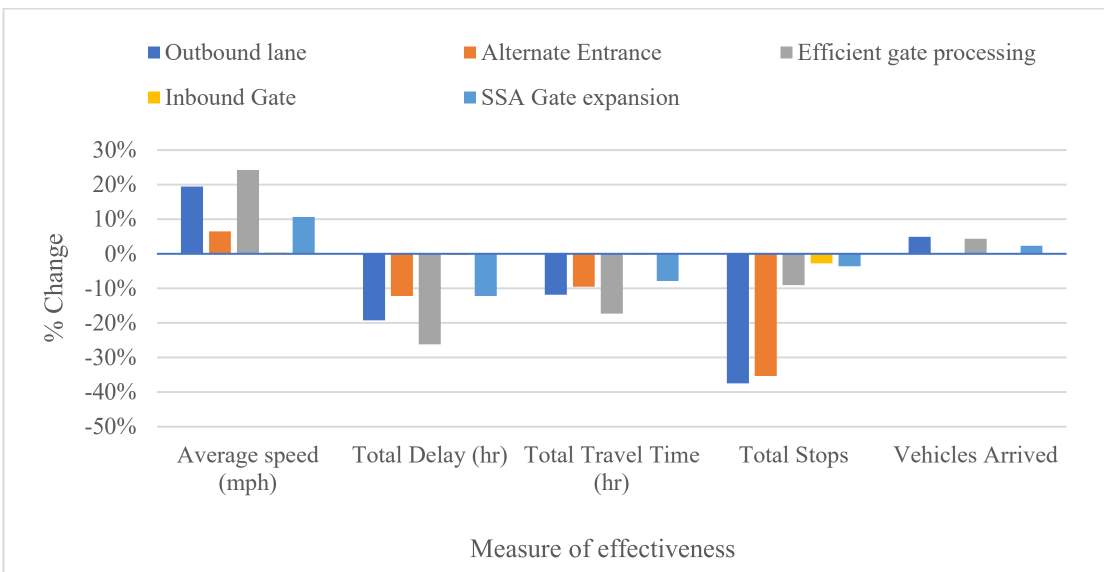


Figure 7-2 Percent change in overall network performance measures compared to the 2035 “No Build” scenario.

7.2 Intersection level analysis

Performance measures of the intersections were evaluated in VISSIM using node evaluation. The default values for the start of the delay segment and the speed defining the beginning and end of queues were adopted for the node configuration. Two key performance indicators were used for evaluation: queue length and delay.

7.2.1 Delay

The change in vehicle delay with the implementation of the infrastructure and operational improvements at each intersection is shown in Figure 7-3.

- Adding an outbound lane along Dave Rawls Boulevard and an outbound service gate at the main entrance reduced delay at the critical intersections of Dave Rawls Boulevard/Intermodal Drive and Dave Rawls Boulevard/William Mills Street for both 2030 and 2035 scenarios. This is a result of increased capacity, which alleviates congestion.
- Reducing the dwell time at the gate resulted in significant delay reductions across multiple intersections, including Dave Rawls Boulevard/William Mills Street, Dave Rawls Boulevard/Intermodal Drive, and Blount Island Boulevard/Intermodal Drive. Delays at these intersections are primarily caused by queue buildup at the tenant gates. Therefore, improving gate operations reduces vehicle dwell times and queue lengths, resulting in improved traffic flow and better operational conditions upstream.
- SSA gate expansion decreased delays at most intersections, notably achieving a 37% reduction at Blount Island Boulevard/Intermodal Drive and a 32% reduction at Dave Rawls Boulevard/Intermodal Drive. Increased capacity at the gate reduces congestion and spillback to these intersections, improving their efficiency.
- The new alternative entrance to the terminal eased congestion along Dave Rawls Boulevard/Blount Island Boulevard. However, vehicle delay increased at Blount Island Boulevard/Intermodal Drive. This is because traffic that would have used the main gate is redirected to this location, increasing demand at this intersection.
- The additional inbound gate for POV traffic at the main entrance resulted in generally marginal delay reductions, with the most notable decrease in delay observed at Dave Rawls Boulevard/Blount Island Boulevard.

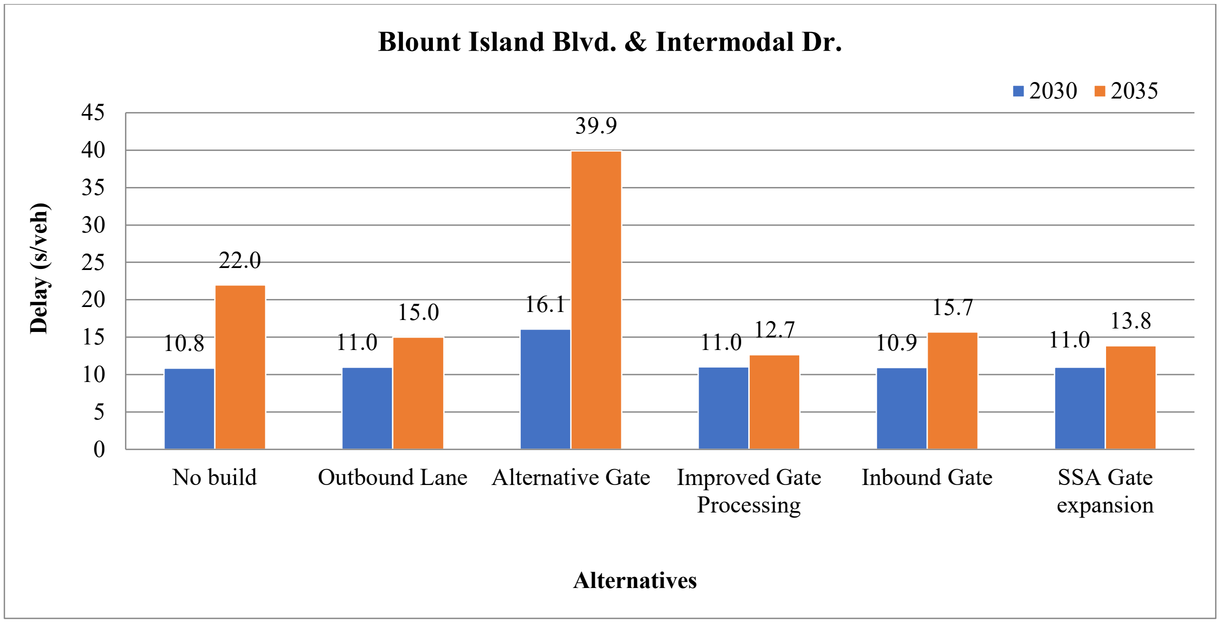


Figure 7-3 a. Vehicle delay across the alternative scenarios.

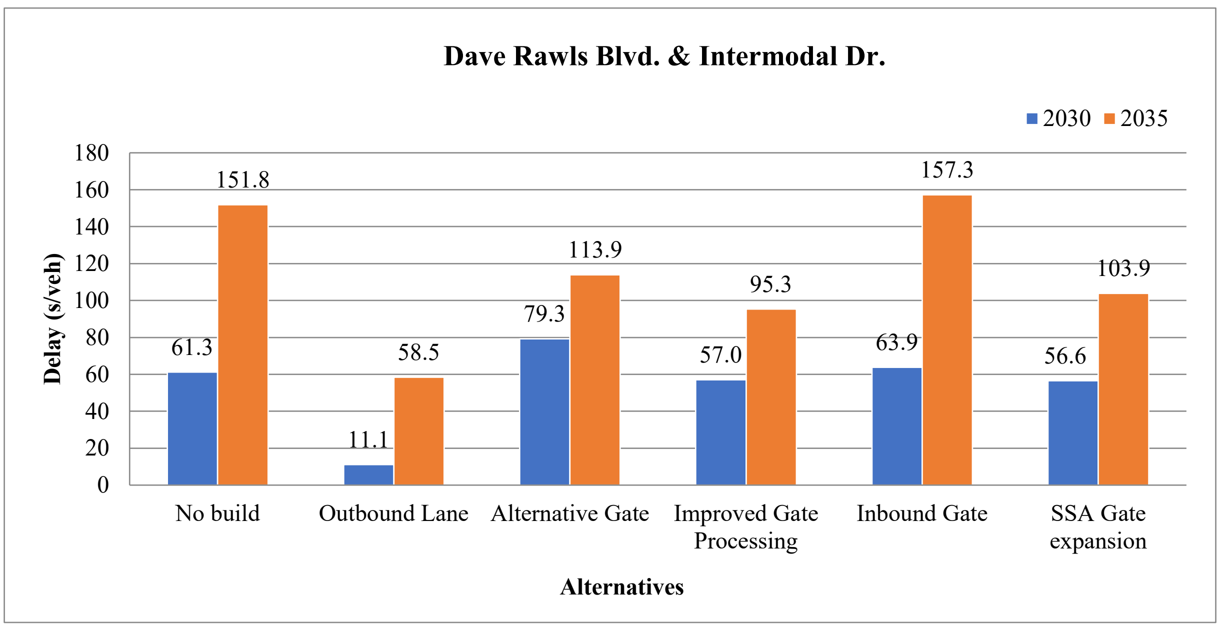


Figure 7-3 b. Vehicle delay across the alternative scenarios.

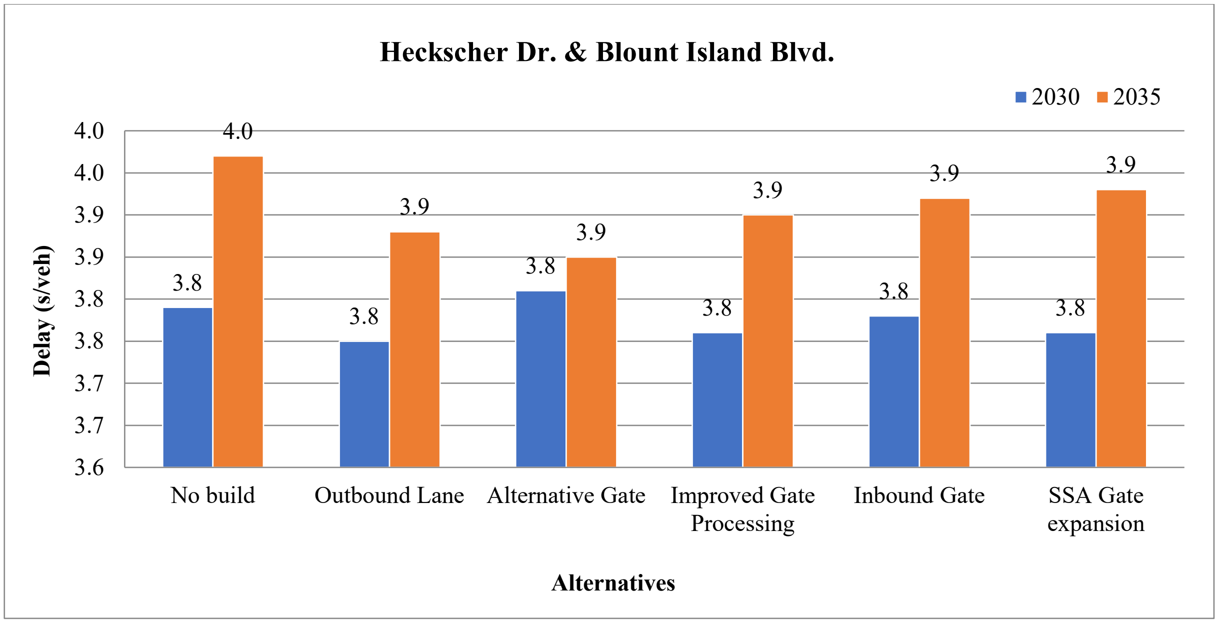


Figure 7-3 c. Vehicle delay across the alternative scenarios.

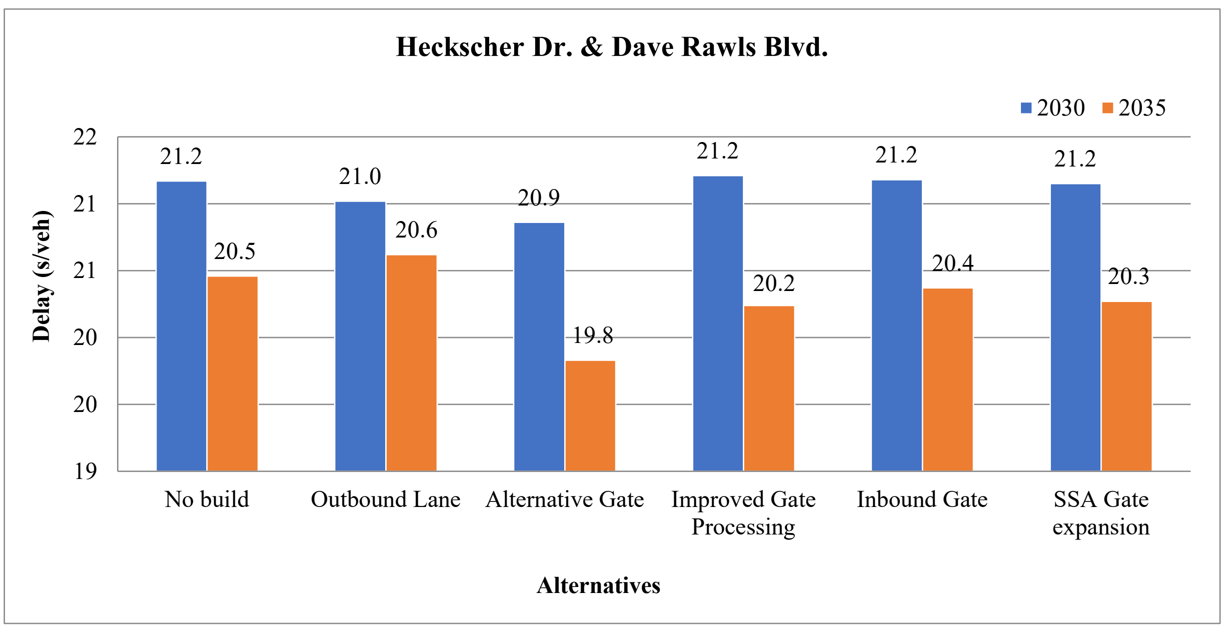


Figure 7-3 d. Vehicle delay across the alternative scenarios.

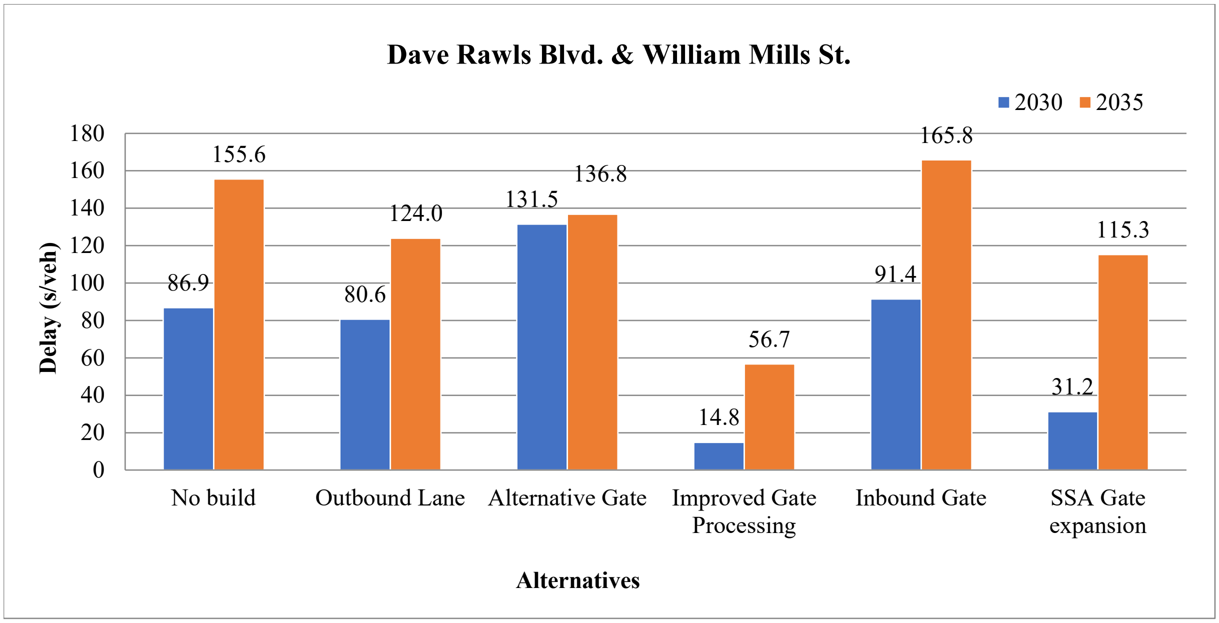


Figure 7-3 e. Vehicle delay across the alternative scenarios.

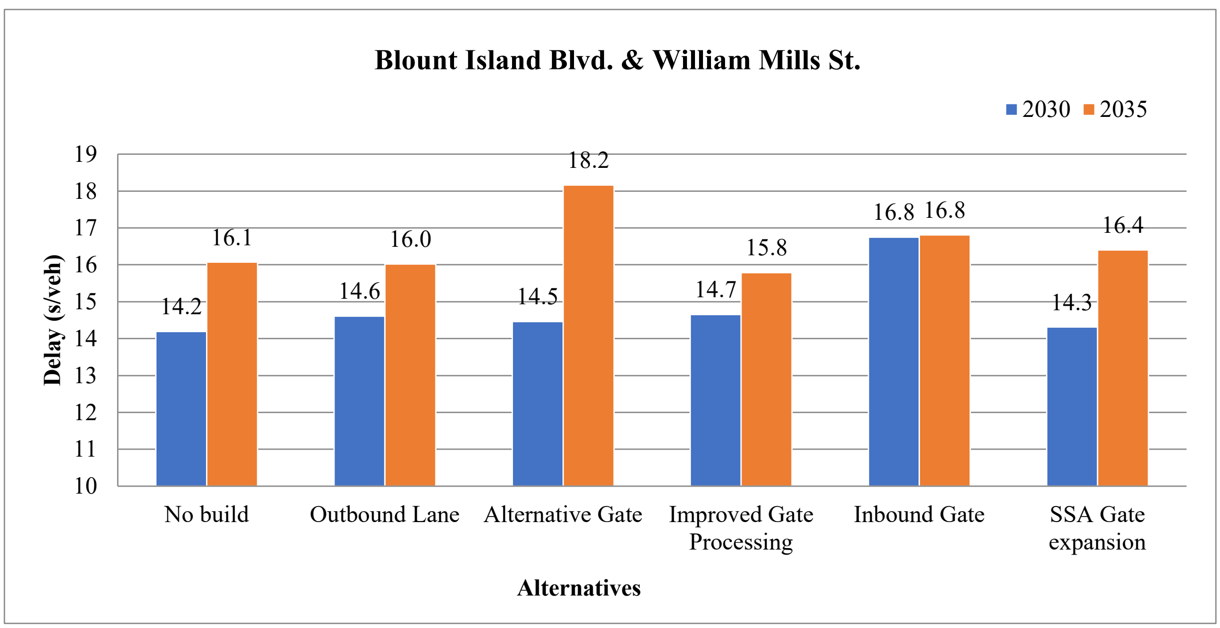


Figure 7-3 f. Vehicle delay across the alternative scenarios.

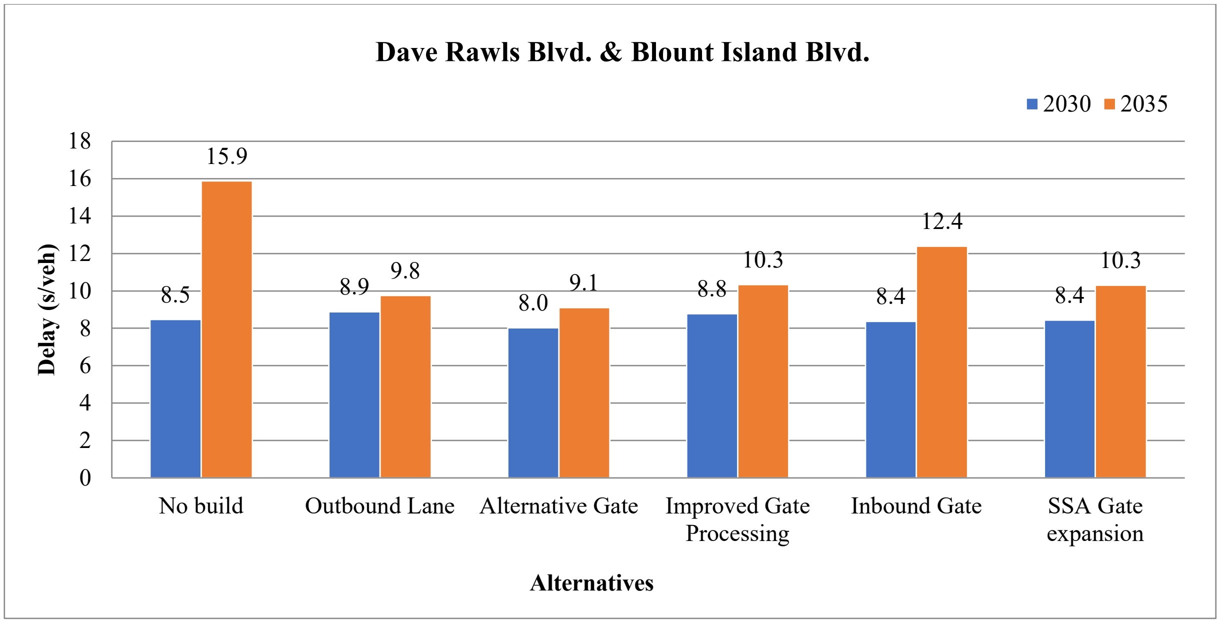


Figure 7-3 g. Vehicle delay across the alternative scenarios.

Delay analyses were also conducted at the main gate and the gates serving SSA Atlantic and Tote Maritime. Improved gate processing resulted in significant reductions in delay at the gates compared to the 2030 "No Build" scenario (33% at Tote and 43% at SSA) and the 2035 "No Build" scenario (35% at Tote and 42% at SSA). These findings suggest that inefficiencies in gate operations are a key contributor to overall delays at these intersections.

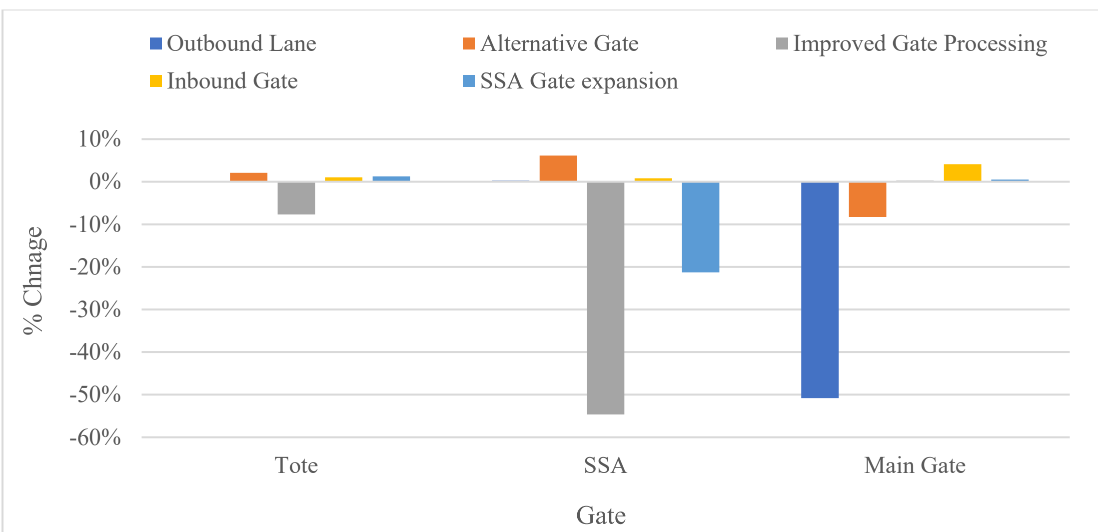


Figure 7-4 Percentage change in vehicle delay <u>at the gates</u> for different alternatives compared to the 2030 "No Build" scenario.

