Stamford Transportation Center

MASTER PLAN

Connecticut Department of Transportation
State Project No. 301-0512

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Executive Summary

Project Overview

The Stamford Transportation Center (STC) – officially known as the Stewart. B. McKinney Transportation Center - is the busiest passenger rail station in Connecticut, serving approximately 28,300 customers each weekday (pre-COVID). The STC is owned and operated by the Connecticut Department of Transportation (CTDOT) and serves Metro-North Railroad's New Haven Line (NHL), and Amtrak's Northeast Corridor (NEC) trains. It is the Stamford hub for CT*transit* buses, as well as Stamford's intercity bus station, while also serving as the hub for private shuttles linking area employees to the trains and buses serving the STC.

With this volume of trains and buses, the STC is also a key access point for taxis and transportation network companies (TNC) such as Uber and Lyft. The STC provides garage parking for commuters as well as a number of amenities for passengers and the general public, including some limited retail and dining facilities.

With all of these uses packed into a site that is constrained in size by the NHL/NEC railroad tracks, Interstate 95, and surrounding development, improvements for customer access and the overall passenger experience must be carefully coordinated.

The purpose of the STC Master Plan is to develop recommendations for conceptual improvements to the state-owned complex and surrounding environs, including opportunities for future Transit Oriented Development (TOD), leading to enhanced access and increased public transit use, transforming the STC into a best-in-class facility. The development of the STC Master Plan was led by the CTDOT in collaboration with the City of Stamford and the public. This collaborative process included the development and maintenance of a project website (www.STCMasterplan.com) where information related to plan development was shared, and opportunities for public input made available.

The STC Master Plan study area is bounded by North State Street, Washington Boulevard (including the new parking garage), Station Place (including the original footprint of the existing station parking garage, to be demolished), and Atlantic Street. While the planning process considered the greater context of Downtown Stamford, and even more regional contributing forces, the specific improvements proposed from the STC Master Plan are limited to this study area.

FIGURE 1: AERIAL VIEW OF EXISTING STC

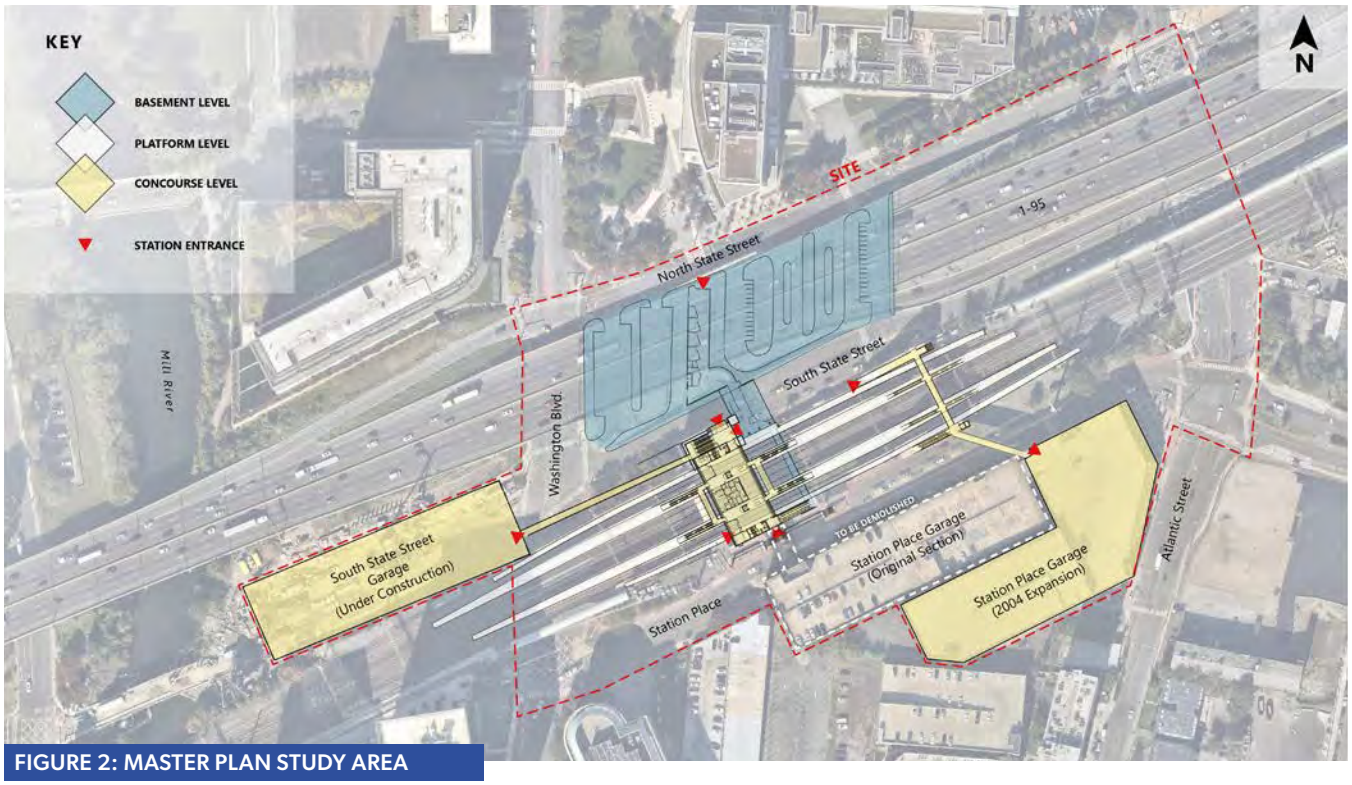


FIGURE 2: MASTER PLAN STUDY AREA

Goals and Objectives

Over the years, CTDOT and the City of Stamford have conducted a number of planning studies concerning the STC and the surrounding area. The objective of this Master Plan is to provide a path to advance improvements to the STC that transform it into a best-in-class, multi-modal passenger facility, as well as enhancements to interior and exterior spaces, including station area roadways and new civic open spaces with three distinct areas of focus:

1

STATION PLACE

GOALS: Create a well-organized roadway and an engaging public plaza that functions as an entrance to the City of Stamford for those individuals connecting to vehicle pickup. Create a safer and more welcoming pedestrian and bicycle environment through dedicated bike lanes and amenities.

2

STC CONCOURSE BUILDING, WAITING AND TICKETING AREAS

GOALS: Enhance circulation and connectivity, improve ticketing and signage, provide new amenities, and enhance the overall customer experience.

3

TUNNEL LEVEL AND BUS AND SHUTTLE AREA

GOALS: Improve the customer experience, maximize access and connectivity, while creating efficiencies for operations and public safety personnel and improve access between the bus bays, waiting facilities, and rail platforms.

FIGURE 3: BIRDS EYE VIEW OF REIMAGINED STC

Plan Recommendations

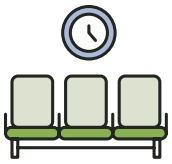
The STC Master Plan recommendations have been developed with the above goals and objectives in mind and incorporate numerous other benefits and enhancements to the STC organized around elements that address traffic and station area roadways, pedestrian paths of travel, customer waiting areas, wayfinding, bus and shuttle operations, and TNC and taxi services. The recommendations are summarized below and described in detail in Chapter 4 of this document, with supporting documents and graphics found in the Appendix. They address both short- and long-term needs of the STC and support a sustainable, transformative vision.

Traffic and Station Area Roads

Recommendations for improvements to these areas were based on an evaluation of traffic volumes and crash history data for roadways at and around the STC including the Stamford Urban Transitway, Atlantic Street, North State Street, South State Street, Washington Boulevard, and Station Place. Recommendations include redesigning and reconfiguring the roadway geometry of Station Place and converting it from a two-way flow into a one-way "couple," with South State Street. This aims to improve access for all roadway users, including bicyclists and pedestrians, and to provide a safer, more organized system for vehicular pick-up and drop-off surrounding the station. Further, the redesign of Station Place includes the introduction of a new civic plaza enhancing the sense of arrival to and from the STC and Downtown Stamford.

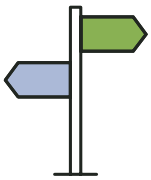
Pedestrian and Bicycle Paths of Travel

Pedestrian paths of travel, both internal and external to the STC, were reviewed and evaluated. Changes recommended aim to improve clarity of pedestrian wayfinding and connectivity, enhance the pedestrian experience, minimize walking distances, and strengthen safe and convenient connectivity and access to station amenities, retail, ticketing, and transportation services. Existing, and planned, bicycle infrastructure was also reviewed, and recommendations for enhanced connectivity and facilities are included. Additionally, the Master Plan recommends an upgrade of all study area travel paths and access points to current ADA standards.