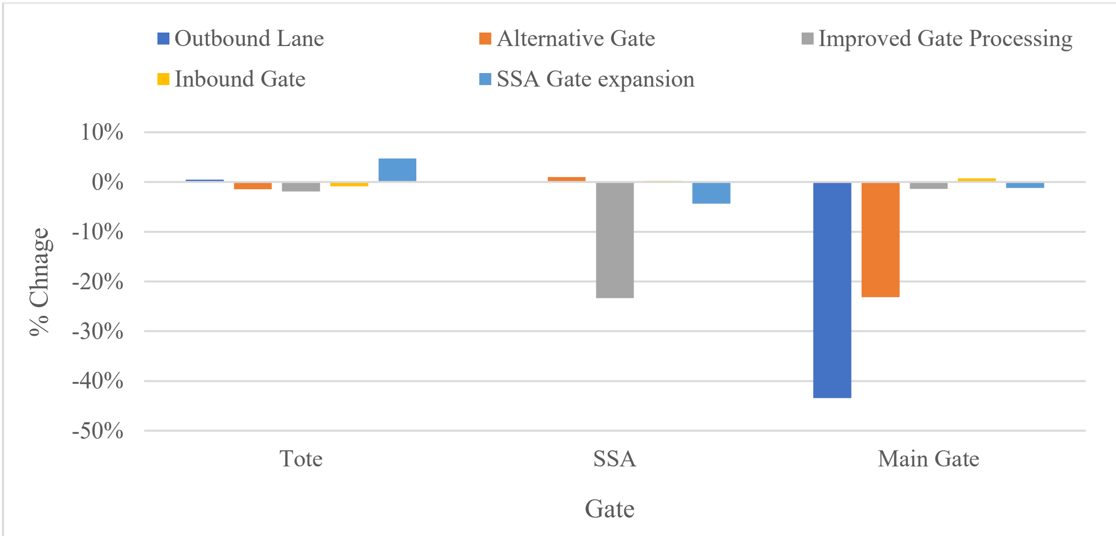
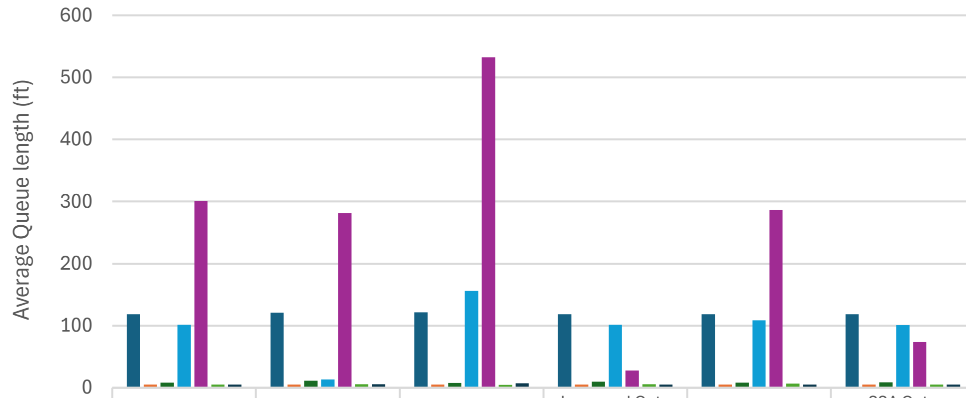


Figure 7-5 Percentage change in vehicle delay at the gates for different alternatives compared to the 2035 "No Build" scenario.

At the main gate, all alternative scenarios resulted in reduced delays, by adding an outbound lane and service gate having the most significant impact among the alternatives (18% compared to 2030 "No Build" and 19% compared to 2035 "No Build").

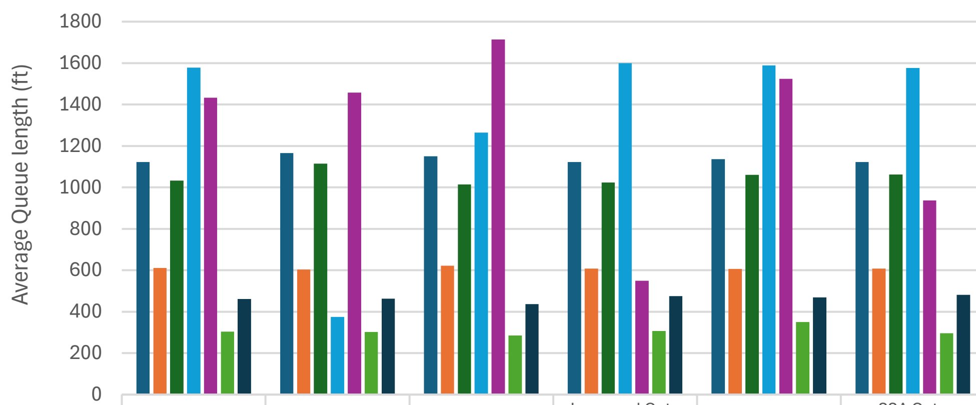
7.2.2 Queue length

The impact of the alternative interventions on vehicle queue lengths at the seven intersections was analyzed. The average and maximum queue length results are presented in Figures 7-6 to 7-9. The average queue length represents the mean queue length recorded at each time step and may be shorter than the length of a vehicle. The maximum queue length, on the other hand, represents the longest queue recorded at each time step.



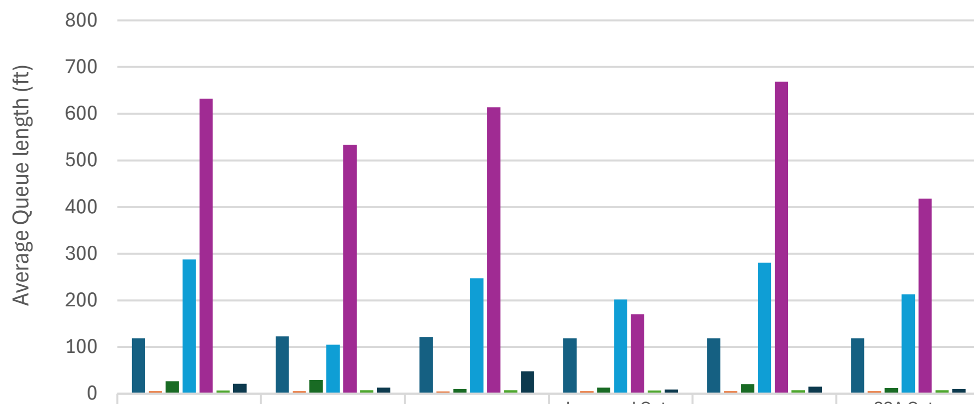
	2030 "no build"	Outbound Lane	Alternative Gate	Improved Gate Processing	Inbound Gate	SSA Gate expansion
Heckscher Dr. & Dave Rawls Blvd.	118.38	121.19	121.76	118.54	118.38	118.59
Heckscher Dr. & Blount Island Blvd.	5.11	5.07	5.16	5.06	5.1	5.09
Dave Rawls Blvd. & Blount Island Blvd.	8.44	11.37	7.81	9.92	8.51	8.66
Dave Rawls & Intermodal Dr.	101.73	13.31	156.23	101.42	108.71	100.82
Dave Rawls Blvd. & William Mills St.	300.88	280.9	532.6	28.07	286.44	73.7
Blount Island Blvd. & William Mills St.	5.38	5.65	4.76	5.65	6.96	5.26
Blount Island Blvd. & Intermodal Dr.	5.21	5.51	7.12	5.39	4.98	5.2

Figure 7-6 Average queue length at each intersection for the different alternative scenarios against 2030 "No Build" condition.



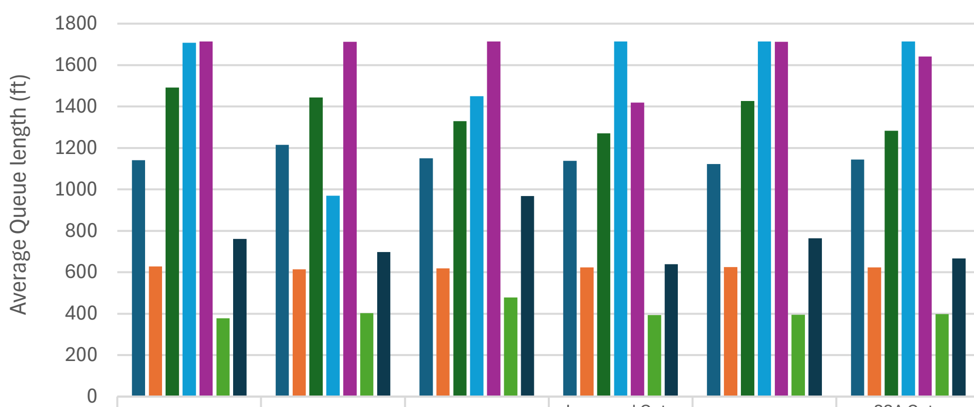
	2030 No build	Outbound Lane	Alternative Gate	Improved Gate Processing	Inbound Gate	SSA Gate expansion
Heckscher Dr. & Dave Rawls Blvd.	1122.23	1165.31	1150.42	1122.27	1136.19	1122.37
Heckscher Dr. & Blount Island Blvd.	611.4	603.97	621.8	607.58	607.16	607.49
Dave Rawls Blvd. & Blount Island Blvd.	1032.62	1114.84	1014.24	1024.09	1060.61	1062.98
Dave Rawls & Intermodal Dr.	1577.48	374.82	1264.99	1599.85	1589.56	1576.23
Dave Rawls Blvd. & William Mills St.	1433.56	1457.26	1713.83	549.2	1523.33	937.12
Blount Island Blvd. & William Mills St.	303.17	302.86	285.58	307.53	350.52	296.53
Blount Island Blvd. & Intermodal Dr.	462.1	462.31	436.08	475.52	468.54	481.75

Figure 7-7 Maximum queue length at each intersection for the different alternative scenarios against 2030 "No Build" condition.



	2035 "no build"	Outbound Lane	Alternative Gate	Improved Gate Processing	Inbound Gate	SSA Gate expansion
Heckscher Dr. & Dave Rawls Blvd.	118.84	123.14	121.74	118.76	118.51	118.99
Heckscher Dr. & Blount Island Blvd.	5.49	5.26	5.2	5.4	5.53	5.41
Dave Rawls Blvd. & Blount Island Blvd.	26.55	29.26	10.4	13.04	20.52	12.51
Dave Rawls & Intermodal Dr.	287.95	104.99	246.94	201.55	280.67	212.79
Dave Rawls Blvd. & William Mills St.	632.33	533.3	613.93	170.38	668.61	418.37
Blount Island Blvd. & William Mills St.	7.09	7.41	7.89	7.24	7.6	7.62
Blount Island Blvd. & Intermodal Dr.	21.55	13.28	48.4	8.84	15.09	10.69

Figure 7-8 Average queue length <u>at each intersection</u> for the different alternative scenarios against 2035 "No Build" condition.



	2035 No build	Outbound Lane	Alternative Gate	Improved Gate Processing	Inbound Gate	SSA Gate expansion
Heckscher Dr. & Dave Rawls Blvd.	1141.19	1215.56	1150.54	1138	1122.79	1144.68
Heckscher Dr. & Blount Island Blvd.	628.18	614.08	618.35	623.29	625.82	623.53
Dave Rawls Blvd. & Blount Island Blvd.	1491.13	1444.33	1329.59	1270.78	1426.64	1282.62
Dave Rawls & Intermodal Dr.	1708.26	970.29	1449.71	1713.92	1713.92	1713.87
Dave Rawls Blvd. & William Mills St.	1713.93	1712.07	1713.94	1418.76	1712.05	1640.98
Blount Island Blvd. & William Mills St.	377.89	402.73	478	393.06	395.39	397.66
Blount Island Blvd. & Intermodal Dr.	761.16	698.15	967.3	639.71	764.65	666.5

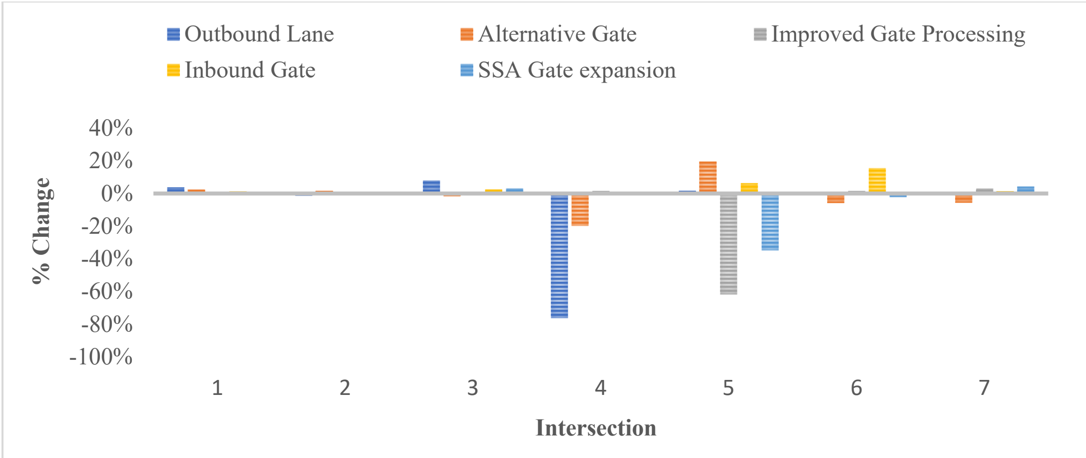
Figure 7-9 Maximum queue length <u>at each intersection</u> for the different alternative scenarios against 2035 "No Build" condition.

- According to Figures 7-10 and 7-11, the outbound lane and service gate significantly reduced average vehicle queue lengths at Dave Rawls Boulevard/Intermodal Drive and Dave Rawls Boulevard/William Mills Street and reduced maximum queue lengths at Dave Rawls Boulevard/Intermodal Drive. Only minimal increases in average and maximum queue lengths were observed when reviewing 2035 results: Dave Rawls/Blount Island Boulevards and Blount Island Boulevard/William Mills Street (Figure 7-12), and Heckscher Drive/Dave Rawls Boulevard and Blount Island Boulevard/William Mills Street (Figure 7-13).
- Under 2030 traffic conditions, the alternate service gate reduced average and maximum queue lengths at Dave Rawls/Blount Island Boulevards and Blount Island Boulevard /William Mills Street (Figures 7-10 and 7-11). When reviewing 2035 results, the alternate service gate reduced average queue lengths at most intersections. However, queue lengths increased at Dave Rawls/Blount Island Boulevards and Blount Island Boulevard/William Mills Street (Figure 7-12). Maximum queue lengths increased at Blount Island Boulevard /William Mills Street and Blount Island Boulevard/Intermodal Drive (Figure 7-13).
- Reducing gate processing times significantly reduced average and maximum queues at the Dave Rawls Boulevard/William Mills Street intersection under 2030 traffic conditions (Figures 7-10 and 7-11). This scenario also significantly reduced average queues at Dave Rawls Boulevard/Intermodal Drive, Dave Rawls Boulevard/William Mills Street and Blount Island Boulevard/Intermodal Drive, and maximum queues at Dave Rawls Boulevard/William Mills Street and Blount Island Boulevard/Intermodal Drive (Figures 7-12 and 7-13).
- Expanding the SSA gate reduced average and maximum vehicle queue lengths at the Dave Rawls Boulevard/William Mills Street intersection under 2030 traffic conditions (Figures 7-10 and 7-11). Additionally, as illustrated in Figure 7-12, the SSA gate expansion substantially reduced average queue lengths at Dave Rawls/Blount Island Boulevards, Dave Rawls Boulevard/Intermodal Drive, Dave Rawls Boulevard/William Mills Street and Blount Island Boulevard/Intermodal Drive under the 2035 traffic conditions. This scenario also reduced maximum queue lengths at Dave Rawls/Blount Island Boulevards, Dave Rawls Boulevard/William Mills Street and Blount Island Boulevard/Intermodal Drive (Figure 7-13).

- As shown in Figure 7-10, expanding the inbound gate access reduced average queue lengths at Dave Rawls Boulevard/William Mills Street and Blount Island Boulevard/Intermodal Drive intersections under 2030 traffic conditions. Maximum queue lengths reduced at Heckscher Drive/Blount Island Boulevard (Figure 7-11). Under 2035 traffic conditions, this intervention reduced queue lengths at the Dave Rawls/Blount Island Boulevards, Dave Rawls Boulevard/Intermodal Drive, and Blount Island Boulevard/Intermodal Drive intersections, with minor increases in queue length observed at other intersections (Figure 7-12). Maximum queue lengths decreased at Heckscher Drive/Blount Island Boulevard, Dave Rawls/Blount Island Boulevards and Dave Rawls Boulevard/William Mills Street (Figure 7-13).

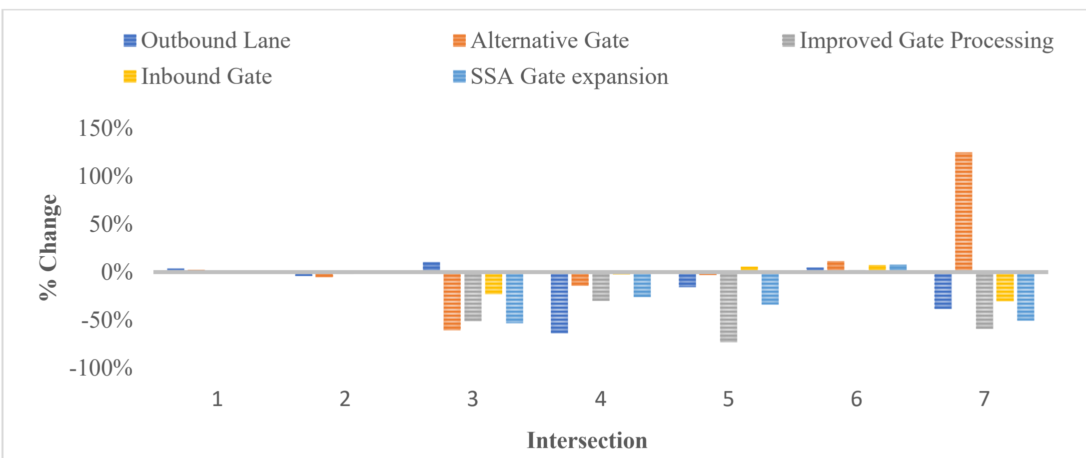
Note: 1. Heckscher Drive/Dave Rawls Blvd., 2. Heckscher Drive/Blount Island Blvd., 3. Dave Rawls Blvd./Blount Island Blvd., 4. Dave Rawls Blvd/Intermodal Drive, 5 Dave Rawls Blvd./William Mills St., 6. Blount Island Blvd/William Mills St and 7. Blount Island Blvd./Intermodal Drive.

Figure 7-10 Percent change in average queue length <u>at each intersection</u> when compared to the 2030 “No Build” scenario



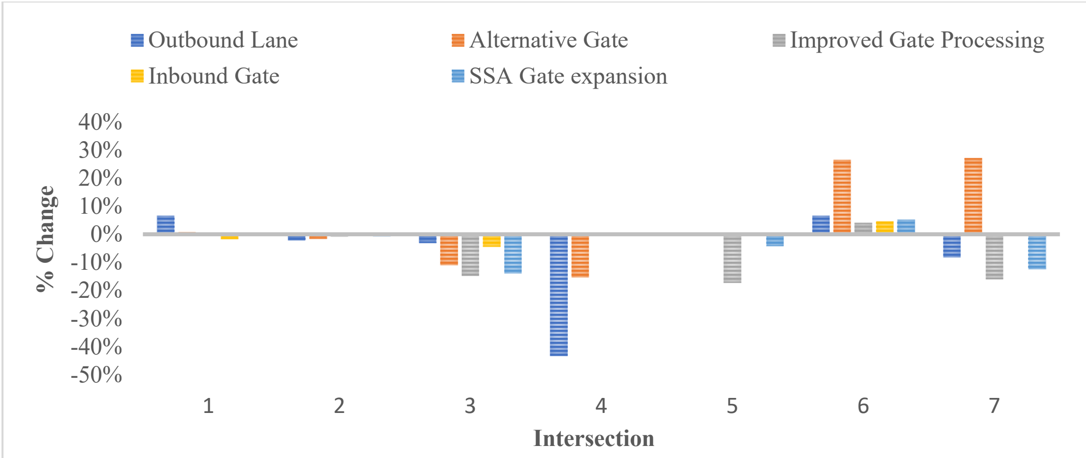
Note: 1. Heckscher Drive/Dave Rawls Blvd., 2. Heckscher Drive/Blount Island Blvd., 3. Dave Rawls Blvd./Blount Island Blvd., 4. Dave Rawls Blvd./Intermodal Drive, 5 Dave Rawls Blvd./William Mills St., 6. Blount Island Blvd./William Mills St and 7. Blount Island Blvd./Intermodal Drive.

Figure 7-11 Percent change in maximum queue length at each intersection when compared to the 2030 "No Build" scenario



Note: 1. Heckscher Drive/Dave Rawls Blvd., 2. Heckscher Drive/Blount Island Blvd., 3. Dave Rawls Blvd./Blount Island Blvd., 4. Dave Rawls Blvd./Intermodal Drive, 5 Dave Rawls Blvd./William Mills St., 6. Blount Island Blvd./William Mills St and 7. Blount Island Blvd./Intermodal Drive.

Figure 7-12 Percent change in average queue length at each intersection when compared to the 2035 "No Build" scenario



Note: 1. Heckscher Drive/Dave Rawls Blvd., 2. Heckscher Drive/Blount Island Blvd., 3. Dave Rawls Blvd./Blount Island Blvd., 4. Dave Rawls Blvd./Intermodal Drive, 5 Dave Rawls Blvd./William Mills St., 6. Blount Island Blvd./William Mills St. and 7. Blount Island Blvd./Intermodal Drive.

Figure 7-13 Percent change in maximum queue length at each intersection when compared to the 2035 "No Build" scenario

Evaluating queue lengths at the gates revealed significant queue reductions at the main entrance, and adding an outbound lane achieved the most significant decrease (51%) when compared to the 2030 and 2035 "No Build" conditions (Figures 7-14 and 7-15). Constructing an alternative entrance gate also reduced queue lengths at the main gate under both traffic scenarios, resulting in a 23% reduction in queue length under 2035 traffic conditions (Figure 7-15).

In contrast, most infrastructure-related interventions had minimal impact on queue lengths at the tenant gates. At the SSA Atlantic gate, the most notable improvement was achieved by reducing gate processing time, resulting in a 55% decrease in queue length under 2030 traffic conditions (Figure 7-14) and a reduction in queue lengths under 2035 traffic conditions (Figure 7-15). An expanded gate at SSA also reduced queue length, with a reduction of up to 21% (Figure 7-14).

Improved gate processing produced only a slight reduction in queue length at the Tote Maritime gate (up to 8%). This is likely because queues at this location tend to form early during peak hours due to gate closures for breaks. Thus, even with improved processing efficiency, the constrained staging area limits flow, resulting in lower reductions in queue length. All other alternatives resulted in negligible decreases in queue lengths, with some minor increases observed under the SSA gate expansion alternative.

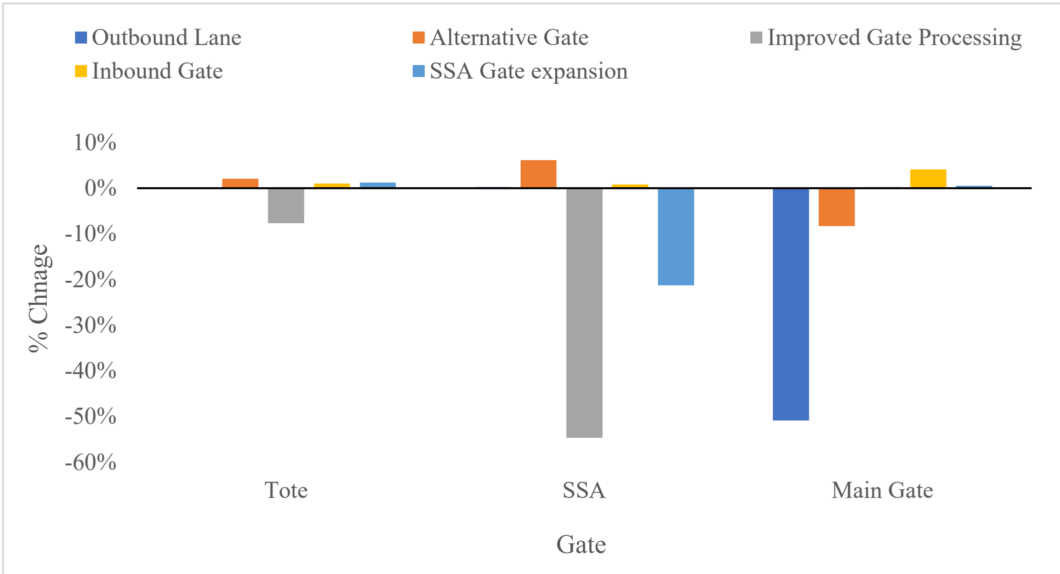


Figure 7-14 Percent change in average queue length <u>at the gates</u> for alternative scenarios when compared to the 2030 “No Build” scenario

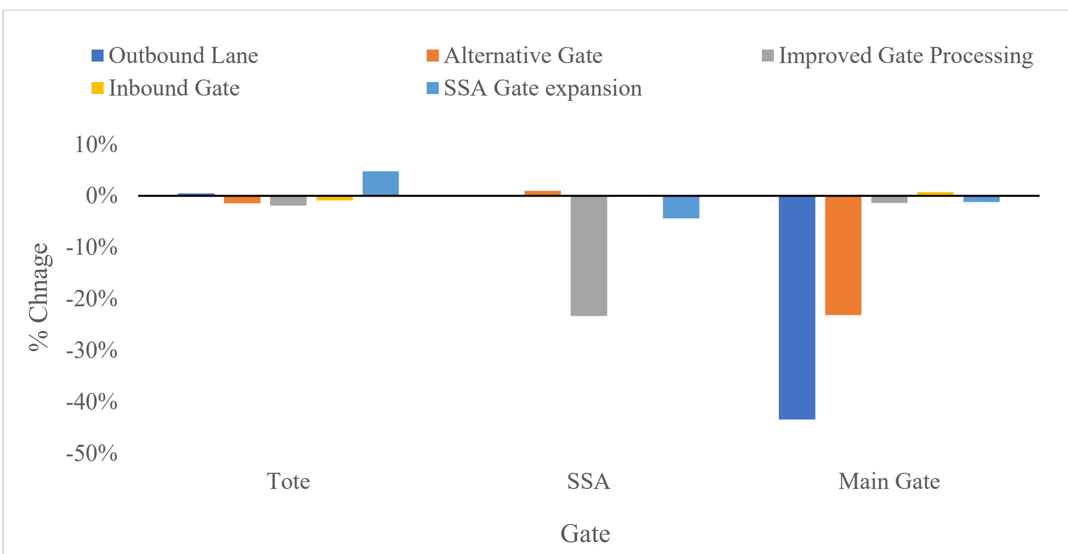


Figure 7-15 Percent change in average queue length <u>at the gates</u> for alternative scenarios when compared to the 2035 “No Build” scenario

7.2.3 Overall intersection performance

Comparing the overall intersection results for the base scenario and the alternatives is presented in Table 7-3 and Table 7-4. The intersection performance analysis across the alternative scenarios reveals that scenarios 3 (Additional outbound lane and gate), 4 (SSA gate expansion), and 5 (Improved gate processing) produced significant improvements in both delay reduction and LOS at critical intersections.

The most congested intersections under the base conditions—Dave Rawls Boulevard/Intermodal Drive and Dave Rawls Boulevard/William Mills Street —initially operated at LOS F, with delays exceeding 80 seconds under 2030 volumes and 150 seconds under 2035 volumes. Under scenario 3, the LOS at Dave Rawls Boulevard/Intermodal Drive improved from LOS F to B when compared to the 2030 "No Build" condition, while under scenario 5, the LOS at Dave Rawls Boulevard/William Mills Street improved from LOS F to B. Other intersections also exhibited modest delay reductions under various scenarios (Table 7-3).

Under 2035 traffic conditions, substantial improvements in delay were observed at the critical intersections by implementing scenarios 3 and 5, even though the LOS remained constant (Table 7-4). Since Heckscher Drive/Dave Rawls Boulevard, as well as Heckscher Drive/Blount Island Boulevard, are not directly affected by terminal traffic, their LOS remains stable across all scenarios.

Table 7-3 Overall intersection performance results across alternatives compared to 2030 "No Build" condition.

ID*	Existing			2030 "No build"			Scenario 1 Alternative gate			Scenario 2 Inbound gate expansion			Scenario 3 Additional outbound lane			Scenario 4 SSA gate expansion			Scenario 5 Improved gate processing		
	LOS	Avg. Delay (s/veh)	Veh	LOS	Avg. Delay (s/veh)	Veh	LOS	Avg. Delay (s/veh)	Veh	LOS	Avg. Delay (s/veh)	Veh	LOS	Avg.Delay (s/veh)	Veh	LOS	Avg. Delay (s/veh)	Veh	LOS	Avg. Delay (s/veh)	Veh
1	C	24.06	1298	C	21.17	1586	C	20.86	1595	C	21.18	1580	C	21.02	1665	C	21.15	1584	C	21.21	1582
2	A	3.75	859	A	3.79	856	A	3.81	856	A	3.78	856	A	3.88	857	A	3.76	856	A	3.76	856
3	A	8.56	973	A	8.47	1257	A	8.02	1267	A	8.37	1250	A	8.88	1342	A	8.44	1255	A	8.78	1254
4	A	5.33	790	F	61.28	1025	F	79.25	911	F	63.86	1024	B	11.12	1121	F	56.51	1039	F	56.98	1040
5	A	9.45	578	F	86.88	604	F	131.5	581	F	91.14	604	F	80.63	622	D	31.18	650	B	14.8	668
6	B	11.58	234	B	14.19	318	B	14.46	320	C	16.74	317	B	14.61	319	B	14.31	321	B	14.65	322
7	B	9.57	449	B	10.84	632	C	16.08	591	B	10.94	632	B	11	663	B	11	633	B	11.01	634

Green	Light to Moderate Traffic (LOS A – C)
Light yellow	Heavy Traffic (LOS D)
Orange	High Congestion (LOS E)
Red	Severe Congestion (LOS F)

*Note: 1. Heckscher Dr./Dave Rawls Blvd., 2. Heckscher Dr./Blount Island Blvd., 3. Dave Rawls Blvd./Blount Island Blvd., 4. Dave Rawls Blvd./Intermodal Dr., 5. Dave Rawls Blvd./William Mills St., 6. Blount Island Blvd./William Mills St., 7. Blount Island Blvd./Intermodal Dr.

Table 7-4 Overall intersection performance results across alternatives compared to 2035 “No Build” condition.

ID*	Existing			2035 “No build”			Scenario 1			Scenario 2			Scenario 3			Scenario 4			Scenario 5		
							Alternative gate			Inbound gate expansion			Additional outbound lane			SSA gate expansion			Improved gate processing		
	LOS	Avg. Delay (s/veh)	Veh	LOS	Avg. Delay (s/veh)	Veh	LOS	Avg. Delay (s/veh)	Veh	LOS	Avg. Delay (s/veh)	Veh	LOS	Avg. Delay (s/veh)	Veh	LOS	Avg. Delay (s/veh)	Veh	LOS	Avg. Delay (s/veh)	Veh
1	C	24.04	1294	C	20.46	1668	C	19.83	1684	C	20.37	1665	C	20.62	1777	C	20.27	1679	C	20.24	1679
2	A	3.7	858	A	3.97	864	A	3.85	863	A	3.92	864	A	3.88	865	A	3.93	865	A	3.9	865
3	A	8.33	969	C	15.87	1297	B	9.11	1348	B	12.39	1304	B	14.83	1409	B	10.3	1343	A	10.34	1343
4	A	5.35	787	F	151.79	979	F	113.9	900	F	157.27	971	F	58.49	1115	F	103.86	1049	F	95.34	1065
5	A	9.07	575	F	155.64	577	F	136.75	5898	F	165.79	574	F	123.95	629	F	115.25	628	F	56.71	672
6	B	11.55	234	C	16.07	334	C	18.16	346	C	16.81	333	C	16.02	336	C	16.4	339	C	15.79	347
7	A	9.32	449	C	21.98	650	E	39.91	615	C	15.69	647	C	15.02	663	B	13.84	664	B	12.65	674

(green)	Light to Moderate Traffic (LOS A – C)
(light yellow)	Heavy Traffic (LOS D)
(orange)	High Congestion (LOS E)
(red)	Severe Congestion (LOS F)

*Note: 1. Heckscher Dr./Dave Rawls Blvd., 2. Heckscher Dr./Blount Island Blvd., 3. Dave Rawls Blvd./Blount Island Blvd., 4. Dave Rawls Blvd./Intermodal Dr., 5. Dave Rawls Blvd./William Mills St., 6. Blount Island Blvd./William Mills St., 7. Blount Island Blvd./Intermodal Dr.

7.3 Travel time analysis

Travel time measurements were collected using predefined travel time segments within the network. A comparative analysis of vehicle travel times under the various infrastructure and operational scenarios is presented in Figures 7-16 and 7-17.

Figure 7-16 compares travel times across multiple roadway segments for various improvement scenarios under projected 2030 traffic conditions. The road segments that experience the longest travel times are the segments from the main gate to the SSA Atlantic gate and from the SSA Atlantic gate to the main gate. Improved gate processing time (scenario 5) will result in the most significant reductions in travel time at the segment from the main gate to the SSA Atlantic gate. At the other critical road segment from the SSA Atlantic gate to the main gate, adding an outbound lane (scenario 3) will result in the most significant reduced travel time. The alternative gate (scenario 1) increases travel time along the segment from the main gate to the SSA Atlantic gate.

Figure 7-17 compares travel time across the roadway segments and improvement scenarios under 2035 traffic conditions. The critical road segments are the segments from the main gate to the SSA Atlantic gate and the segment from the SSA Atlantic gate to the main gate. Similar to 2030 traffic conditions, improved gate processing time (scenario 5) will provide the most significant travel time reductions at the road segment from the main gate to the SSA Atlantic gate. Adding an outbound lane and gate (scenario 3) will deliver the most significant reduced travel time at the road segment from the SSA Atlantic gate to the main gate. The alternative gate (scenario 1) slightly increases travel time along the segment from the main gate to the SSA Atlantic gate when compared to the "No Build" scenario.

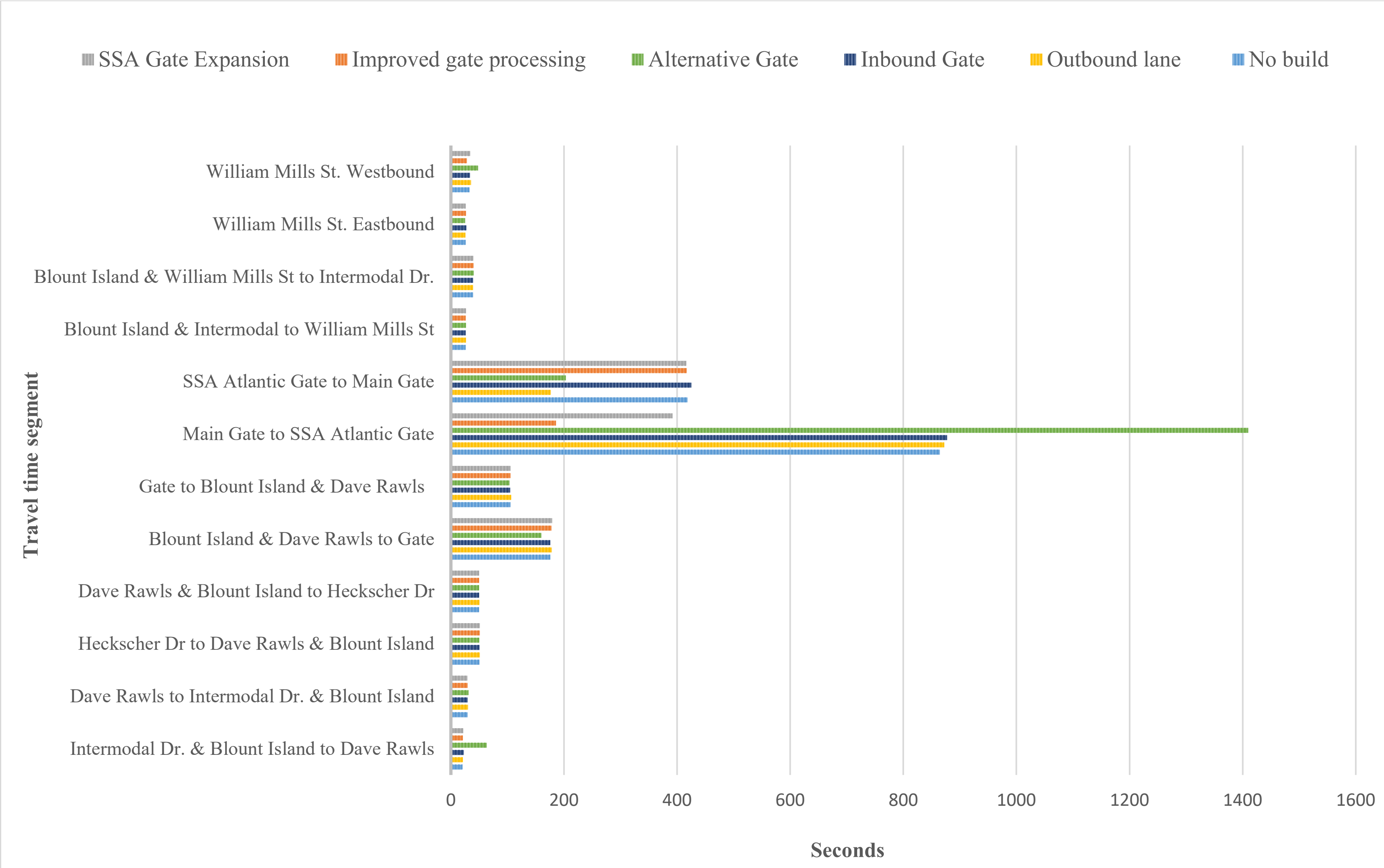


Figure 7-16 Travel time comparison between 2030 "No Build" condition and alternative scenarios

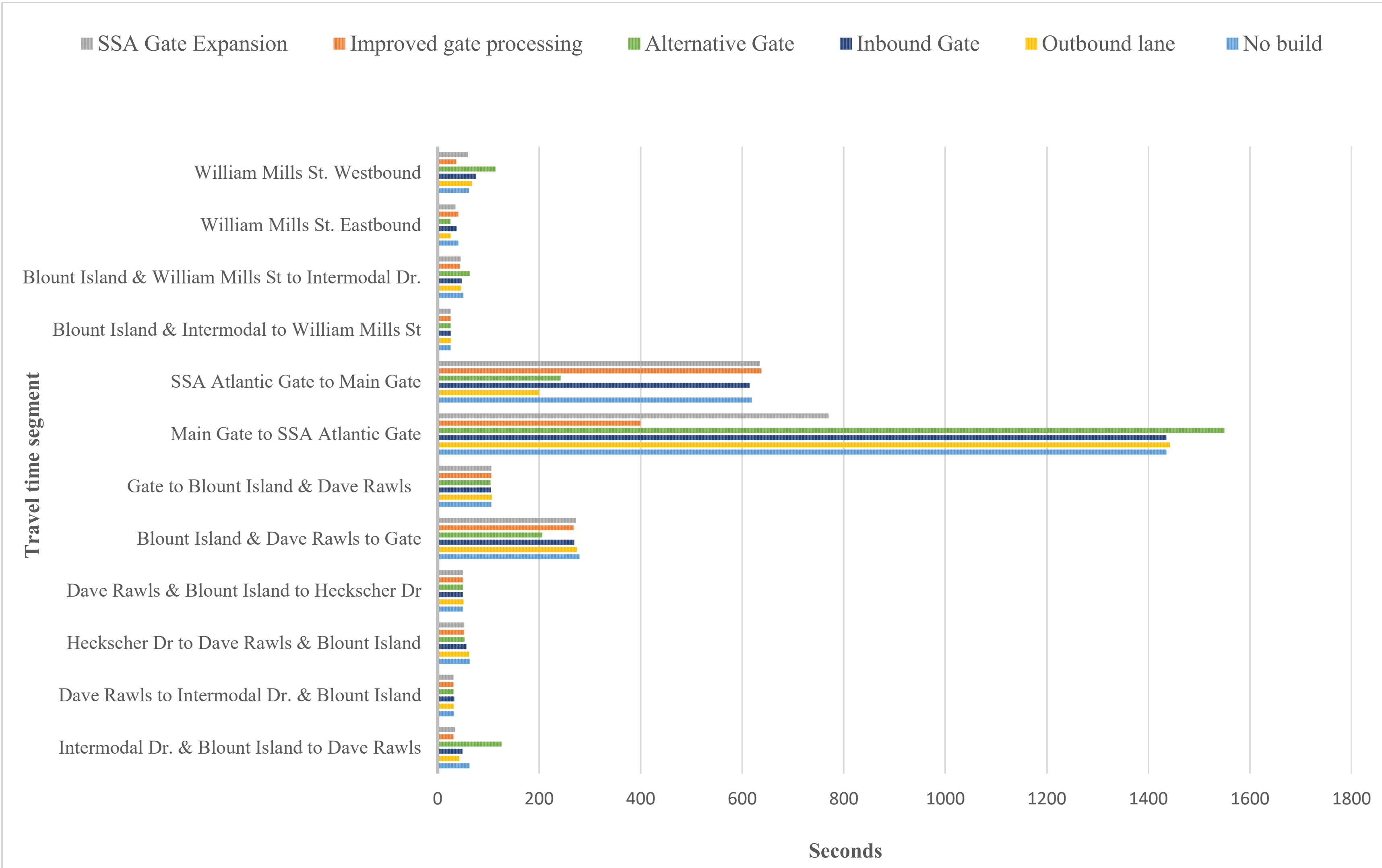
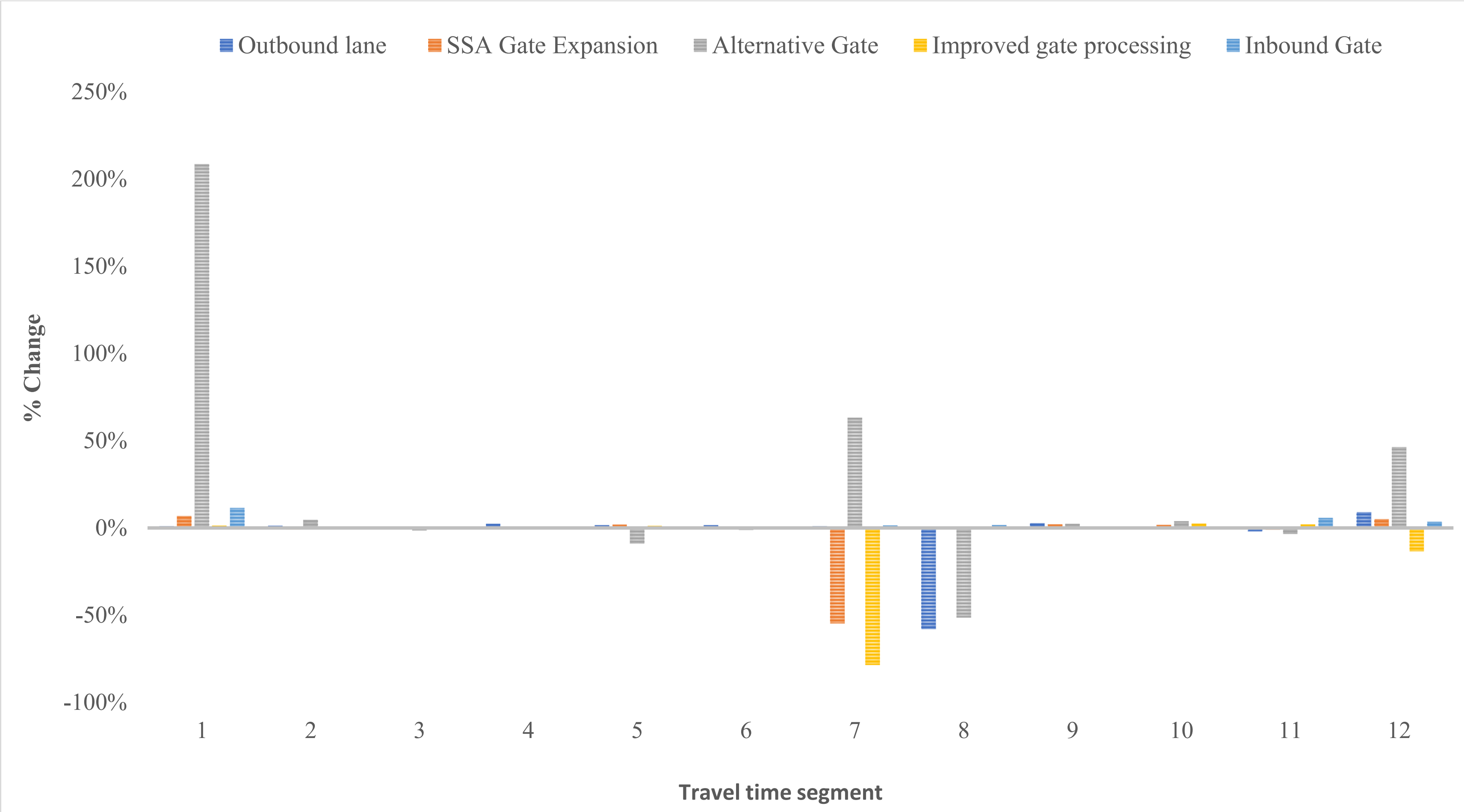


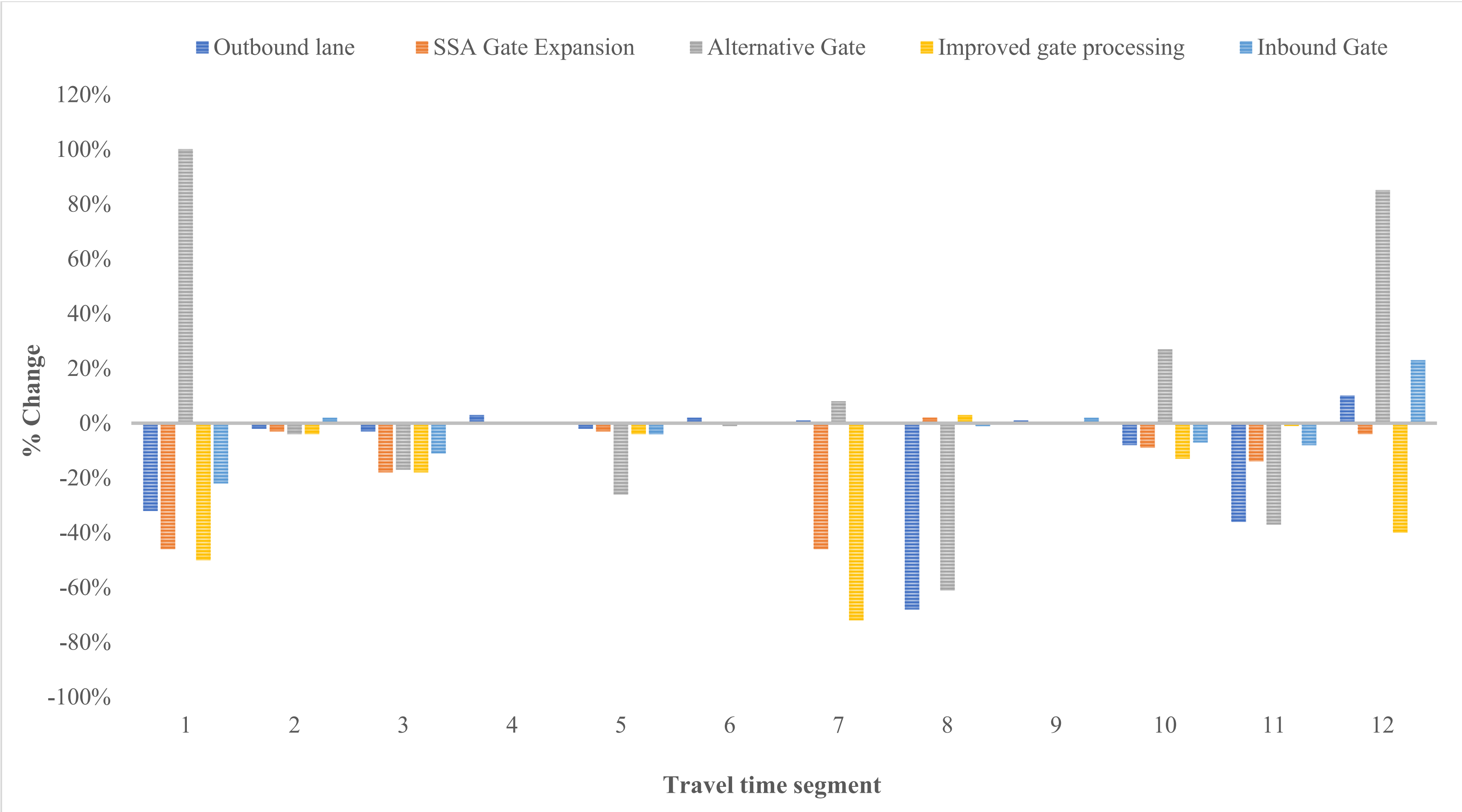
Figure 7-17 Travel time comparison between 2035 “No Build” condition and alternative scenarios

- Reduced gate processing times produced notable improvements, including a reduced travel time up to 50% along the segment from Intermodal Drive/Blount Island Boulevard to Dave Rawls Boulevard and up to 78% reduction along the segment from the main gate to SSA Atlantic. Across all remaining segments, this intervention achieved travel time reductions of up to 40% (Figures 7-18 and 7-19).
- Adding an outbound lane led to up to 68% reduced travel time along the segment from SSA Atlantic to the main gate. Furthermore, the segment between Intermodal Drive/Blount Island Boulevard and Dave Rawls Boulevard experienced a 32% reduced travel time under this alternative. Although most road segments experienced improvements, with travel time reductions ranging from 1% to 36%, some minor increases in travel time were observed at a few segments.
- The alternative gate reduced travel times by 1% to 61%. However, certain road segments, such as from Blount Island Boulevard/William Mills Street to Intermodal Drive/William Street, from the main gate to SSA gate, and from Intermodal Drive/Blount Island Boulevard to Dave Rawls Boulevard, experienced increased travel times. This suggests that while the alternative gate reduced travel time in most road segments, it also created localized congestion due to higher traffic volumes being rerouted through Blount Island Boulevard and Intermodal Drive.
- The expanded inbound gate and the SSA Atlantic gate led to travel time reductions of up to 22% and 55%, respectively, across specific roadway segments. However, on William Mills Street, travel times increased by 23% in the westbound direction under the inbound gate expansion scenario, likely attributable to higher traffic volumes and increased demand flowing into downstream segments



Note: 1. Intermodal Drive/Blount Island Blvd. to Dave Rawls Blvd., 2. Dave Rawls Blvd. to Intermodal Drive/Blount Island Blvd., 3. Heckscher Drive to Dave Rawls Blvd./Blount Island Blvd., 4. Dave Rawls Blvd./Blount Island Blvd. to Heckscher Drive, 5. Blount Island Blvd./Dave Rawls Blvd. to Gate, 6. Gate to Blount Island Blvd./Dave Rawls Blvd., 7. Gate to SSA Atlantic, 8. SSA Atlantic to Gate, 9. Blount Island Blvd./Intermodal Drive to William Mills St., 10. Blount Island Blvd./William Mills St. to Intermodal Drive, 11. William Mills St. Eastbound, 12. William Mills St. Westbound

Figure 7-18 Percent change in travel time across different scenarios when compared to the 2030 “No Build” scenario.