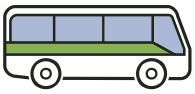
Customer Waiting Areas

Physical condition, functional performance, capacity and accommodation of demand, clarity of access and use, as well as connectivity between waiting areas, rail platforms and bus bays, and overall quality of the customer experience were evaluated in a number of methods, including stakeholder and customer surveys. The recommended conceptual design improvements are intended to enhance the customer experience by elevating the sense of comfort, safety, and convenience for the general public. The existing STC concourse building will be reimagined and significantly expanded to improve multi-modal connectivity between trains, buses, and vehicles, provide upgraded passenger amenities, and create a safe and inspiring 21st century transportation facility.



Wayfinding Signage

Exterior and interior wayfinding improvements are recommended that coordinated multiple design elements throughout the STC and surrounding area/environs – signage, display boards, ticketing kiosks, directional lighting and markings, and color palette. Enhanced and streamlined static signage will be designed to support a notion of brand awareness and place identity. New dynamic electronic signage throughout the complex will provide directional orientation to all points of interest – the concourse building, roadway network, pick-up and drop-off zones, bus and shuttle connections, as well as current and future uses at and around the STC. New, centralized electronic public information displays (PIDs) will convey information for all carriers (trains, buses, shuttles, etc.).



Bus and Shuttle Operations

Recommendations to the bus and shuttle operations build on the previous 2016 Stamford Bus and Shuttle Study to provide recommendations of a management plan to be implemented to improve customer safety, convenience and comfort in the bus and shuttle areas below I-95 and other identified locations at and around the STC. A new south-side shuttle facility is proposed beneath the new Station Place Plaza with direct connection to the existing shuttle facility via basement-level tunnel expansion. Connectivity, visual and physical comfort were also addressed in proposed modifications to architectural elements including the indoor customer waiting areas, bus bay shelters, office locations and tunnel expansion.

TNC and Taxi Services

A growing number of travelers access the STC by Transportation Network Companies (TNC, such as Uber or Lyft) and taxi services. The Master Plan recommendations comprise conceptual design improvements to existing customer access and safety, improving convenience and comfort at the STC. These align with the recommended modifications proposed to the traffic pattern and roadway configuration at Station Place, resulting in a more organized and safer environment for those arriving at the STC via TNC or taxi.

2

Background Information

Train service to Stamford dates back to 1849. In 1980, the Federal Railroad Administration (FRA) awarded the State $50 million for the construction of a new station and parking garage in Stamford. The city began construction of the existing Stamford Transportation Center (STC) and Station Place parking garage in 1983, under agreement with the Connecticut Department of Transportation (CTDOT). The STC and Station Place parking garage opened in 1987. The City continued to operate the facility until the year 2000, at which time the CTDOT contracted with private facility management for day-to-day operations.

In the early 2000s, a renovation of the STC was performed with a focus on modifications and enhancements to the original design, and included a redesign of the existing platforms, provision of platform canopies, new stair and escalator access to the waiting room from the tracks, and a new pedestrian bridge connecting to a 1,200-space addition to the original section of the Station Place parking garage.

In October 2021, construction of a new 928-space, $82 million parking garage northwest of the station began and opened February 2024. Upon the completion and opening of the new garage, the original section of 1987 garage on Station Place will be demolished, with the 2000s addition to remain. The STC is also presently undergoing a multi-million-dollar elevator and escalator improvement project, expected to be completed by late 2024. A new track 7 platform is also planned to serve the New Canaan Line shuttle. The sequencing of these anticipated projects has served as a catalyst for the STC Master Plan, and the conceptualization of a transformative vision for the STC, its surrounding environs, and opportunities for Transit Oriented Development (TOD).

The STC Master Plan was developed as part of an iterative process, grounded in an understanding of existing conditions as well as the strengths and weaknesses of the STC's building facilities and operations. To identify current best practices, peer facilities were researched with takeaways informing recommendations to both architectural and operational components. Lastly, data sets ranging from public feedback to an analysis of traffic patterns and volumes served to further identify the most pressing needs of the STC and its users, and opportunities for change. This chapter summarizes applicable background information collected, key takeaways and lessons learned.

Existing Conditions and Station Layout

The STC is made up of the main station concourse building, five (5) railroad tracks served by Metro-North Railroad and Amtrak with supporting high-level platforms, and the adjacent bus and shuttle facility on North State Street. The STC concourse building sits above the tracks and straddles the central island rail platforms. Access between the concourse building and rail platforms is provided by stairs, elevators, and escalators.

The tunnel also provides connectivity to the adjacent bus and shuttle facility situated under Interstate 95, with its main entrance on North State Street.