Note: 1. Intermodal Drive/Blount Island Blvd. to Dave Rawls Blvd., 2. Dave Rawls Blvd. to Intermodal Drive/Blount Island Blvd., 3. Heckscher Drive to Dave Rawls Blvd./Blount Island Blvd., 4. Dave Rawls Blvd./Blount Island Blvd. to Heckscher Drive, 5. Blount Island Blvd./Dave Rawls Blvd. to Gate, 6. Gate to Blount Island Blvd./Dave Rawls Blvd., 7. Gate to SSA Atlantic, 8. SSA Atlantic to Gate, 9. Blount Island Blvd./Intermodal Drive to William Mills St., 10. Blount Island Blvd./William Mills St. to Intermodal Drive, 11. William Mills St. Eastbound, 12. William Mills St. Westbound

Figure 7-19 Percent change in travel time across different scenarios when compared to the 2035 “No Build” scenario.

7.4 Recommendations

Based on the findings presented in the previous section, the following key observations are noted:

<u>Scenario 1: Constructing an Alternative Entrance for Ro-Ro Traffic:</u>

- This intervention will result in 10% reduced total travel time (from 528 to 478 hours) and a 12% decrease in total delay (from 370 to 325 hours) under the 2035 traffic conditions.
- Additionally, this alternative will ease congestion along Dave Rawls Boulevard/Blount Island Boulevard. However, vehicle delays are expected to increase at Blount Island Boulevard/Intermodal Drive.
- The new entrance is located very close to the intersection of Blount Island Boulevard and Intermodal Drive. Since Jacksonville Fire and Rescue Department (JFRD) Fire Station 48 is scheduled for demolition upon completion of the new Fire Station 48 northeast of Channel View Boulevard and Blount Island Boulevard, the study recommends possibly relocating the new entrance's intersection with Blount Island Boulevard to this location, as shown in Figure 7-20.

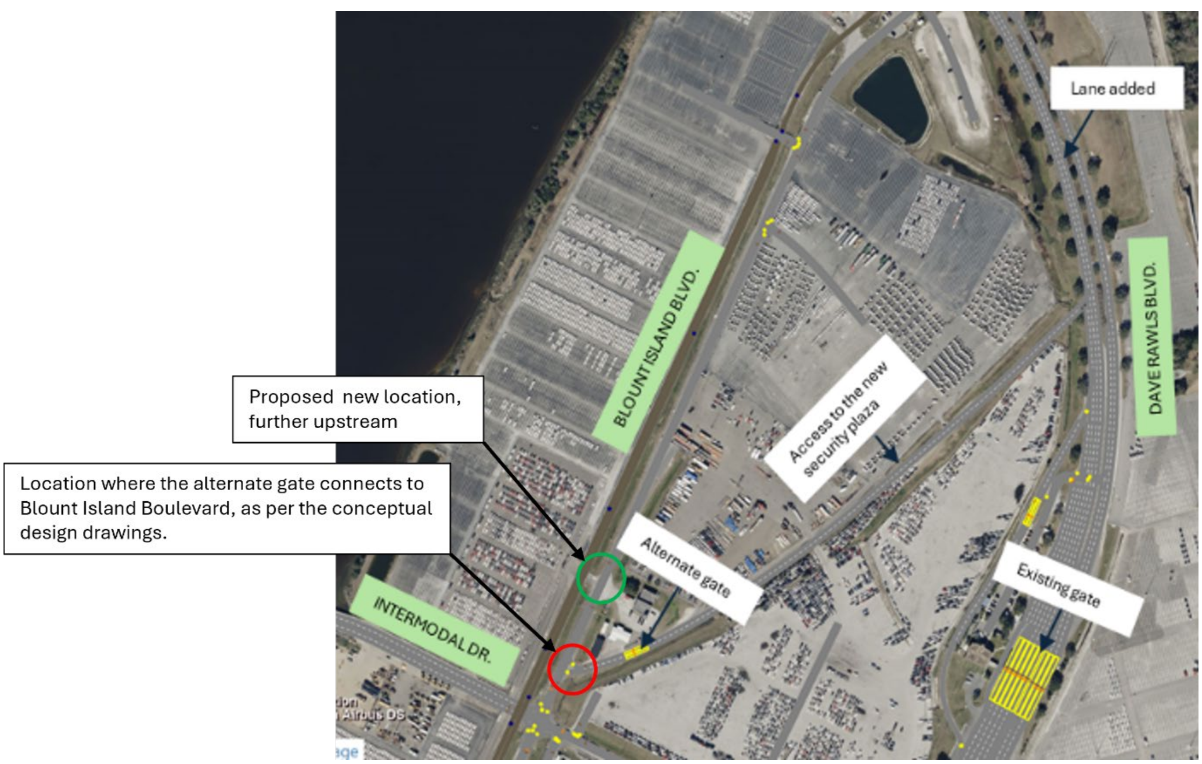


Figure 7-20 Proposed location for the alternative gate connection to Blount Island Boulevard.

Scenario 2: Inbound Gate Expansion:

- This scenario will result in only minor improvements in overall travel time and delays, as well as intersection delays and queues, compared to the 2035 baseline conditions.

Scenario 3: Adding an Outbound Lane and Gate:

- With this intervention, total travel time and delay in the network will reduce by 12% (528 to 466 hours) and 19% (370 to 299 hours), respectively, under 2035 traffic conditions.
- This scenario will also reduce delays and queues at the critical intersections of Dave Rawls Boulevard/Intermodal Drive and Dave Rawls Boulevard/William Mills Street for both 2030 and 2035 traffic conditions.
- The increased outbound truck traffic leaving the new Southeast Toyota facility causes long queues that, in turn, affect the northbound and eastbound left turn movements at Dave Rawls Boulevard/Intermodal Drive and the northbound movements at Dave Rawls Boulevard/William Mills Street.
- This scenario increases outbound capacity, easing congestion caused by this outbound truck traffic.

Scenario 4: SSA Gate Expansion:

- Adding an extra service lane at the SSA Atlantic terminal will reduce the overall network travel time by 8% (528 to 487 hours) and overall network delay by 12% (370 to 325 hours) compared to the 2035 "No Build" condition.
- Moreover, this scenario will reduce the average delay at Blount Island Boulevard/Intermodal Drive and Dave Rawls Boulevard/Intermodal Drive and reduce average queue lengths at the Dave Rawls/Blount Island Boulevards, Dave Rawls Boulevard/Intermodal Drive, and Blount Island Boulevard/Intermodal Drive intersections under 2035 traffic conditions. However, minor increases in queue length will be observed at other intersections.
- Increased capacity at the gate reduces congestion and spillback to these intersections, improving their efficiency.

Scenario 5: Reducing Gate Processing Times:

- This intervention will result in 17% reduced total travel time (from 528 to 437 hours) and a 26% decrease in total delay (from 370 to 273 hours).
- Implementing this intervention will lead to significant delay reductions at multiple intersections, including Dave Rawls Boulevard/William Mills Street, Dave Rawls Boulevard/Intermodal Drive, and Blount Island Boulevard/Intermodal Drive.
- Traffic operations at Dave Rawls Boulevard/William Mills Street and Dave Rawls Boulevard/Intermodal Drive are affected by queue spillback from the tenant gates.
- Therefore, improving gate operations will reduce vehicle dwell times and queue lengths, resulting in improved traffic flow and better operational conditions at these intersections.

Since the best-performing alternatives were scenario 3: Adding an Outbound Lane and Gate and scenario 5: Reducing Gate Processing Times, the research team considered combining these two scenarios into an additional alternative, scenario 6. The results of this new scenario are shown in the following sections.

Overall Network Performance

Table 7-5 shows the overall network performance results under 2030 and 2035 conditions when scenarios 3 (Adding an Outbound Lane and Gate) and 5 (Reducing Gate Processing Times) are combined, referred to as scenario 6.

Table 7-5 Network-wide performance measures results

MOE (Peak hour)	2030 "No Build"	2030 "Scenario 6"	Difference	2035 "No Build"	2035 "Scenario 6"	Difference
Average speed (mph)	13.3	18.0	36%	10.2	18.1	78%
Total Delay (hr.)	240	140	-42%	370	138	-63%
Latent Delay (hr.)	0.087	0.087	0%	0.128	0.09	-33%
Latent Demand	0.0	0.0	0%	0.2	0.0	-100%
Total Travel Time (hr.)	395	303	-23%	528	300	-43%
Total Stops	25,923	14,954	-42%	41,131	14,578	-65%
Vehicles Arrived	2,516	2,668	6%	2,542	2,664	5%

Compared to the 2030 “No Build” scenario, the total delay will be reduced by 42% and the overall travel time will be reduced by 23%. Relative to the 2035 “No Build” scenario, this combined implementation reduces the overall network delay by 63% and the overall travel time by 43%.

Intersection Performance

Comparing the overall intersection performance when scenarios 3 (Adding an Outbound Lane and Gate) and 5 (Reducing Gate Processing Times) are combined is presented in Table 7-6. With this combined scenario, all intersections will operate at LOS C or better under 2030 traffic conditions and LOS D or better under 2035 traffic conditions (Table 7-6).

The performance of the most congested intersections under the base conditions, Dave Rawls Boulevard/Intermodal Drive and Dave Rawls Boulevard/William Mills Street, will improve from having average delays exceeding 80 seconds under 2030 volumes and 150 seconds under 2035 volumes to average delays as low as 10 seconds under 2030 volumes and 28 seconds under 2035 volumes.

Similarly, queue lengths at the critical intersections will decrease from average queue lengths as high as 300 ft under 2030 traffic conditions and 632 ft under 2035 traffic conditions to average queue lengths of 9 ft and 54 ft under 2030 and 2035 traffic conditions, respectively.

Travel Time

Figure 7-21 compares travel time results between the “No Build” and scenario 6. Implementing scenario 6 (combination of adding an outbound lane and gate and reducing gate processing times) significantly lowers the travel time along the critical SSA Atlantic Gate to Main Gate and Main Gate to SSA Atlantic Gate segments.

Table 7-6 Overall intersection performance results

ID*	Existing			2030 "No Build"			2030 "Scenario 6"					2035 "No Build"			2035 "Scenario 6"				
	Avg. Delay (s/veh)	Avg. Queue Length (ft)	LOS	Avg. Delay (s/veh)	Avg. Queue Length (ft)	LOS	Avg. Delay (s/veh)	Difference	Avg. Queue Length (ft)	Difference	LOS	Avg. Delay (s/veh)	Avg. Queue Length (ft)	LOS	Avg. Delay (s/veh)	Difference	Avg. Queue Length (ft)	Difference	LOS
1	24.06	115.48	C	21.17	118.38	C	20.91	-1%	121.69	3%	C	20.46	118.84	C	20.09	-2%	121.94	3%	C
2	3.75	4.83	A	3.79	5.11	A	3.77	-1%	5.07	-1%	A	3.97	5.49	A	3.95	-1%	5.46	-1%	A
3	8.56	6.07	A	8.47	8.44	A	8.82	4%	10.56	25%	A	15.87	26.55	C	10.5	-34%	14.68	-45%	B
4	5.33	3.12	A	61.28	101.73	F	5.45	-91%	7.19	-93%	A	151.79	287.95	F	14.29	-91%	26.3	-91%	B
5	9.45	6.29	A	86.88	300.88	F	10.13	-88%	8.93	-97%	B	155.64	632.33	F	28.27	-82%	53.39	-92%	D
6	11.58	2.31	B	14.19	5.38	B	14.74	4%	5.61	4%	B	16.07	7.09	C	16.02	0%	7.27	3%	C
7	9.57	3.95	B	10.84	5.21	B	11.3	4%	5.79	11%	B	21.98	21.55	C	12.87	-41%	9.27	-57%	B

(green)	Light to Moderate Traffic (LOS A – C)
(light orange)	Heavy Traffic (LOS D)
(orange)	High Congestion (LOS E)
(red)	Severe Congestion (LOS F)

*Note: 1. Heckscher Dr./Dave Rawls Blvd., 2. Heckscher Dr./Blount Island Blvd., 3. Dave Rawls Blvd./Blount Island Blvd., 4. Dave Rawls Blvd./Intermodal Dr., 5. Dave Rawls Blvd./William Mills St., 6. Blount Island Blvd./William Mills St., 7. Blount Island Blvd./Intermodal Dr.

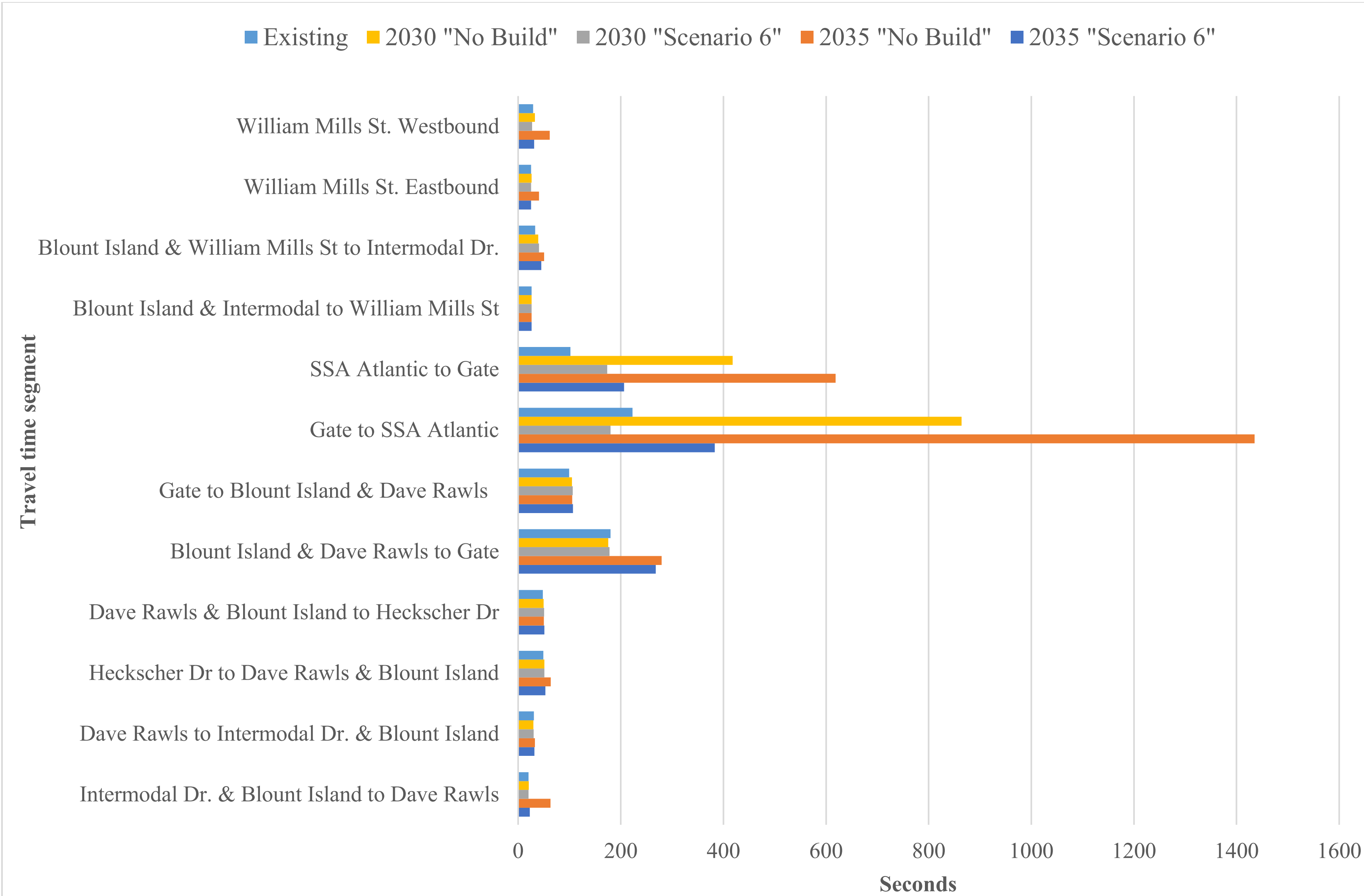


Figure 7-21 Travel time comparison between scenarios

Based on these findings, the study recommends implementing scenario 3 (adding an outbound lane and service gate) and scenario 5 (reducing gate processing time).

- Reducing gate processing times (Scenario 5): Faster gate processing helps to clear queues more quickly, preventing spillback and reducing bottlenecks at intersections. Efficient gate processing can be achieved by deploying IT solutions, including AI-integrated, real-time truck appointment systems, and gate operating systems connected to the TOS. While JAXPORT has taken initial steps towards modernizing BIMT gates, such as installing cameras for pre-screening inbound trucks and transitioning to paperless processing with electronic TWIC checks beginning in 2025, further efficiency gains can be achieved through a real-time truck appointment system integrated with AI algorithms capable of analyzing vessel schedules, predicting traffic increases, and dynamically adjusting appointment availability to optimize flow and reduce peak-time congestion. Moreover, implementing fast lanes for truck drivers who have completed all required documentation in advance by utilizing LPR and OCR technologies to automatically validate truck and cargo details upon arrival can further streamline gate operations.
- Adding an outbound lane and gate (Scenario 3): This ensures that the additional outbound traffic generated by the new Southeast Toyota facility is accommodated. With this intervention, total travel time and delay in the network are reduced by 12% (528 to 466 hours) and 19% (370 to 299 hours), respectively.
- Implementing scenarios 3 and 5 will result in a 63% decrease (370 to 138 hours) in overall network delay and a 43% decrease (528 to 300 hours) in overall travel time relative to the 2035 “No Build” conditions.

8 CONCLUSIONS

The focus of this study was to develop a microsimulation model to analyze traffic flow patterns at the Blount Island Marine Terminal in Jacksonville, Florida, to improve operational efficiency, anticipating increased demand resulting from port expansion. A comprehensive assessment of current traffic patterns related to truck movements at the terminal was first conducted to provide input for developing the baseline model. To accommodate future traffic demands, the study employed time series analysis to project traffic growth, considering anticipated expanded tenant yard facilities and increases in berth capacity. These projections are incorporated into the calibrated model to account for future traffic demand, allowing for the analysis of both future "do nothing" and "do something" scenarios.

The results indicate that intersection performance deteriorates as traffic demand increases, revealing operational deficiencies in the network. While all other intersections were projected to maintain an acceptable LOS (LOS C or better) in future year 2035, two intersections – Dave Rawls Boulevard/Intermodal Drive, and Dave Rawls Boulevard/William Mills Street – operate under failing conditions. To address these deficiencies, five strategies were proposed and evaluated, including adding lanes, gate expansion, alternative entrance, and improvements to gate processing efficiency. A sixth scenario, involving the combined two best-performing alternatives, was also evaluated.

Potential benefits of the improvements were measured in terms of travel time, vehicle delay, queue length, and Level of Service (LOS). The analysis revealed that, among the individual improvement strategies, reducing gate processing time resulted in the most significant improvement in overall network performance, yielding a 17% reduced total travel time (528 to 437 hours) and a 26% decrease in total delay (370 to 273 hours). This was followed by adding an outbound lane and service gate, resulting in a 12% decrease in total travel time (528 to 466 hours) and 19% reduced total delay (370 to 299 hours).

Additionally, constructing an alternative gate entrance for Ro-Ro traffic resulted in 10% reduced total travel time (528 to 478 hours) and 12% decreased total delay (370 to 325 hours). However, this scenario increases vehicle delays at Blount Island Boulevard/Intermodal Drive. The new entrance is located very close to this intersection. The study recommends possibly shifting the location where the new entrance intersects Blount Island Boulevard further upstream. The most significant overall performance gains, however, were achieved through the combined implementation of scenario 3 (adding an outbound lane and service gate) and scenario 5 (reducing gate processing time). This scenario will result in a 63% decrease (370 to 138 hours) in overall network delay and a 43% decrease (528 to 300 hours) in overall travel time relative to the 2035 "No Build" conditions.

Based on these findings, the study recommends implementing the combined improvement strategy (scenario 6), which involves (1) adding an outbound lane and gate to accommodate the outbound traffic from the new facility, and (2) reducing gate processing times to ease congestion at the gates and minimize bottlenecks at intersections. Gate processing times can be reduced by implementing a real-time truck appointment system integrated with AI algorithms that predict traffic patterns and optimize resource allocation. Additionally, LPR and OCR technologies can be used to further expedite processing by automatically validating trucks and cargo that have completed all required documentation in advance.

These strategies are both scalable and adaptable. For example, automated gate systems and truck appointment systems can be introduced gradually—initially during peak periods, then expanded as needed. Lane assignments can be dynamically adjusted in response to evolving traffic patterns, usage levels, or operational hours. The new entrance layout can also be reconfigured or repurposed in the future to accommodate terminal reorganization or changes in cargo types. For example, if the vehicle storage yards are later converted into container handling facilities, the entrance can be reconfigured to e.g., by adding dedicated lanes with OCR portals, installing RFID for automated container identification, etc.

Technology components, such as AI-integrated scheduling systems and LPR lanes, are relatively low-cost solutions to congestion. At the same time, infrastructure improvements, such as new entrance gates, are more expensive, depending on the scale of the project. For example, the estimated contract cost for building a 12-lane gate complex at the Northwest Seaport Alliance (Seattle-Tacoma) was $10 to $14 million (Magli, 2024). At the Port of Los Angeles, $850,000 was allocated toward an AI-driven appointment engine as part of the funding specified for the integration of AI into their truck appointment system (California Governor's Office of Business and Economic Development, 2024)

This study had several limitations. First, the model was developed using data from only two days, and simulations were conducted for only $3\frac{1}{2}$ hours, representing the AM pre-peak and post-peak period. However, port operations are variable, with traffic volumes tied to shipping schedules. Incorporating multi-day data that captures variations resulting from different vessel schedules, cargo operations, weather conditions, and seasonal fluctuations in cargo and traffic volumes would be beneficial. Additionally, 24-hour simulations capturing off-peak conditions will enable a more comprehensive understanding of cumulative delay, gate performance, and network resilience.

Second, the study did not include a cost assessment of the proposed interventions, primarily due to the lack of accessible capital expenditure information to perform a comprehensive cost assessment.

Third, at the time of this study, information on projected future rail volumes was unavailable and therefore not incorporated into the analysis. The terminal is expected to begin handling approximately 22 rail cars per day starting in 2027.

Fourth, although the assumed 30% reduction in gate processing time is consistent with industry practice and prior implementations, the study does not include a formal sensitivity analysis to assess how variations in this assumption may affect the study results.

Finally, the study used travel time and speed data from BlueTOAD devices. Despite their advantages, BlueTOAD data has some limitations. For example, the BlueTOAD devices occasionally went offline, resulting in missing data and low detection counts at certain locations, which were supplemented using CCTV footage.