In an effort to understand the intricacies and complexities of the STC and user interface, a virtual site visit (due to COVID) was conducted with twenty-two project team members. The site visit began by establishing the boundaries of the project and explaining the typical commuter/traveler journey for those using

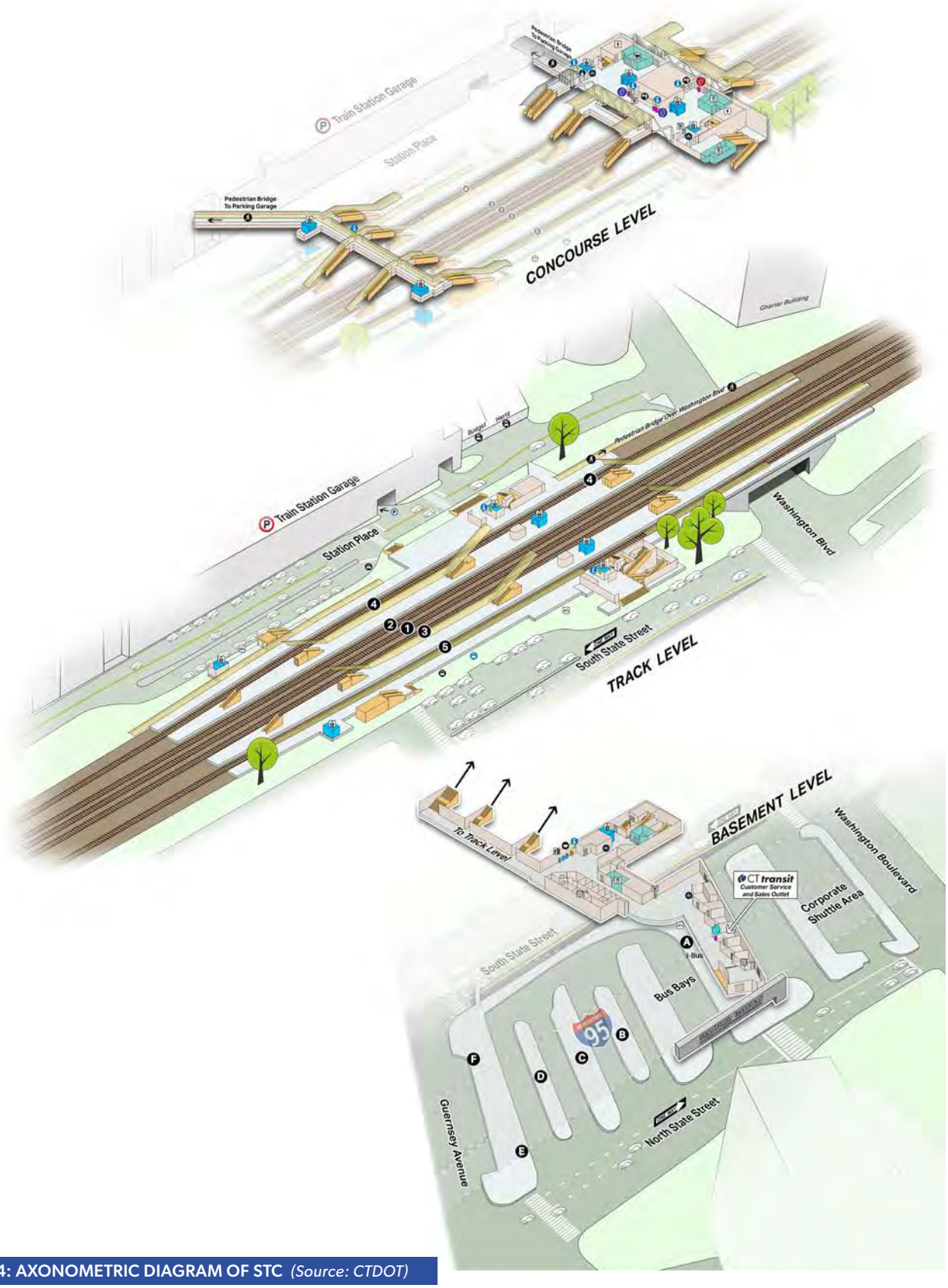


FIGURE 4: AXONOMETRIC DIAGRAM OF STC *(Source: CTDOT)*

the STC. The virtual site visit provided examples of where passengers using different access modes would arrive at the station. Both Street View and station maps were used to illustrate the paths passengers would follow to access the STC given different access points.

Additionally, the site visit walked team members through the different levels of the transit center, showing pictures highlighting the major facilities by level, such as restrooms, ticketing machines, stores, entrances/exits, bus bays, rail platforms, and other features of interest.