9 REFERENCES

Abadi, A., Baphana, M., & Ioannou, P. (2009). Simulation models for evaluation of terminal operations and traffic flow on adjacent road network. In *IFAC Proceedings Volumes (IFAC-PapersOnline)* (Vol. 42, Issue 15). IFAC. https://doi.org/10.3182/20090902-3-US-2007.0091

Archer, J. (1997). *F Undamental T Raffic S Afety I Ssues C Oncerning*. *January*. https://doi.org/10.1007/0-387-24109-4

Arvis, J.-F., Vesin, V., Carruthers, R., Ducruet, C., & De Langen, P. (2018). Hinterland Connectivity. *Maritime Networks, Port Efficiency, and Hinterland Connectivity in the Mediterranean*, 47–68. https://doi.org/10.1596/978-1-4648-1274-3_ch3

Chang, H., Jula, H., Chassiakos, A., & Ioannou, P. (2009). Integrated simulation of freeway traffic flow and container terminal operation: Framework and case study. In *IFAC Proceedings Volumes (IFAC-PapersOnline)* (Vol. 42, Issue 15). IFAC. https://doi.org/10.3182/20090902-3-US-2007.0080

Chen, X., Zhou, X., & List, G. F. (2011). Using time-varying tolls to optimize truck arrivals at ports. *Transportation Research Part E: Logistics and Transportation Review*, *47*(6), 965–982. https://doi.org/10.1016/j.tre.2011.04.001

County, C., & County, M. (2007). *Unified Planning Work Program*. *0050*(20). http://www.miamidadetpo.org/library/reports/upwp/2015-2016-unified-planning-work-program-2014-06.pdf

Du, X., & Sun, D. (2018). Research on the arterial coordination control of road intersections in port areas based on vissim simulation. *Proceedings of the 30th Chinese Control and Decision Conference, CCDC 2018*, 5744–5747. https://doi.org/10.1109/CCDC.2018.8408134

Ezzahra, S. F., Abdelouahad, B., Khalifa, M., & Mohammed, Q. (2023). Optimizing Port Operations: Synchronization, Collision Avoidance, and Efficient Loading and Unloading Processes. *International Journal of Advanced Computer Science and Applications*, *14*(7), 613–620. https://doi.org/10.14569/IJACSA.2023.0140768

FDOT. (2021). Traffic Analysis Handbook. *Florida Department of Transportation*, *May*, 164. https://www.fdot.gov/planning/systems/systems-management/traffic-analysis

GIDADO, U. (2015). Consequences of Port Congestion on Logistics and Supply Chain in African Ports. *Developing Country Studies*, *5*(6), 160–168. http://iiste.org/Journals/index.php/DCS/article/download/20933/21177

Heilig, L., & Voß, S. (2017). Information systems in seaports: a categorization and overview. *Information Technology and Management*, *18*(3), 179–201. https://doi.org/10.1007/s10799-016-0269-1

JAXPORT. (n.d.). *Technical Specifications*. Retrieved June 25, 2025, from https://www.jaxport.com/cargo/facilities/tech-specs/

JAXPORT. (2023, December 28). *Blount Island Vehicle Berth Upgrades*. https://www.jaxport.com/blount-island-vehicle-berth-upgrades/

JAXPORT. (2025, March 12). *Increasing efficiency at JAXPORT's Blount Island terminal*. https://www.jaxport.com/increasing-efficiency-at-jaxports-blount-island-terminal-for-shippers-and-cargo-owners/

Jr, J. G. P., McLeod, M., & Leue, M. C. (1996). Simulation Modeling of Traffic Access for Port Planning. *Transportation Research Circular*, *1991*, 180–186. http://trid.trb.org/view.aspx?id=463190

Karakikes, I., Spangler, M., & Margreiter, M. (2017). Designing a Vissim-Model for a motorway network with systematic calibration on the basis of travel time measurements. *Transportation Research Procedia*, *24*, 171–179. https://doi.org/10.1016/j.trpro.2017.05.086

Li, B., Tan, K. W., & Tran, K. T. (2016). Traffic simulation model for port planning and congestion prevention. *Proceedings - Winter Simulation Conference*, *0*, 2382–2393. https://doi.org/10.1109/WSC.2016.7822278

Linbins. (n.d.). *YTI Terminal: Enhancing Productivity in Yard and Terminal Operations - Linbis Logistics Software*. Retrieved June 25, 2025, from https://www.linbis.com/general/yti-terminal-enhancing-productivity-in-yard-and-terminal-operations/

Ma, M., Fan, H., Jiang, X., & Guo, Z. (2019). Truck arrivals scheduling with vessel dependent timewindows to reduce carbon emissions. *Sustainability (Switzerland)*, *11*(22). https://doi.org/10.3390/su11226410

Maguire, A., Ivey, S., Golias, M. M., & Lipinski, M. E. (2010). Relieving Congestion at Intermodal Marine Container Terminals: Review of Tactical/Operational Strategies. *51st Annual Transportation Research Forum, Arlington, Virginia, March 11-13, 2010*. https://doi.org/10.22004/AG.ECON.207280

Mahdi, M. B., Leong, L. V., & Sadullah, A. F. M. (2019). Use of Microscopic Traffic Simulation Software to Determine Heavy-Vehicle Influence on Queue Lengths at Toll Plazas. *Arabian Journal for Science and Engineering*, *44*(8), 7297–7311. https://doi.org/10.1007/s13369-019-03809-7

McCartt, A. T., Hellinga, L. A., & Solomon, M. G. (2008). Work schedules of long-distance truck drivers before and after 2004 hours-of-service rule change. *Traffic Injury Prevention*, *9*(3), 201–210. https://doi.org/10.1080/15389580802040287

Motono, I., Furuichi, M., Ninomiya, T., Suzuki, S., & Fuse, M. (2016). Insightful observations on trailer queues at landside container terminal gates: What generates congestion at the gates? *Research in Transportation Business and Management*, *19*, 118–131. https://doi.org/10.1016/J.RTBM.2016.04.001

Muchori, P. K. (2015). The Effects of Road Traffic Congestion on the Efficiency of Freight Logistics: A Survey of the Port of Mombasa. . *The International Journal of Business & Management,* , *3*(10), 339–370.

ODOT. (2011). *Protocol for VISSIM Simulation*. https://www.oregon.gov/odot/Planning/Documents/APMv2_Add15A.pdf?

PORTIC. (2015). *From a Paperless Port towards a Smart Port*. http://iaphworldports-org.check-xbiz.jp/n-iaph/wp-content/uploads/2020/12/ITAward2015_Silver_Bracelona.pdf

PTV GROUP. (2022). *Manual PTV Vissim 2022*. file:///C:/Program Files/PTV Vision/PTV Vissim 2022/Doc/Eng/Vissim 2022 - Manual.pdf

Puglisi, C. M. (2008). *Issues and challenges of federating between different transportation simulators*. Georgia Institute of Technology. http://hdl.handle.net/1853/26507

Rajamanickam, G. D., & Ramadurai, G. (2016). Simulation of truck congestion in Chennai port. *Proceedings - Winter Simulation Conference*, *2016-Febru*, 1904–1915. https://doi.org/10.1109/WSC.2015.7408307

Regan, A. C., & Golob, T. F. (2000). Trucking industry perceptions of congestion problems and potential solutions in maritime intermodal operations in California. *Transportation Research Part A: Policy and Practice*, *34*(8), 587–605. https://doi.org/10.1016/S0965-8564(99)00042-7

Roberts, T., Williams, I., Preston, J., Clarke, N., Odum, M., & O'Gorman, S. (2023). Ports in a Storm: Port-City Environmental Challenges and Solutions. *Sustainability (Switzerland)*, *15*(12), 1–24. https://doi.org/10.3390/su15129722

Saeed, N., Song, D. W., & Andersen, O. (2018). Governance mode for port congestion mitigation: A transaction cost perspective. *NETNOMICS: Economic Research and Electronic Networking*, *19*(3), 159–178. https://doi.org/10.1007/s11066-018-9123-4

Shi, Z. (2021). Research on the Capacity of Port Collecting and Distributing Road based on VISSIM. *International Core Journal of Engineering*, *7*(8), 411–418. https://doi.org/10.6919/ICJE.202108

Spasovic, L. N., He Graduate Student, Y., & Besenski, D. (2015). *Quantifying Impact of Port Truck Traffic on Highway Operations Using GPS-Based Speed Data Final Report*. *May*. https://cait.rutgers.edu/wp-content/uploads/2018/05/cait-utc-023-final.pdf

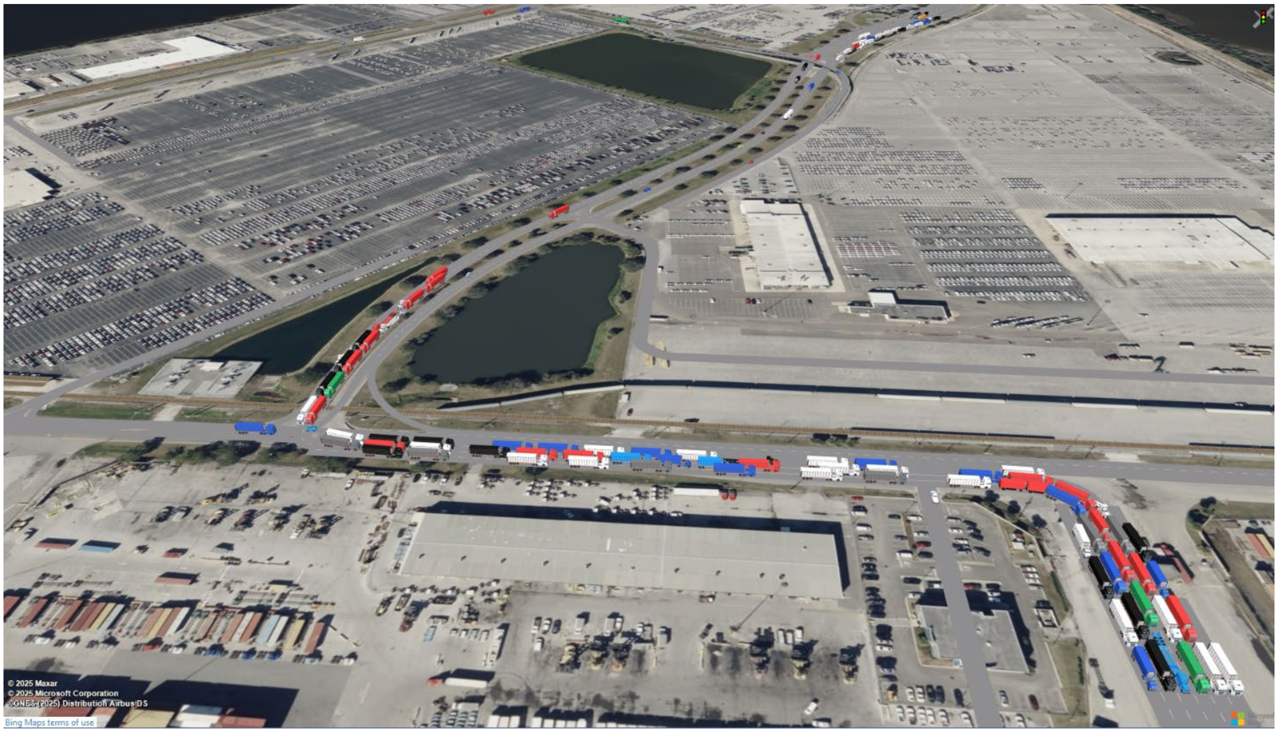
Wan, Y., Zhang, A., & Yuen, A. C. L. (2013). Urban road congestion, capacity expansion and port competition: Empirical analysis of US container ports. *Maritime Policy and Management*, *40*(5), 417–438. https://doi.org/10.1080/03088839.2013.797615

Xu, B., Liu, X., Yang, Y., Li, J., & Postolache, O. (2021). Optimization for a multi-constraint truck appointment system considering morning and evening peak congestion. *Sustainability (Switzerland)*, *13*(3), 1–19. https://doi.org/10.3390/su13031181

Ziemska-Osuch, M., & Guze, S. (2023). Analysis of the Impact of Road Traffic Generated by Port Areas on the Urban Transport Network—Case Study of the Port of Gdynia. *Applied Sciences (Switzerland)*, *13*(1). https://doi.org/10.3390/app13010200

10 APPENDIX

A sample visualization snapshot of the VISSIM model



Balanced hourly traffic volumes (Base model)

Note:

- Demand – total number of vehicles measured in vehicles per hour
- Rel Flow (Relative Flow) – proportion of the total number of vehicles attributed to a specific movement
- AV (Approach Volume) – total number of vehicles arriving at an intersection approach

Heckscher Dr./Blount Island												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	39	0	17	0	0	0	4	391	0	0	384	31
Rel Flow	0.696	0.000	0.304	0.000	0.000	0.000	0.010	0.990	0.000	0.000	0.925	0.075
AV		56			0			395			415	
Blount Island/Channel View Blvd.												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	106	22	14	0	13	22	0	0	0	34	3	86
Rel Flow	0.746	0.155	0.099	0.000	0.371	0.629	0.000	0.000	0.000	0.276	0.024	0.699
AV		142			35			0			123	
Blount Island/Dave Rawls Blvd.												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	0	0	79	0	20	0	346	114	28	367	0
Rel Flow	0.000	0.000	0.000	0.798	0.000	0.202	0.000	0.752	0.248	0.071	0.929	0.000
AV		0			99			460			395	

Blount Island/Ceres Marine Terminals North Entrance												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	33	0	0	0	0	0	0	0	0	0	0	68
Rel Flow	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
AV	33			0			0			68		
Blount Island/Ceres Marine Terminals Entrance 2												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	26	33	2	0	68	0	3	0	0	0	0	12
Rel Flow	0.426	0.541	0.033	0.000	1.000	0.000	1.000	0.000	0.000	0.000	0.000	1.000
AV	61			68			3			12		
Blount Island/JFRD Fire Station Entrance												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	1	60	0	0	79	4	0	0	0	1	0	1
Rel Flow	0.016	0.984	0.000	0.000	0.952	0.048	0.000	0.000	0.000	0.500	0.000	0.500
AV	61			83			0			2		
Blount Island/Ceres Marine Terminal South Entrance												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	18	58	0	0	74	6	0	0	0	3	0	11
Rel Flow	0.237	0.763	0.000	0.000	0.925	0.075	0.000	0.000	0.000	0.214	0.000	0.786
AV	76			80			0			14		
Blount Island/Intermodal Dr.												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	91	50	12	10	35	40	65	8	6	20	10	55
Rel Flow	0.595	0.327	0.078	0.118	0.412	0.471	0.823	0.101	0.076	0.235	0.118	0.647
AV	153			85			79			85		
Blount Island/AMPORTS North Entrance												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	126	1	8	148	0	1	0	30	0	0	0
Rel Flow	0.000	0.992	0.008	0.051	0.949	0.000	0.032	0.000	0.968	0.000	0.000	0.000
AV	127			156			31			0		
Blount Island/AMPORTS Entrance 2												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	2	116	9	8	140	1	9	40	7	4	12	1
Rel Flow	0.016	0.913	0.071	0.054	0.940	0.007	0.161	0.714	0.125	0.235	0.706	0.059
AV	127			149			56			17		
Blount Island/AMPORTS Entrance 3												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	34	83	0	0	69	81	0	0	0	44	0	8
Rel Flow	0.291	0.709	0.000	0.000	0.460	0.540	0.000	0.000	0.000	0.846	0.000	0.154
AV	117			150			0			52		
Blount Island/AMPORTS South Entrance												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	79	0	5	48	24	1	6	6	32	2	0
Rel Flow	0.000	1.000	0.000	0.065	0.623	0.312	0.077	0.462	0.462	0.941	0.059	0.000
AV	79			77			13			34		
William Mills St./SSA Cooper Entrance												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	42	1	1	1	1	9	0	50	23	7	15	28
Rel Flow	0.955	0.023	0.023	0.091	0.091	0.818	0.000	0.000	0.000	0.140	0.300	0.560
AV	44			11			73			50		
William Mills St./Blount Island												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	8	3	1	17	5	27	4	51	46	30	32	1
Rel Flow	0.667	0.250	0.083	0.347	0.102	0.551	0.040	0.505	0.455	0.476	0.508	0.016
AV	12			49			101			63		
William Mills St./Longshore Way												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	25	0	5	0	0	0	9	76	0	0	58	86
Rel Flow	0.833	0.000	0.167	0.000	0.000	0.000	0.106	0.894	0.000	0.000	0.403	0.597
AV	30			0			85			144		
William Mills St./Maritime St.												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	42	0	3	0	0	0	0	101	0	0	141	0
Rel Flow	0.933	0.000	0.067	0.000	0.000	0.000	0.000	1.000	0.000	0.000	1.000	0.000
AV	45			0			101			141		
William Mills St./AMPORTS Entrance adjacent to Dave Rawls Blvd.												

	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	23	0	1	10	0	5	5	137	1	0	130	15
Rel Flow	0.958	0.000	0.042	0.667	0.000	0.333	0.035	0.958	0.007	0.000	0.897	0.103
AV	24			15			143			145		

William Mills St./Dave Rawls Blvd.

	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	0	0	131	0	161	0	17	165	104	15	0
Rel Flow	0.000	0.000	0.000	0.449	0.000	0.551	0.000	0.093	0.907	0.874	0.126	0.000
AV	0			292			182			119		

William Mills St./SSA

	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	0	0	0	0	0	0	21	132	0	87	1
Rel Flow	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.863	0.000	0.989	0.011
AV	0	0	0	0	0	0	153	0	0	88	0	0

William Mills St./Container Way

	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	1	0	14	0	0	0	7	9	0	0	10	4
Rel Flow	0.067	0.000	0.933	0.000	0.000	0.000	0.438	0.563	0.000	0.000	0.714	0.286
AV	15			0			16			14		

Intermodal Dr./Dave Rawls

	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	229	24	77	288	0	4	0	167	0	0	0
Rel Flow	0.000	0.905	0.095	0.211	0.789	0.000	0.023	0.000	0.977	0.000	0.000	0.000
AV	253			365			171			0		

Intermodal Dr./East Parking lot Entrance along Intermodal Dr.

	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	0	0	1	0	14	0	157	1	0	101	0
Rel Flow	0.000	0.000	0.000	0.067	0.000	0.933	0.000	0.994	0.006	0.000	1.000	0.000
AV	0			15			158			101		

Intermodal Dr./West Parking lot Entrance along Intermodal Dr.

	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	7	0	0	1	0	13	0	138	1	5	84	13
Rel Flow	1.000	0.000	0.000	0.071	0.000	0.929	0.000	0.993	0.007	0.049	0.824	0.127
AV	7			14			139			102		

Blount Island/POV parking lot

	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	390	6	0	364	2	1	0	5	0	0	0
Rel Flow	0.000	0.985	0.015	0.000	0.995	0.005	0.167	0.000	0.833	0.000	0.000	0.000
AV	396			366			6			0		

Heckscher Dr./Dave Rawls

	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	3	460	0	0	0	0	0	392	460	0	0	0
Rel Flow	0.006	0.994	0.000	0.000	0.000	0.000	0.000	0.460	0.540	0.000	0.000	0.000
AV	463			0			852			0		

Balanced hourly traffic volumes (2030)

Heckscher Dr./Blount Island

	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	45	0	19	0	0	0	5	391	0	0	384	38
Rel Flow	0.703	0.000	0.297	0.000	0.000	0.000	0.013	0.987	0.000	0.000	0.910	0.090
AV	64			0			396			422		

Blount Island/Channel View Blvd.

	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	121	25	17	0	16	27	0	0	0	39	3	97
Rel Flow	0.742	0.153	0.104	0.000	0.372	0.628	0.000	0.000	0.000	0.281	0.022	0.698
AV	163			43			0			139		

Blount Island/Dave Rawls Blvd.

	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	0	0	90	0	22	0	428	131	32	437	0
Rel Flow	0.000	0.000	0.000	0.804	0.000	0.196	0.000	0.766	0.234	0.068	0.932	0.000
AV	0			112			559			469		

Blount Island/Ceres Marine Terminals North Entrance

	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL

Demand	39	0	0	0	0	0	0	0	0	0	0	77
Rel Flow	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
AV		39			0			0			77	
Blount Island/Ceres Marine Terminals Entrance 2												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	33	39	2	0	77	0	3	0	0	0	0	14
Rel Flow	0.446	0.527	0.027	0.000	1.000	0.000	1.000	0.000	0.000	0.000	0.000	1.000
AV		74			77			3			14	
Blount Island/JFRD Fire Station Entrance												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	1	73	0	0	89	5	0	0	0	1	0	1
Rel Flow	0.014	0.986	0.000	0.000	0.947	0.053	0.000	0.000	0.000	0.500	0.000	0.500
AV		74			94			0			2	
Blount Island/Ceres Marine Terminal South Entrance												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	20	71	0	0	83	7	0	0	0	3	0	12
Rel Flow	0.220	0.780	0.000	0.000	0.922	0.078	0.000	0.000	0.000	0.200	0.000	0.800
AV		91			90			0			15	
Blount Island/Intermodal Dr.												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	162	57	18	11	40	44	77	77	7	27	12	62
Rel Flow	0.684	0.241	0.076	0.116	0.421	0.463	0.478	0.478	0.043	0.267	0.119	0.614
AV		237			95			161			101	
Blount Island/AMPORTS North Entrance												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	203	1	9	170	0	1	0	34	0	0	0
Rel Flow	0.000	0.995	0.005	0.050	0.950	0.000	0.029	0.000	0.971	0.000	0.000	0.000
AV		204			179			35			0	
Blount Island/AMPORTS Entrance 2												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	2	192	11	9	161	1	10	45	8	4	14	1
Rel Flow	0.010	0.937	0.054	0.053	0.942	0.006	0.159	0.714	0.127	0.211	0.737	0.053
AV		205			171			63			19	
Blount Island/AMPORTS Entrance 3												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	39	155	0	0	80	92	0	0	0	50	0	10
Rel Flow	0.201	0.799	0.000	0.000	0.465	0.535	0.000	0.000	0.000	0.833	0.000	0.167
AV		194			172			0			60	
Blount Island/AMPORTS South Entrance												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	151	0	6	56	28	1	7	7	36	2	0
Rel Flow	0.000	1.000	0.000	0.067	0.622	0.311	0.067	0.467	0.467	0.947	0.053	0.000
AV		151			90			15			38	
William Mills St./SSA Cooper Entrance												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	50	1	1	1	1	10	0	116	27	9	16	34
Rel Flow	0.962	0.019	0.019	0.083	0.083	0.833	0.000	0.000	0.000	0.153	0.271	0.576
AV		52			12			143			59	
William Mills St./Blount Island												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	9	3	1	19	6	32	4	59	113	35	39	1
Rel Flow	0.692	0.231	0.077	0.333	0.105	0.561	0.023	0.335	0.642	0.467	0.520	0.013
AV		13			57			176			75	
William Mills St./Longshore Way												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	29	0	6	0	0	0	11	89	0	0	69	106
Rel Flow	0.829	0.000	0.171	0.000	0.000	0.000	0.110	0.890	0.000	0.000	0.394	0.606
AV		35			0			100			175	
William Mills St./Maritime St.												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	53	0	4	0	0	0	0	118	0	0	171	0
Rel Flow	0.930	0.000	0.070	0.000	0.000	0.000	0.000	1.000	0.000	0.000	1.000	0.000
AV		57			0			118			171	
William Mills St./AMPORTS Entrance adjacent to Dave Rawls Blvd.												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	27	0	1	11	0	6	6	164	1	0	159	18

Rel Flow	0.964	0.000	0.036	0.647	0.000	0.353	0.035	0.959	0.006	0.000	0.898	0.102
AV	28			17			171			177		
William Mills St./Dave Rawls Blvd.												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	0	0	162	0	201	0	19	197	126	17	0
Rel Flow	0.000	0.000	0.000	0.446	0.000	0.554	0.000	0.088	0.912	0.881	0.119	0.000
AV	0			363			216			143		
William Mills St./SSA												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	0	0	0	0	0	0	25	167	0	107	1
Rel Flow	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.130	0.870	0.000	0.991	0.009
AV	0	0	0	0	0	0	192	0	0	108	0	0
William Mills St./Container Way												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	1	0	16	0	0	0	8	10	0	0	11	5
Rel Flow	0.059	0.000	0.941	0.000	0.000	0.000	0.444	0.556	0.000	0.000	0.688	0.313
AV	17			0			18			16		
Intermodal Dr./Dave Rawls												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	456	28	91	389	0	5	0	192	0	0	0
Rel Flow	0.000	0.942	0.058	0.190	0.810	0.000	0.025	0.000	0.975	0.000	0.000	0.000
AV	484			480			197			0		
Intermodal Dr./East Parking lot Entrance along Intermodal Dr.												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	0	0	1	0	18	0	179	2	0	119	0
Rel Flow	0.000	0.000	0.000	0.053	0.000	0.947	0.000	0.989	0.011	0.000	1.000	0.000
AV	0			19			181			119		
Intermodal Dr./West Parking lot Entrance along Intermodal Dr.												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	10	0	0	1	0	16	1	281	1	7	98	15
Rel Flow	1.000	0.000	0.000	0.059	0.000	0.941	0.004	0.993	0.004	0.058	0.817	0.125
AV	10			17			283			120		
Blount Island/POV parking lot												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	641	7	0	479	2	1	0	6	0	0	0
Rel Flow	0.000	0.989	0.011	0.000	0.996	0.004	0.143	0.000	0.857	0.000	0.000	0.000
AV	648			481			7			0		
Heckscher Dr./Dave Rawls												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	3	722	0	0	0	0	0	392	590	0	0	0
Rel Flow	0.004	0.996	0.000	0.000	0.000	0.000	0.000	0.399	0.601	0.000	0.000	0.000
AV	725			0			982			0		

Balanced hourly traffic volumes (2035)

Heckscher Dr./Blount Island												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	48	0	22	0	0	0	5	393	0	0	384	38
Rel Flow	0.686	0.000	0.314	0.000	0.000	0.000	0.013	0.987	0.000	0.000	0.910	0.090
AV	70			0			398			422		
Blount Island/Channel View Blvd.												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	131	27	20	0	16	27	0	0	0	43	4	106
Rel Flow	0.736	0.152	0.112	0.000	0.372	0.628	0.000	0.000	0.000	0.281	0.026	0.693
AV	178			43			0			153		
Blount Island/Dave Rawls Bvd.												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	0	0	98	0	24	0	494	144	34	491	0
Rel Flow	0.000	0.000	0.000	0.803	0.000	0.197	0.000	0.774	0.226	0.065	0.935	0.000
AV	0			122			638			525		
Blount Island/Ceres Marine Terminals North Entrance												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	41	0	0	0	0	0	0	0	0	0	0	82
Rel Flow	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
AV	41			0			0			82		

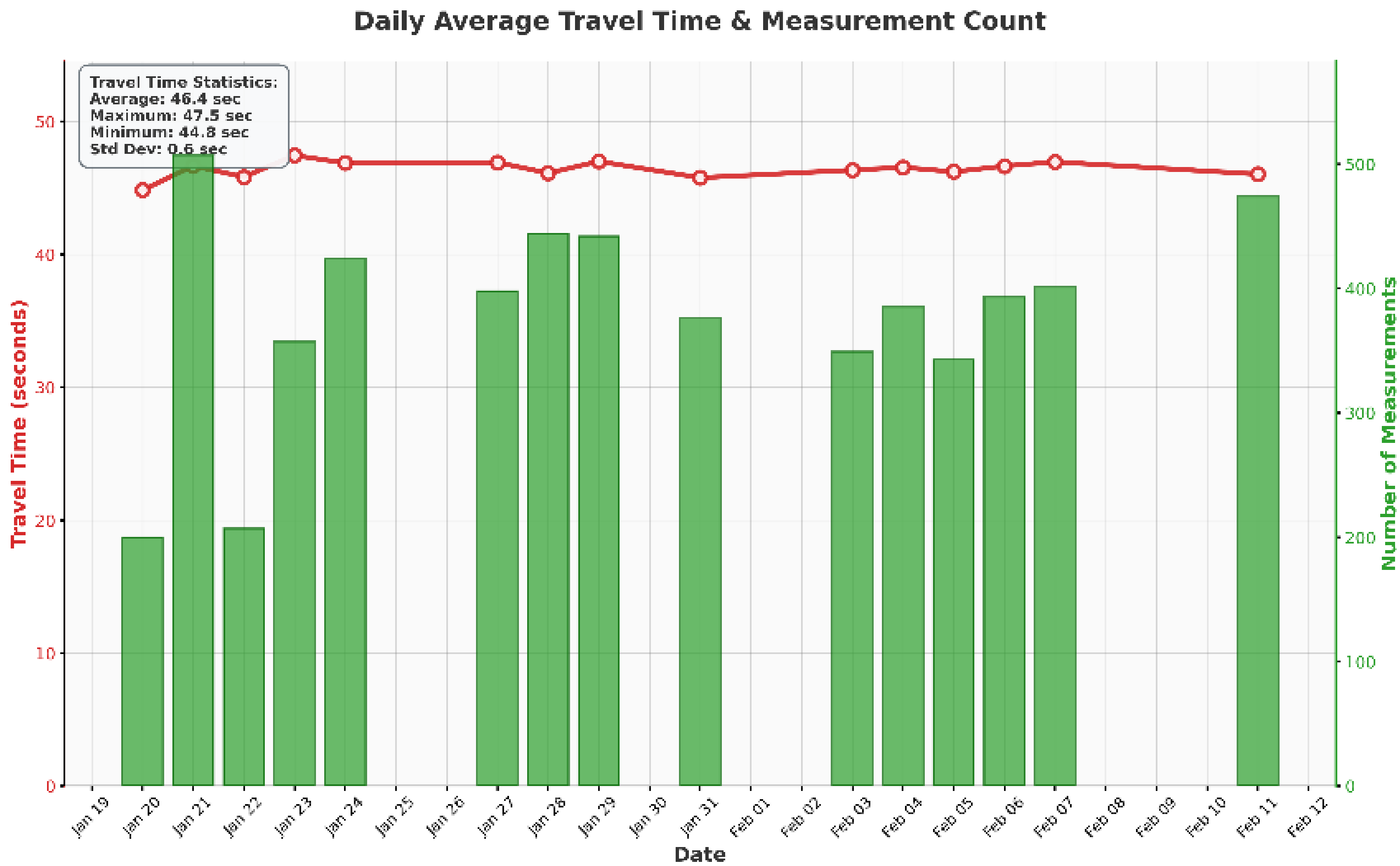
Blount Island/Ceres Marine Terminals Entrance 2												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	37	41	2	0	82	0	4	0	0	0	0	15
Rel Flow	0.463	0.513	0.025	0.000	1.000	0.000	1.000	0.000	0.000	0.000	0.000	1.000
AV		80			82			4			15	
Blount Island/JFRD Fire Station Entrance												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	1	79	0	0	96	5	0	0	0	1	0	1
Rel Flow	0.013	0.988	0.000	0.000	0.950	0.050	0.000	0.000	0.000	0.500	0.000	0.500
AV		80			101			0			2	
Blount Island/Ceres Marine Terminal South Entrance												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	23	76	0	0	90	7	0	0	0	4	0	14
Rel Flow	0.232	0.768	0.000	0.000	0.928	0.072	0.000	0.000	0.000	0.222	0.000	0.778
AV		99			97			0			18	
Blount Island/Intermodal Dr.												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	172	62	21	12	44	48	83	78	7	30	13	69
Rel Flow	0.675	0.243	0.082	0.115	0.423	0.462	0.494	0.464	0.042	0.268	0.116	0.616
AV		255			104			168			112	
Blount Island/AMPORTS North Entrance												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	219	1	9	187	0	1	0	36	0	0	0
Rel Flow	0.000	0.995	0.005	0.046	0.954	0.000	0.027	0.000	0.973	0.000	0.000	0.000
AV		220			196			37			0	
Blount Island/AMPORTS Entrance 2												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	2	207	11	10	177	1	11	50	8	5	15	1
Rel Flow	0.009	0.941	0.050	0.053	0.941	0.005	0.159	0.725	0.116	0.238	0.714	0.048
AV		220			188			69			21	
Blount Island/AMPORTS Entrance 3												
	NBR	NBT	NBL	SBR	SB	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	43	165	0	0	89	100	0	0	0	55	0	11
Rel Flow	0.207	0.793	0.000	0.000	0.471	0.529	0.000	0.000	0.000	0.833	0.000	0.167
AV		208			189			0			66	
Blount Island/AMPORTS South Entrance												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	161	0	6	64	30	1	7	7	40	2	0
Rel Flow	0.000	1.000	0.000	0.060	0.640	0.300	0.067	0.467	0.467	0.952	0.048	0.000
AV		161			100			15			42	
William Mills St./SSA Cooper Entrance												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	58	1	1	1	1	11	0	121	30	10	17	39
Rel Flow	0.967	0.017	0.017	0.077	0.077	0.846	0.000	0.000	0.000	0.152	0.258	0.591
AV		60			13			151			66	
William Mills St./Blount Island												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	9	3	1	21	7	37	5	66	119	39	44	1
Rel Flow	0.692	0.231	0.077	0.323	0.108	0.569	0.026	0.347	0.626	0.464	0.524	0.012
AV		13			65			190			84	
William Mills St./Longshore Way												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	32	0	7	0	0	0	12	100	0	0	77	125
Rel Flow	0.821	0.000	0.179	0.000	0.000	0.000	0.107	0.893	0.000	0.000	0.381	0.619
AV		39			0			112			202	
William Mills St./Maritime St.												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	62	0	4	0	0	0	0	132	0	0	198	0
Rel Flow	0.939	0.000	0.061	0.000	0.000	0.000	0.000	1.000	0.000	0.000	1.000	0.000
AV		66			0			132			198	
William Mills St./AMPORTS Entrance adjacent to Dave Rawls Blvd.												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	30	0	1	12	0	6	6	187	1	0	185	19
Rel Flow	0.968	0.000	0.032	0.667	0.000	0.333	0.031	0.964	0.005	0.000	0.907	0.093
AV		31			18			194			204	
William Mills St./Dave Rawls Blvd.												

	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	0	0	187	0	232	0	22	223	143	19	0
Rel Flow	0.000	0.000	0.000	0.446	0.000	0.554	0.000	0.090	0.910	0.883	0.117	0.000
AV	0			419			245			162		
William Mills St./SSA												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	0	0	0	0	0	0	27	196	0	122	1
Rel Flow	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.121	0.879	0.000	0.992	0.008
AV	0	0	0	0	0	0	223	0	0	123	0	0
William Mills St./Container Way												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	1	0	17	0	0	0	9	11	0	0	12	5
Rel Flow	0.056	0.000	0.944	0.000	0.000	0.000	0.450	0.550	0.000	0.000	0.706	0.294
AV	18			0			20			17		
Intermodal Dr./Dave Rawls												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	492	32	103	445	0	5	0	212	0	0	0
Rel Flow	0.000	0.939	0.061	0.188	0.812	0.000	0.023	0.000	0.977	0.000	0.000	0.000
AV	524			548			217			0		
Intermodal Dr./East Parking lot Entrance along Intermodal Dr.												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	0	0	1	0	20	0	197	1	0	135	0
Rel Flow	0.000	0.000	0.000	0.048	0.000	0.952	0.000	0.995	0.005	0.000	1.000	0.000
AV	0			21			198			135		
Intermodal Dr./West Parking lot Entrance along Intermodal Dr.												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	10	0	0	1	0	17	0	297	1	8	111	17
Rel Flow	1.000	0.000	0.000	0.056	0.000	0.944	0.000	0.997	0.003	0.059	0.816	0.125
AV	10			18			298			136		
Blount Island/POV parking lot												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	0	697	7	0	547	2	1	0	6	0	0	0
Rel Flow	0.000	0.990	0.010	0.000	0.996	0.004	0.143	0.000	0.857	0.000	0.000	0.000
AV	704			549			7			0		
Heckscher Dr./Dave Rawls												
	NBR	NBT	NBL	SBR	SBT	SBL	EBR	EBT	EBL	WBR	WBT	WBL
Demand	5	786	0	0	0	0	0	392	669	0	0	0
Rel Flow	0.006	0.994	0.000	0.000	0.000	0.000	0.000	0.369	0.631	0.000	0.000	0.000
AV	791			0			1061			0		

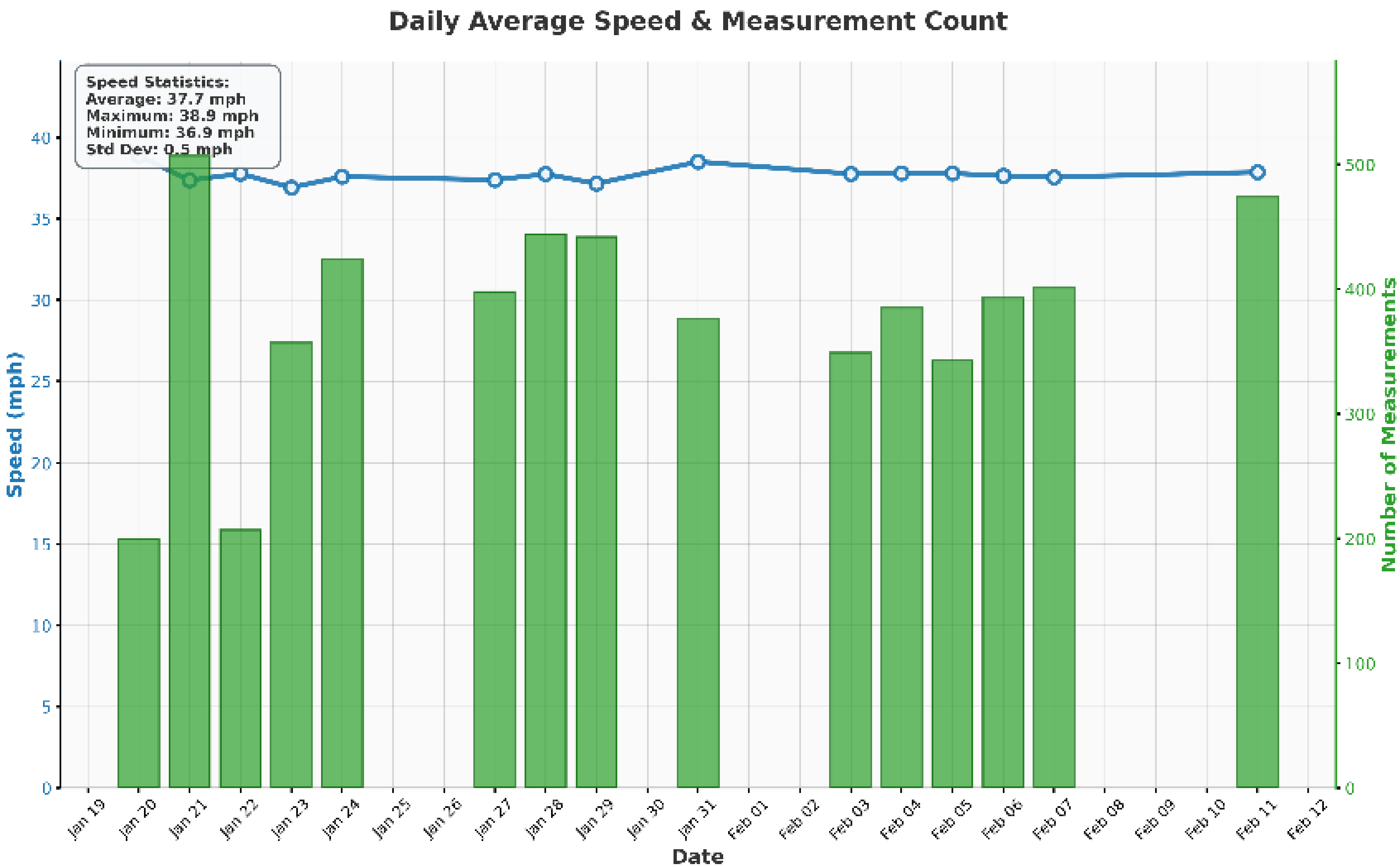
BlueTOAD Data

This section summarizes the travel time and speed data retrieved from the BlueTOAD devices for the different travel time segments during the peak hour of traffic flow from 11:15 AM to 12:15 PM

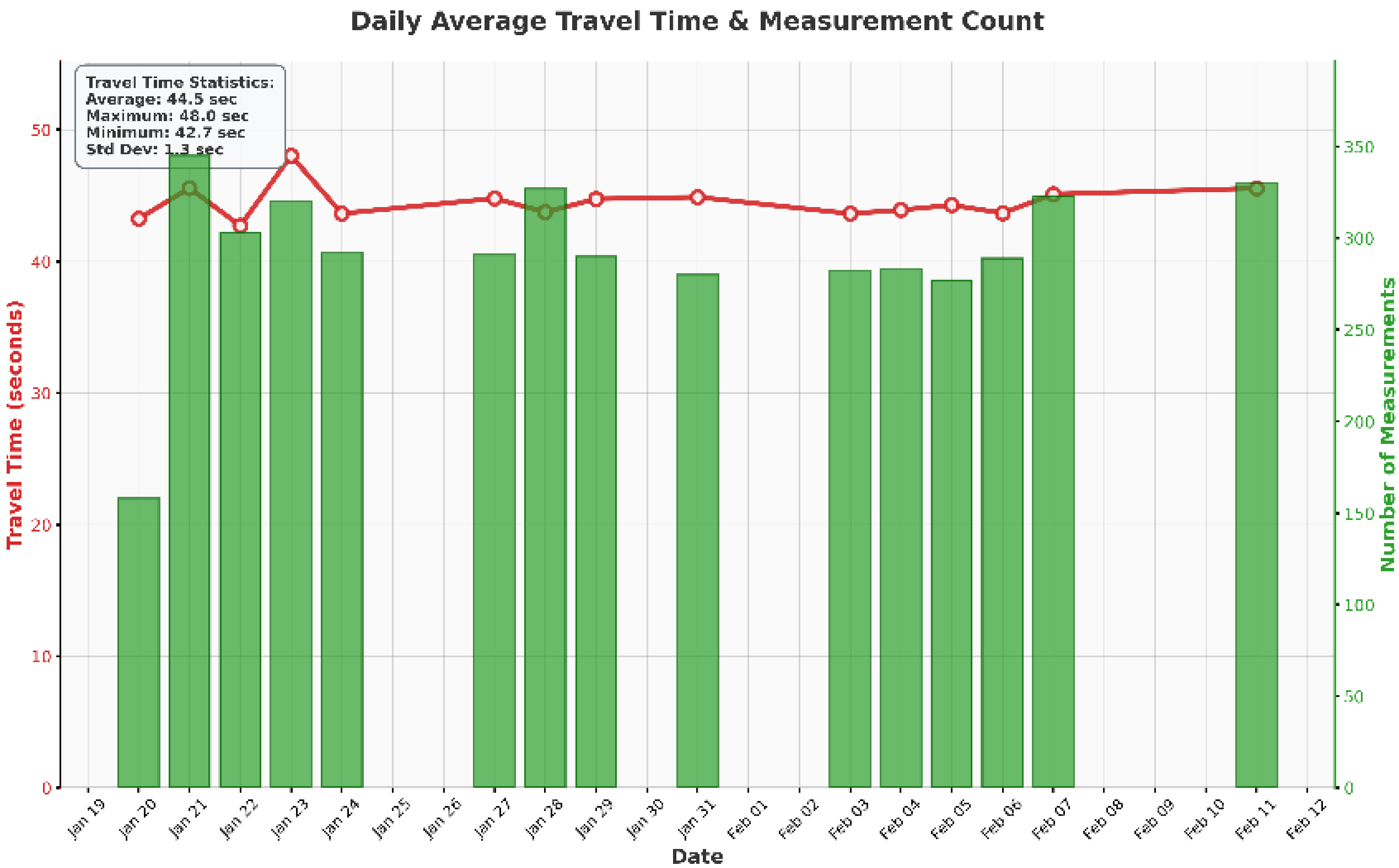
Heckscher Drive to Dave Rawls/Blount Island Boulevards



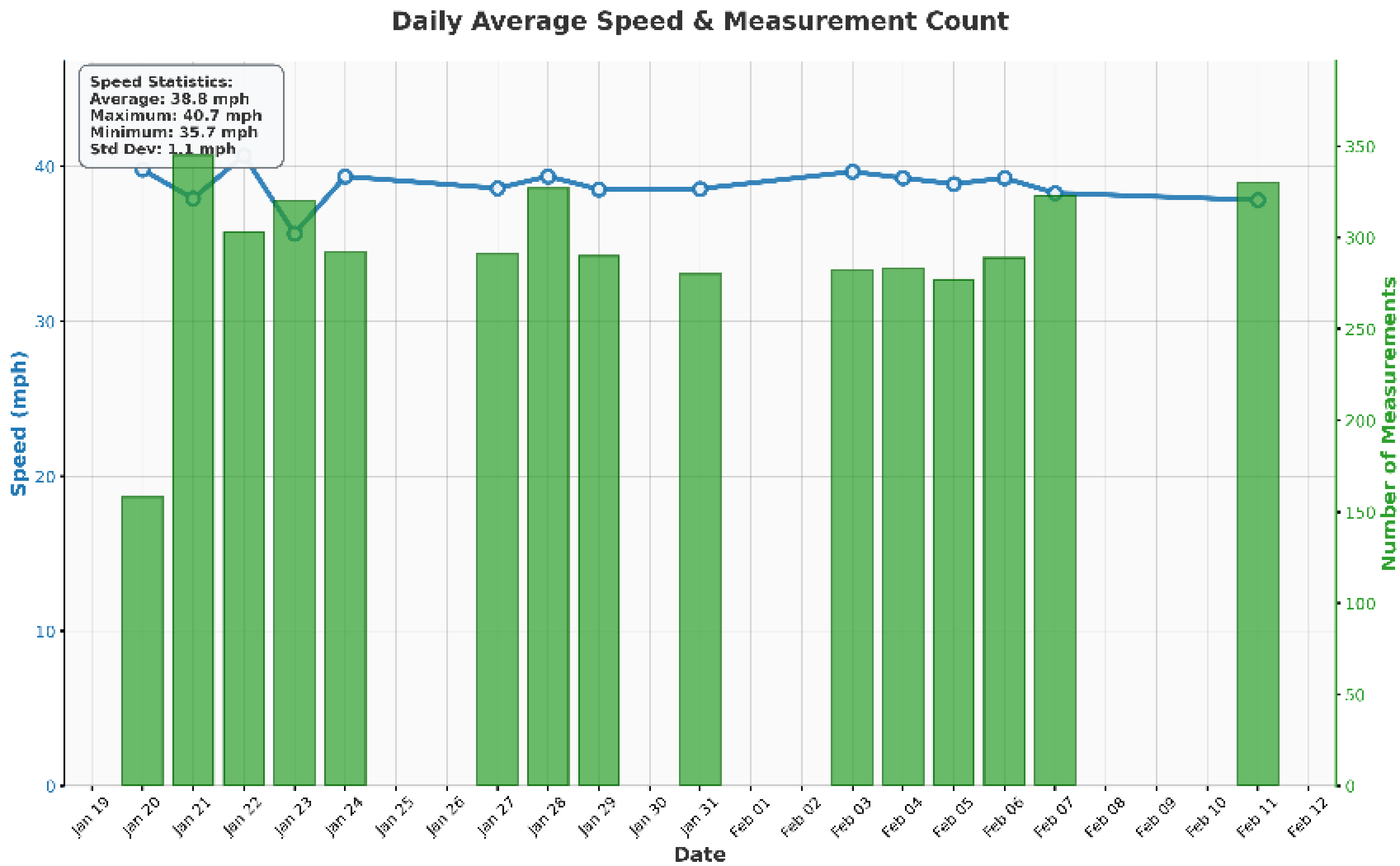
Heckscher Drive to Dave Rawls/Blount Island Boulevards



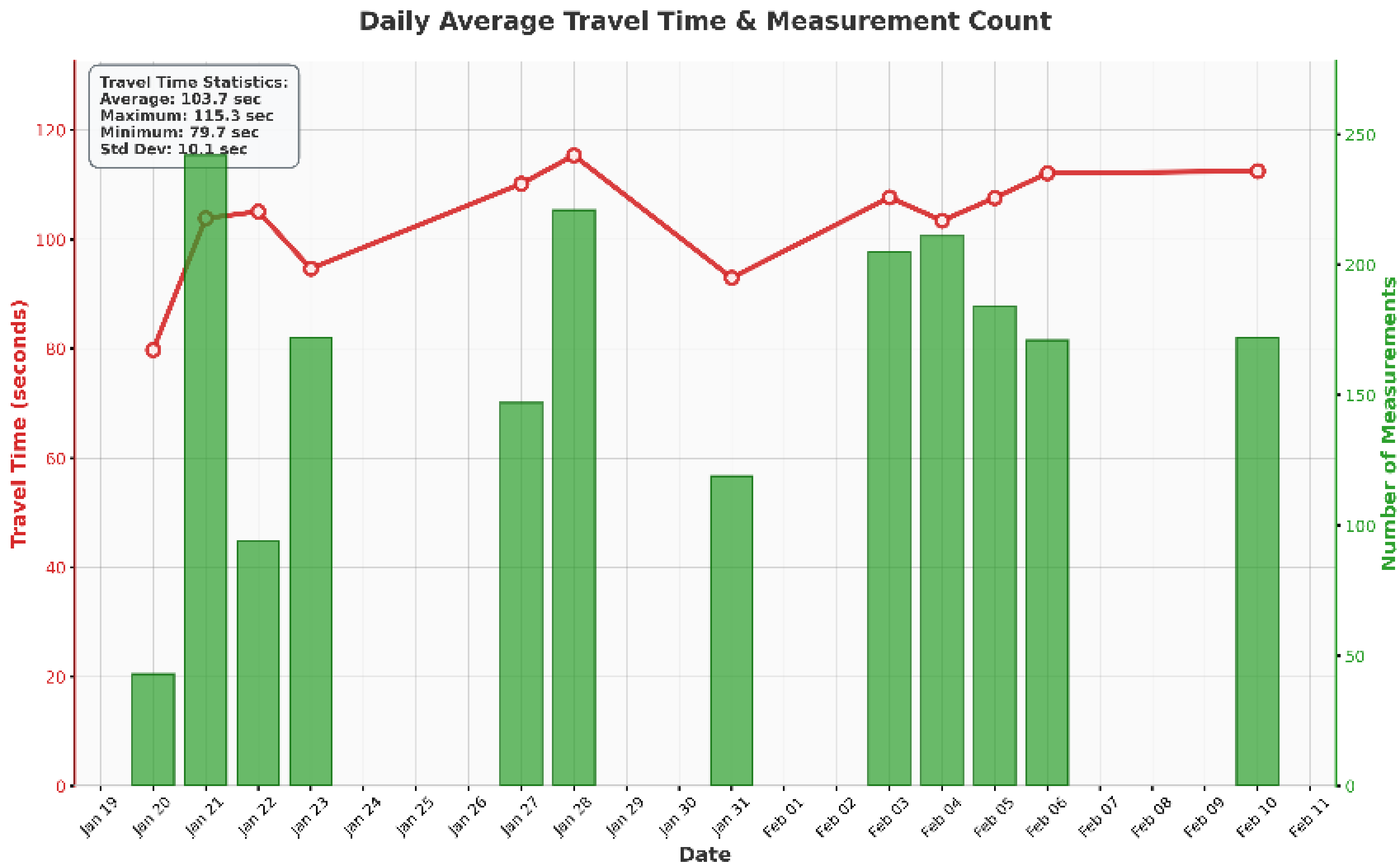
Dave Rawls/Blount Island Boulevards to Heckscher Drive



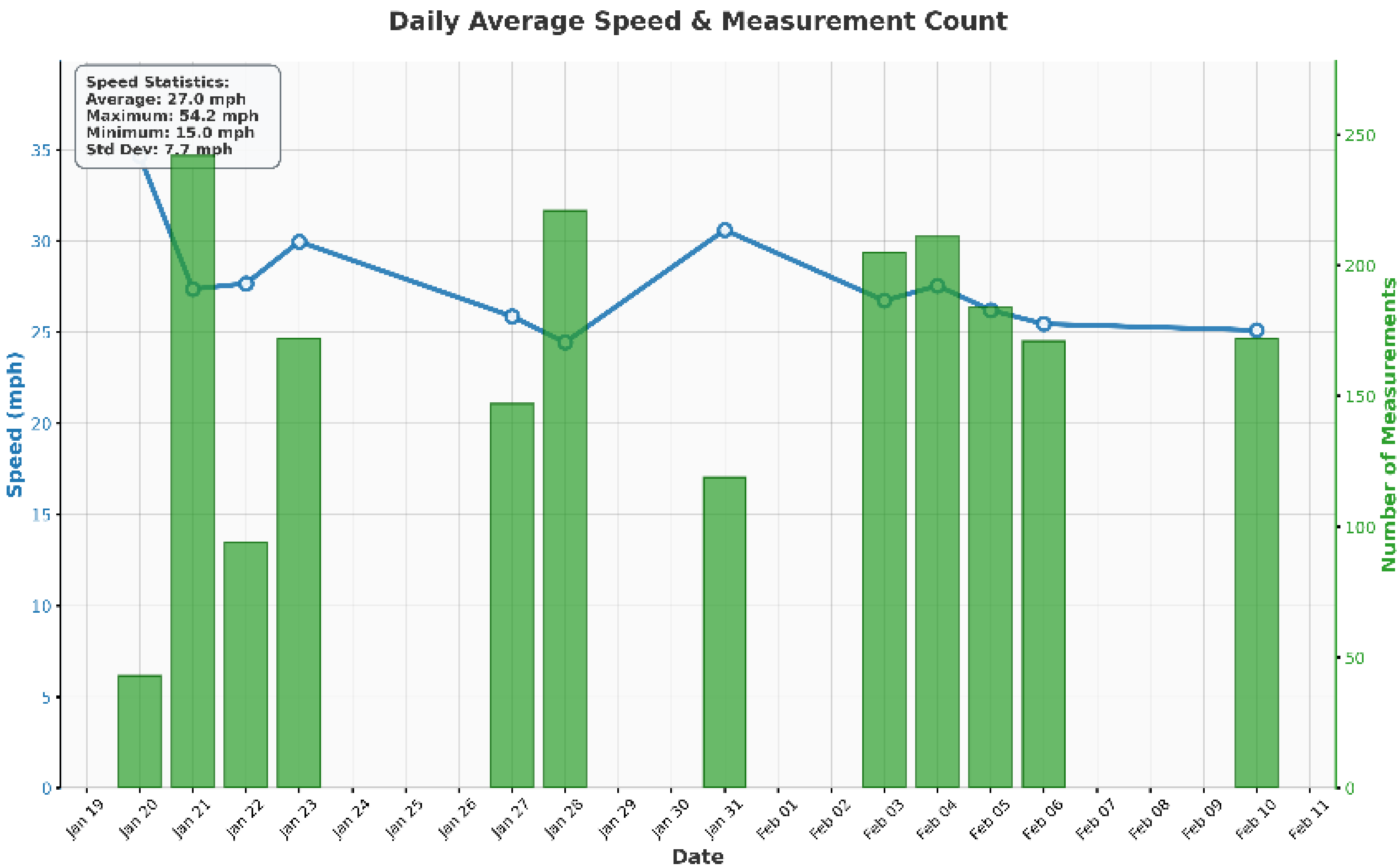
Dave Rawls/Blount Island Boulevards to Heckscher Drive



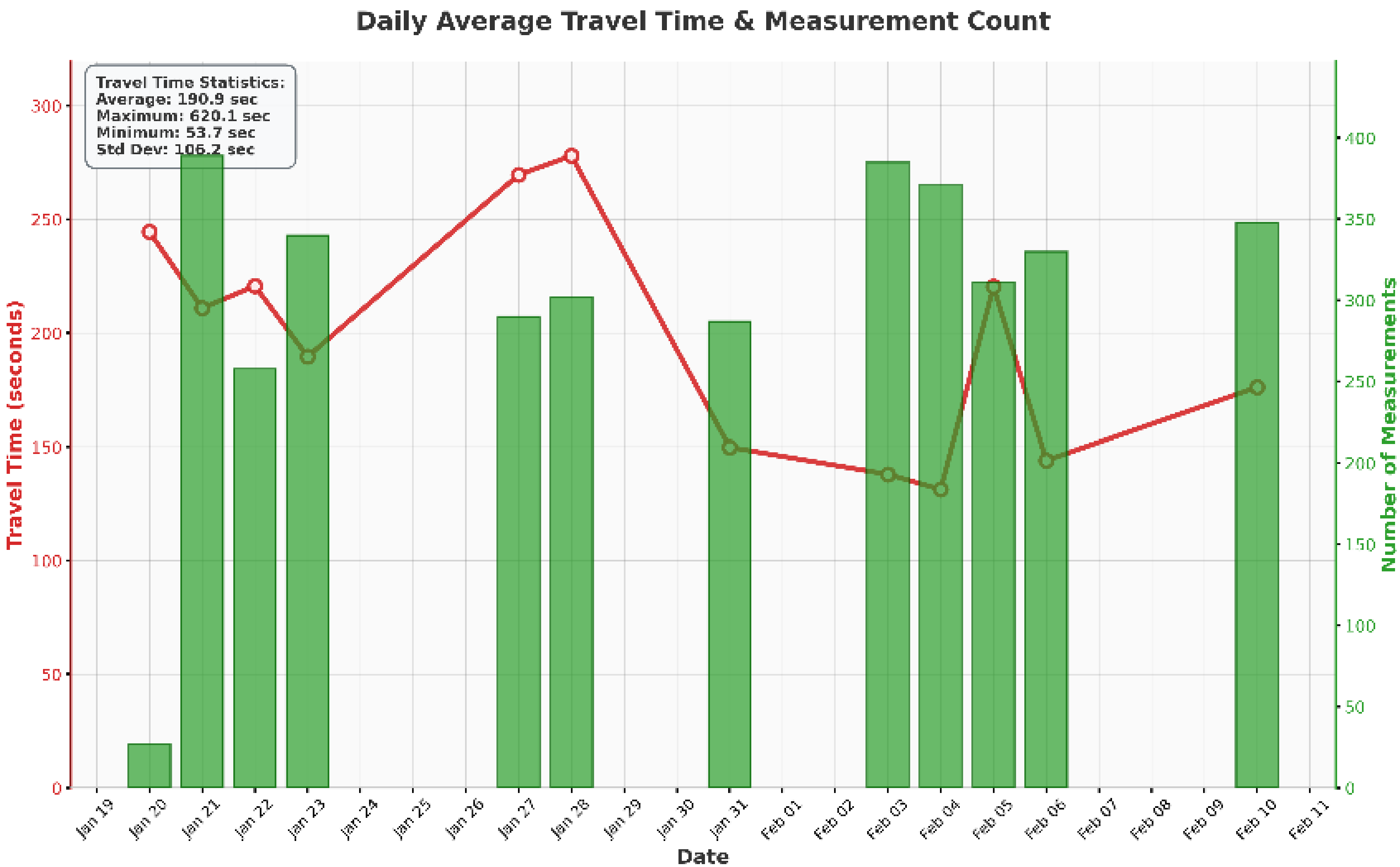
SSA Atlantic to Gate



SSA Atlantic to Gate



Gate to SSA Atlantic



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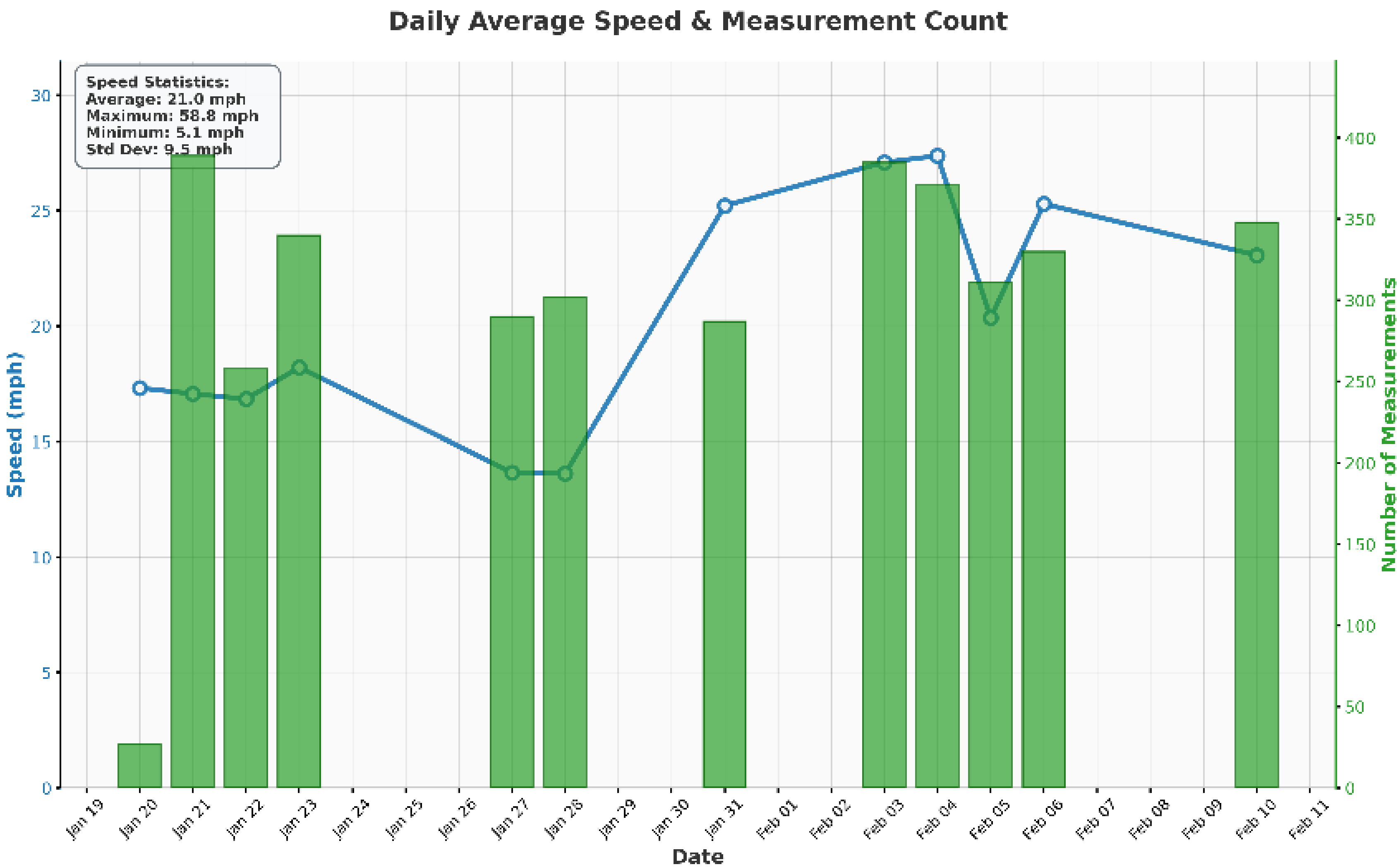
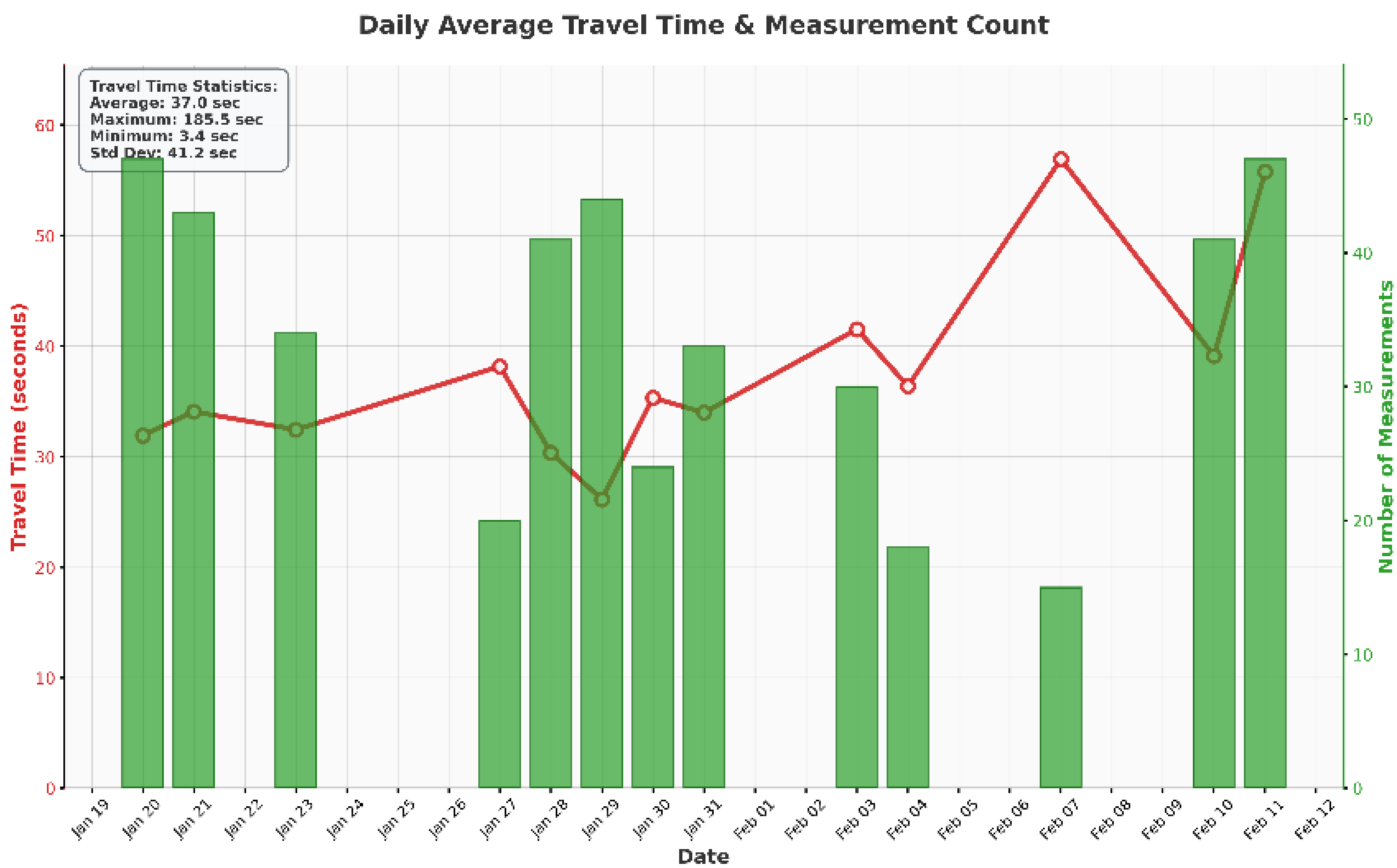
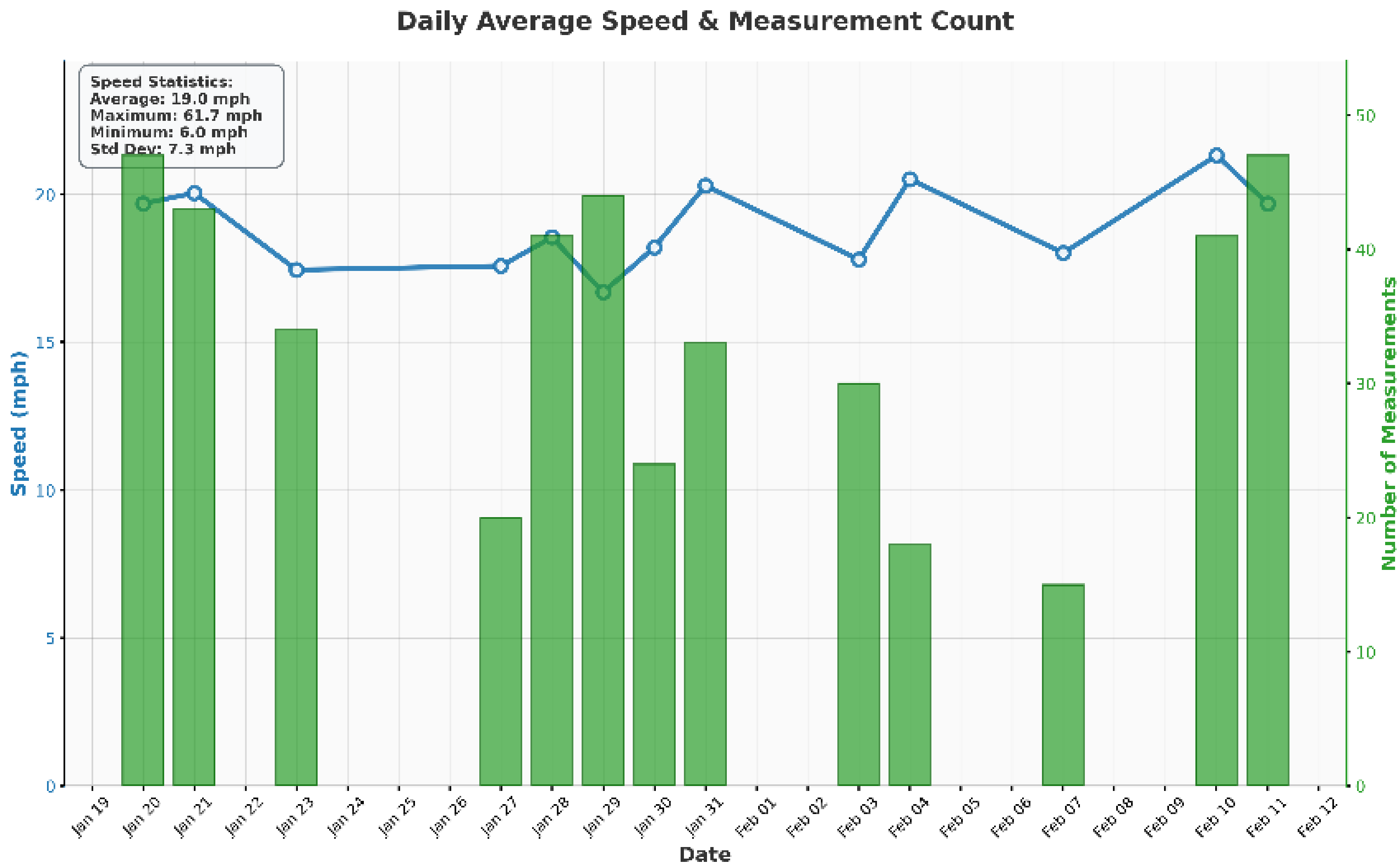


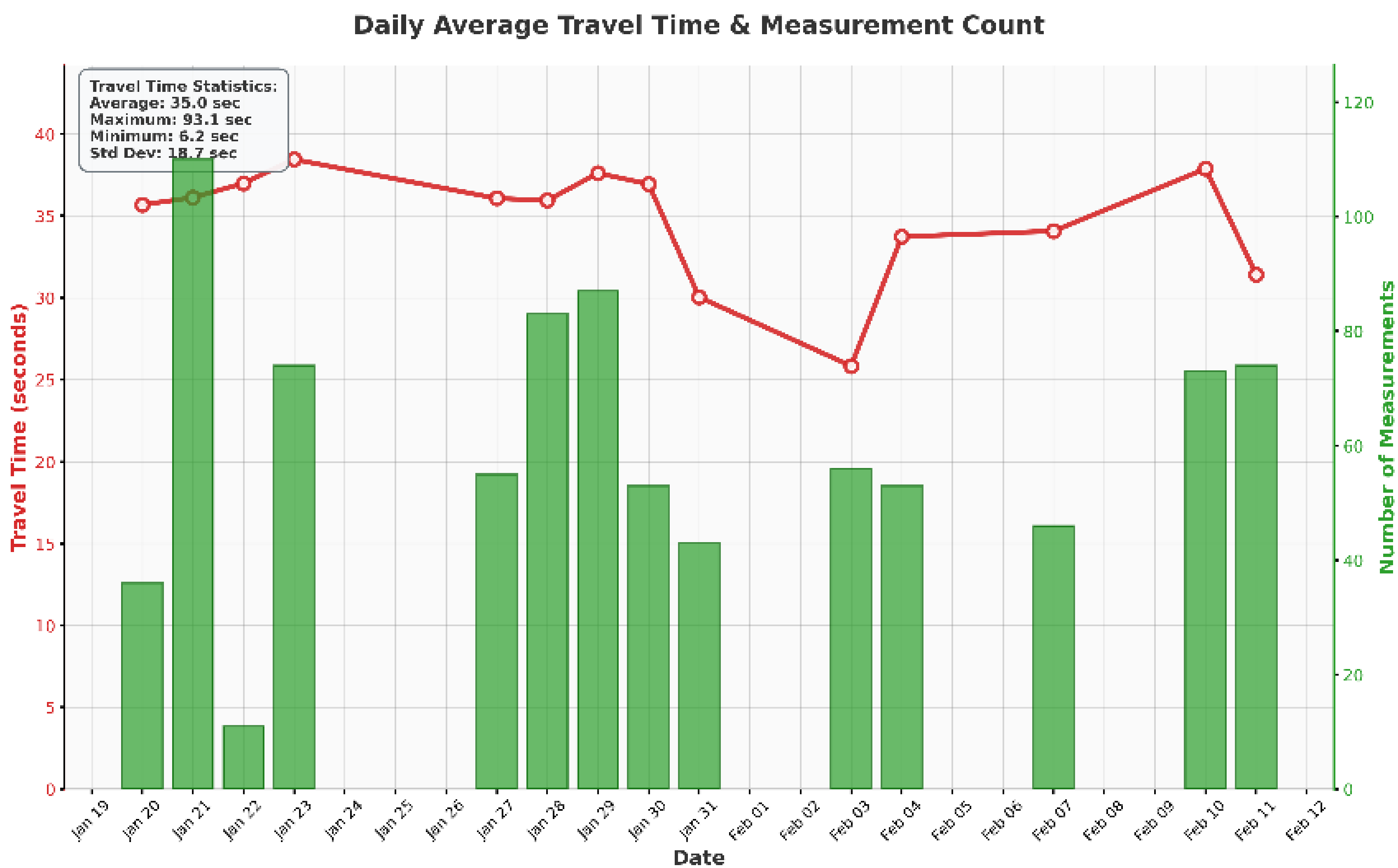
Dave Rawls Boulevard to Blount Island Boulevard/Intermodal Drive



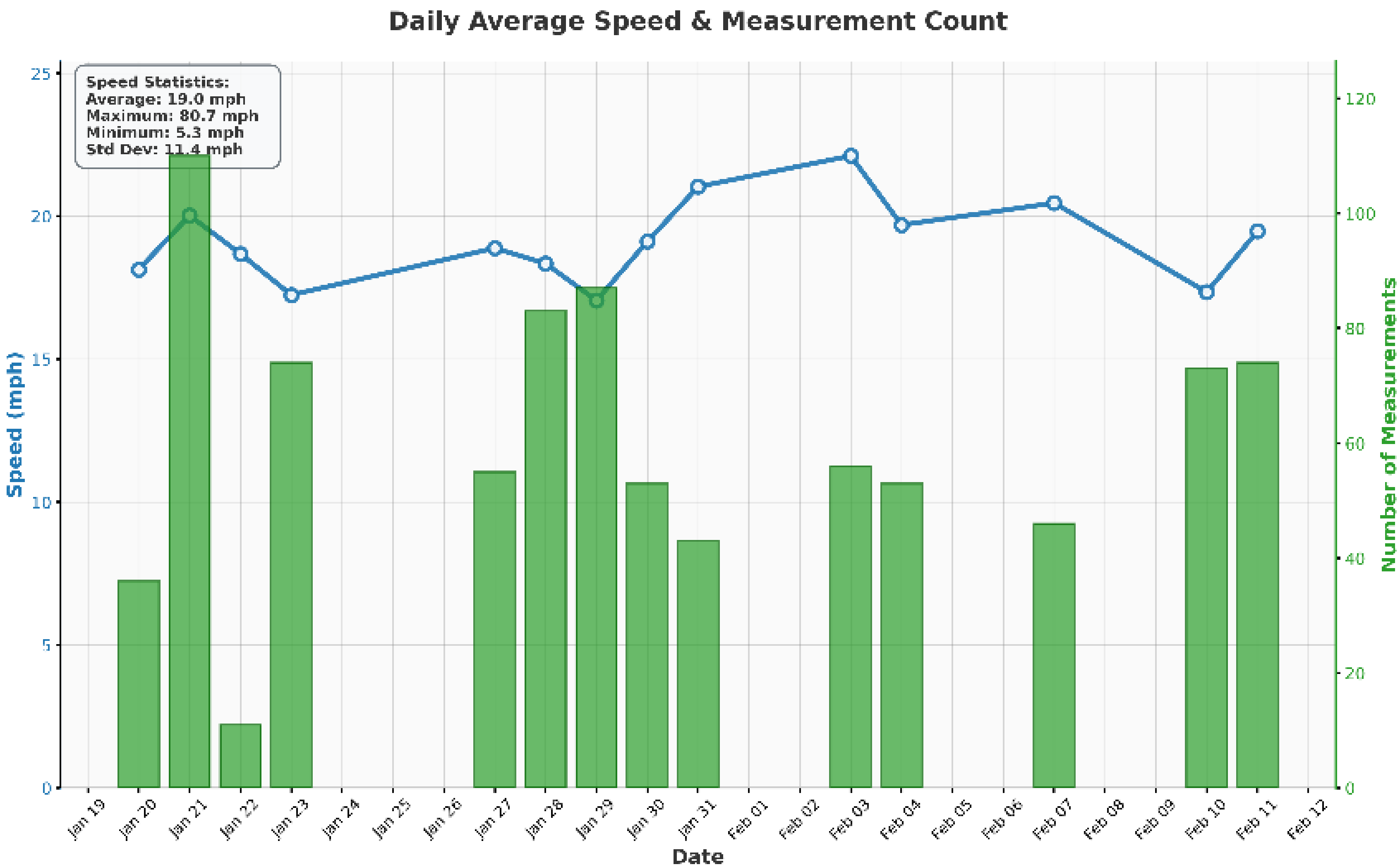
Dave Rawls Boulevard to Blount Island Boulevard/Intermodal Drive



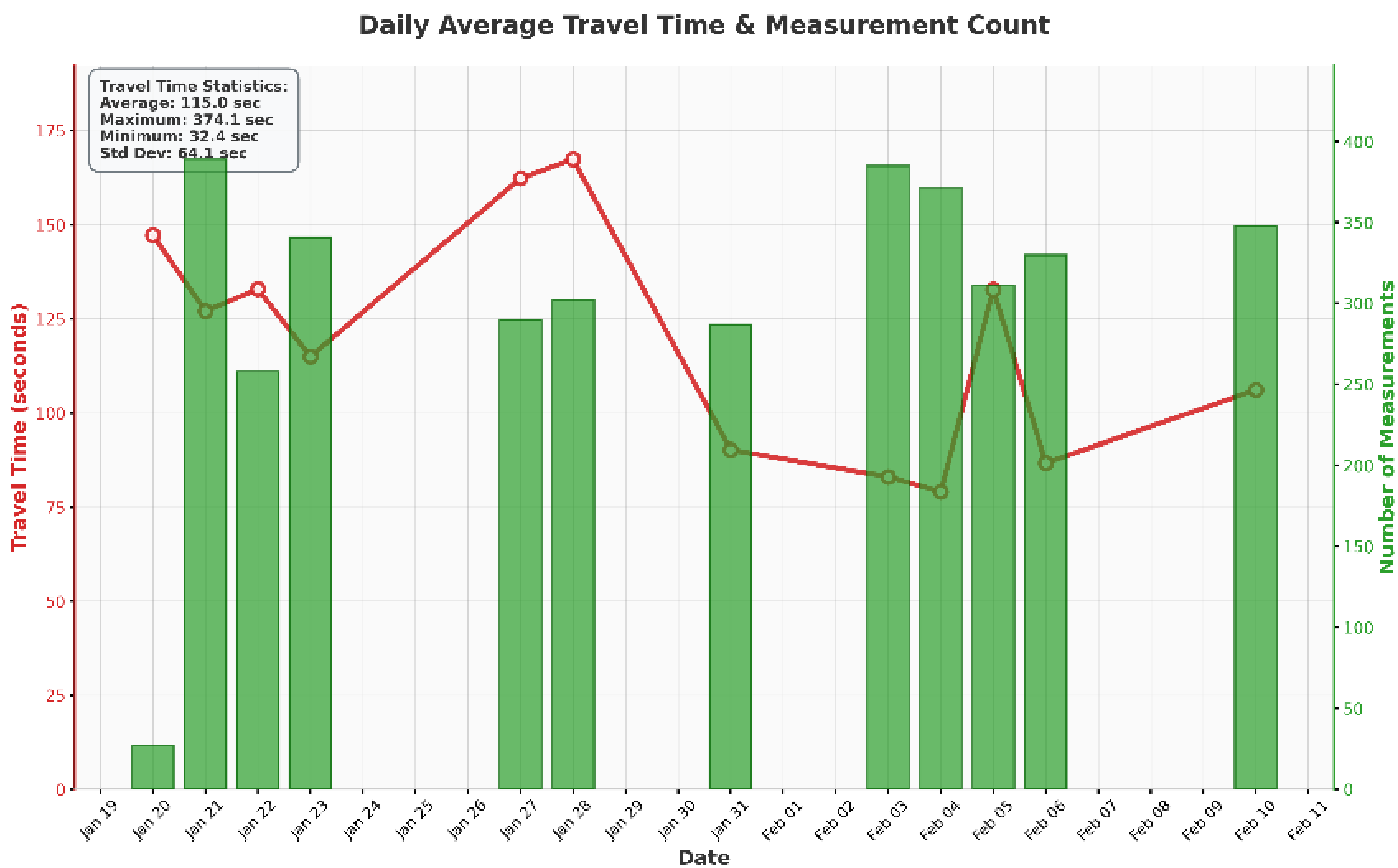
Blount Island Boulevard/Intermodal Drive to Dave Rawls Boulevard



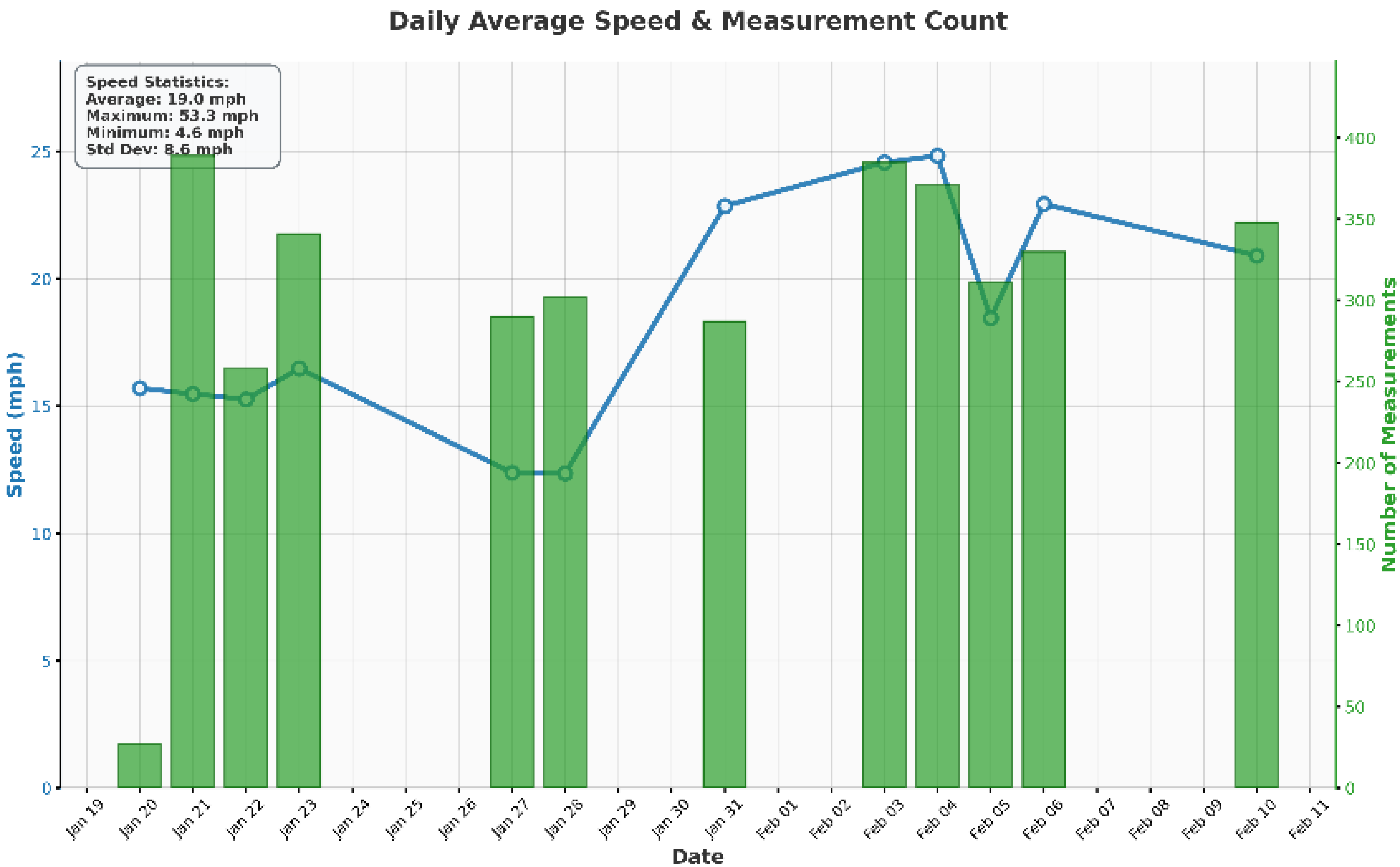
Blount Island Boulevard/Intermodal Drive to Dave Rawls Boulevard



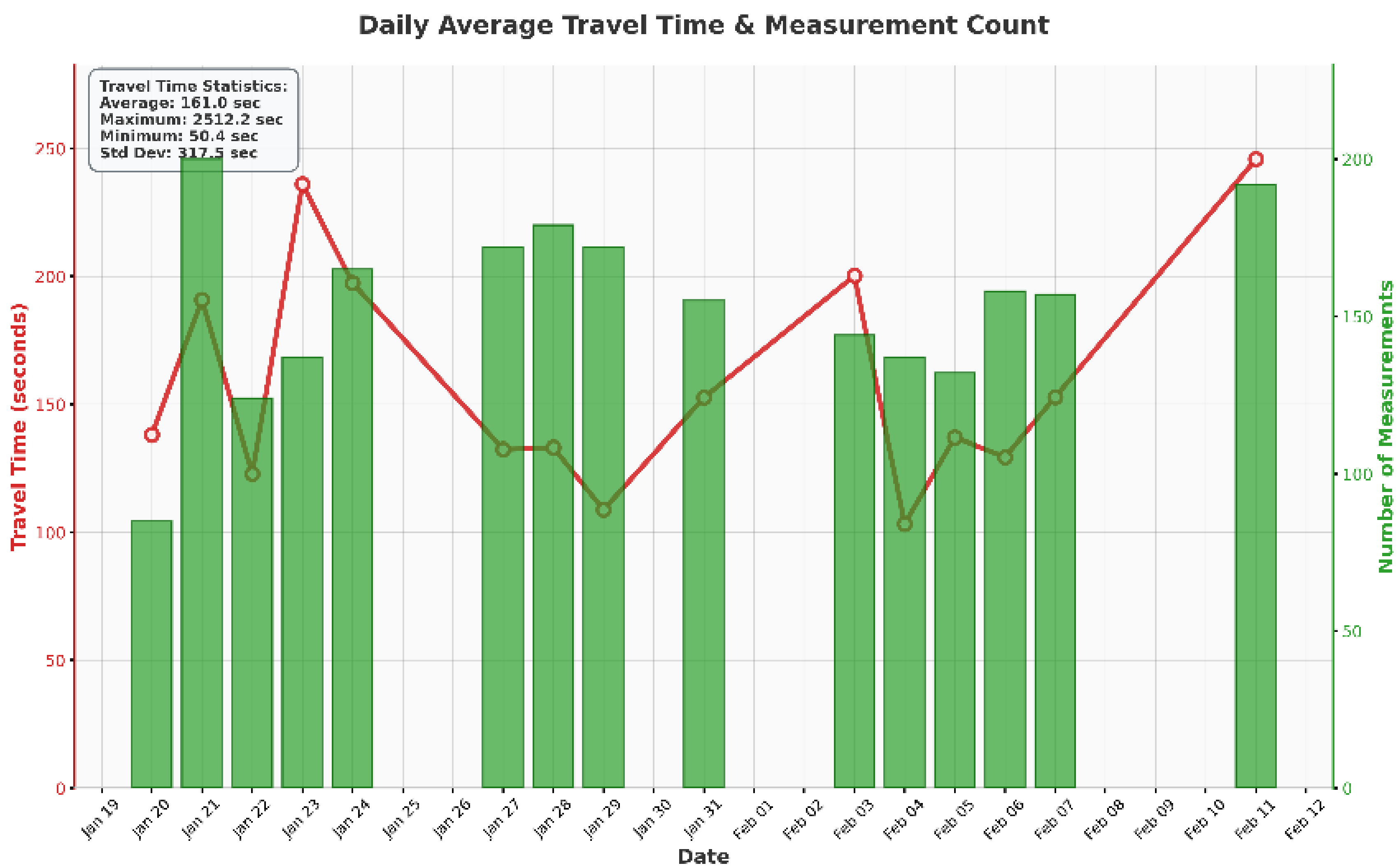
Gate to Blount Island/Dave Rawls Boulevards



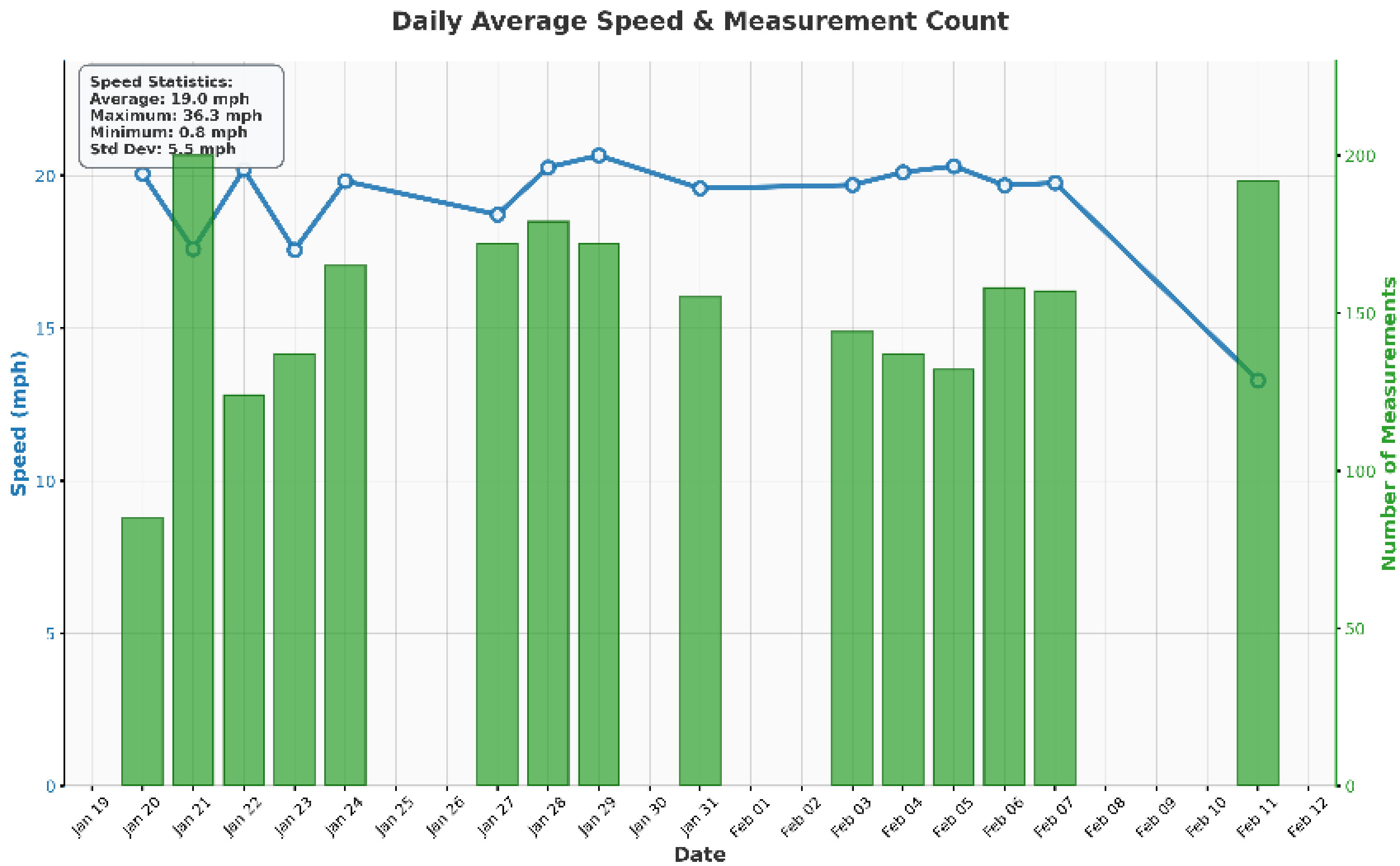
Gate to Blount Island/Dave Rawls Boulevards



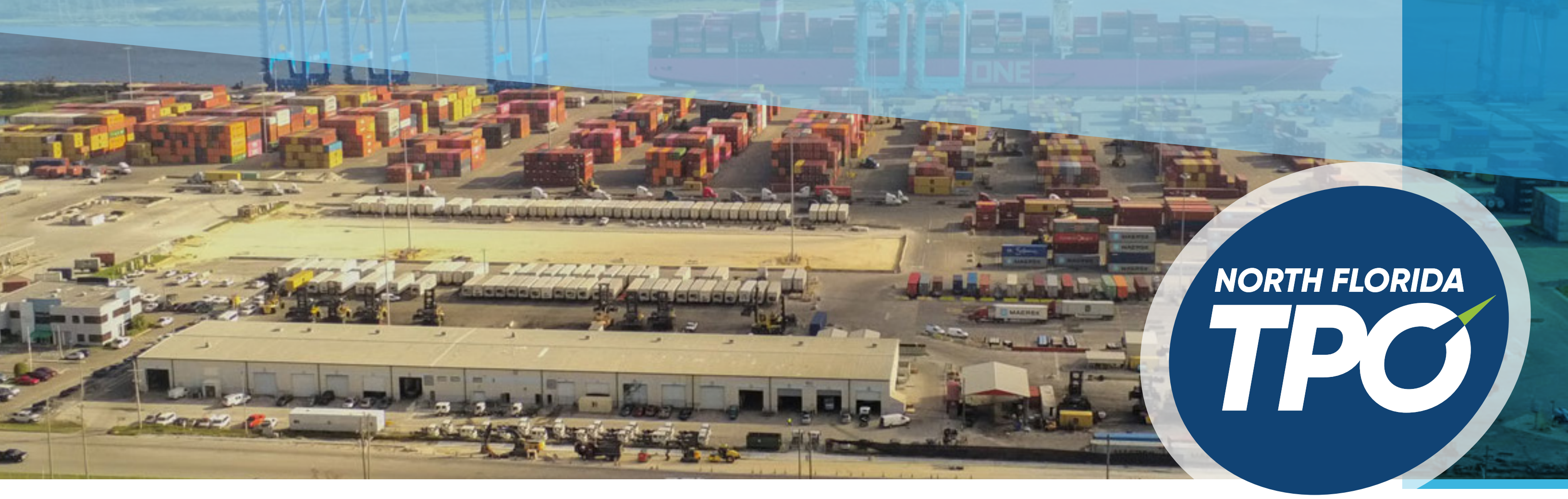
Blount Island/Dave Rawls Boulevards to Gate



Blount Island/Dave Rawls Boulevards to Gate



<u>A study brochure is contained on the following two pages</u>.



JAXPORT OPTIMIZATION STUDY

SUMMARY

JAXPORT's 2025-2030 Strategic Master Plan includes a focus on growing cargo volumes moving through their facilities. To support that aim, the North Florida TPO partnered with JAXPORT to identify ways to reduce the truck travel times and delays in moving cargo into and out of the Blount Island Marine Terminal.

Our research team, which included an exciting partnership with the University of North Florida, reviewed historic data, collected current data and modeled simulations of future 2030 and 2035 truck traffic flows to see potential congestion points.

What are the Problems and Potential Solutions?

While all other intersections are projected to maintain an acceptable level of service in 2030 and 2035, two intersections – Dave Rawls Boulevard at Intermodal Drive and at William Mills Street – will operate under failing conditions. Potential solutions were evaluated to optimize traffic flow and reduce delays.

1. **Add a new entrance and inbound lane for traffic accessing the AMPORTS vehicle transfer yard**
2. **Add an extra service lane for security vehicles at the main gate**
3. **Add a new lane and service gate for outbound traffic**
4. **Add an additional service gate at the SSA Atlantic terminal**
5. **Deploy gate processing technologies and operational improvements**
6. **Combine the best performing solutions**

Recommendation

Optimal benefits would come from combining solutions 3 – Add a new lane and service gate for outbound traffic **and 5** – Deploy gate processing technologies and operational improvements.

Adding a new lane and service gate will help move cargo volumes through JAXPORT's facilities. This solution increases capacity and decreases terminal congestion. This improvement is expected to reduce travel time by 12% and total delay by 19% under 2035 traffic conditions.

Deploying gate processing technologies would reduce long lines of vehicles waiting to access the tenant yards at the SSA and Tote Maritime gates. Clearing queues more quickly prevents spillback and reduces bottlenecks at intersections. This approach is expected to reduce travel time by 17% and total delay by 26% under 2035 traffic conditions.

JAXPORT has already initiated this process by installing cameras for pre-screening inbound trucks and transitioning to paperless processing with electronic Transportation Worker Identification Credential (TWIC) checks which began last year..

Additional ways to speed gate processing include:

- **Real-time Truck Appointment System integrated with AI -** analyzing vessel schedules, predicting traffic increases, and dynamically adjusting appointment availability to optimize flow and reduce peak-time congestion.
- **Fast lanes for truck drivers who have completed all required documentation** in advance by using License Plate Recognition (LPR).
- **Optical Character Recognition (OCR) technologies** to validate truck and cargo details automatically upon arrival.

These strategies are scalable and adaptable. Automated gate systems and truck appointment systems can be introduced gradually during peak periods, then expanded as needed. Lane assignments can be dynamically adjusted in response to evolving traffic patterns, usage levels, or operational hours.

Combined, the best-performing solutions – adding a new lane and service gate along Dave Rawls Boulevard and deploying gate processing technologies – would provide a 63% decrease in overall network delay and a 43% decrease in overall travel time relative to the 2035 "No Build" conditions.

The next steps will be to prioritize and identify funding for these investments.
The complete study is available at northfloridatpo.com/planning/studies-initiative

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