Review of Prior Studies

As previously noted, the Connecticut Department of Transportation (CTDOT) and the City of Stamford have conducted a number of planning studies concerning the STC and the surrounding area. These prior studies were reviewed to understand the existing conditions at the STC and to research any plans that were already considered and developed in relation to the study area. Pertinent plans and studies of Downtown Stamford were also reviewed. Studies reviewed included the:

- **The Project for Public Spaces' (PPS) Walkable Stamford report (2008) –** provided recommendations on how to create a pedestrian friendly downtown.
- **2010 STC Master Plan –** the work done in the 2010 STC Master Plan was reviewed throughout the development of the updated Master Plan and was used for a foundational understanding of the project site and previously studied development plans. The new Master Plan can be located at www.STCMasterPlan.com.
- **Stamford Private Shuttle Study (2016) –** evaluated both the private and CT*transit* shuttle operations at the station. Considered the importance of shuttle coordination at the station and the station's current infrastructure and layout as well as recommendations developed as a result of the study.
- **City of Stamford's 2016 Transit-Oriented Development Technical Assistance Report –** evaluated an appropriate land use mix around the transit center and considered ways to enhance connectivity through future development.
- **The Stamford Bicycle and Pedestrian Plan (2016) –** provided an overview of current pedestrian and bicycle conditions, including in relation to the STC. It highlighted the current issues and challenges for bicyclists and pedestrians in the area and included sections on how to improve the current bicycle and pedestrian networks.
- **2018 STC Inspection Report –** a review of the current STC condition and infrastructure. It provided a summary of work that needs to be completed in order to maintain safe operation of the structure.
- **City of Stamford's Innovation District Connectivity & Wayfinding Master Plan (2018) –** focused on developing a framework for wayfinding and community signage. These wayfinding principles and designs were used as a foundation for the Master Plan's wayfinding plans.
- **The South End Neighborhood Study (2018) –** contained information about development plans and goals for the neighborhood, which contains the STC.
- **New STC Parking Garage project (2020) –** plans for the new CTDOT-owned parking garage, located on South State Street at Washington Boulevard, were reviewed and incorporated into the Master Plan.

The review of these studies provided a foundation from which the STC Master Plan was able to be developed while acknowledging and incorporating work that had already been done by contributing organizations in the region.

Research of Comparable State of the Art Projects

A review of comparable state-of-the-art multimodal facility projects was conducted to assess how they create an overall brand identity, establish visual and physical connectivity between various modes of transportation, provide clarity of access and movement, enhance the overall customer experience, and organize the various transportation components. An assessment of how the comparable multimodal transportation projects accomplished these listed elements was performed to identify trends and considerations with the goal of potentially incorporating the more successful aspects of each to inform the STC Master Plan.

The following transit facilities were considered in the evaluation:

- Bradley International Airport (Connecticut)
- Moynihan Train Hall (New York at Penn Station)
- Raleigh Union Station (North Carolina)
- Denver Union Station (Colorado)
- Anaheim Regional Transportation Intermodal Center (ARTIC) (California)

The full white paper of peer multimodal projects researched was completed in 2021 and key takeaways are summarized below. The full report can be found in the Appendix.

BRAND IDENTITY

Different facilities incorporated different types of brand identity, including destination branding, public art installations, local businesses, facility logos, public spaces, and the historical context of the buildings.

CUSTOMER EXPERIENCE

Public plazas and civic spaces at facilities help create urban gathering spaces for both passengers and the general public. Facilities without public plazas tended to have large and open concourses, encouraging a feeling of a grand public space.

Retail and dining spaces provide amenities that can be enjoyed by both transit and non-transit users, while passenger seating areas, ticket kiosks, and restrooms provide additional amenities for passengers.

Visible and consistent wayfinding throughout facilities are important for the user experience, including overhead signage, signs above ticket windows and other facility elements, directional maps, real-time information displays, electronic monitor displays, and signage for track numbers.

The availability of passenger technology is also important for the passenger experience, including power and charging outlets and complimentary Wi-Fi.

INTERMODAL CONNECTIVITY

All of the assessed projects/facilities provide some level of intermodal connectivity, although Bradley International Airport and Raleigh Union Station offer very limited public transit connections. Intermodal connectivity at the facilities allows passengers to seamlessly travel within the region.

ORGANIZED TRANSPORTATION COMPONENTS

The five projects/facilities assessed all serve different markets with varying transit modes. As a result, they are organized differently with respect to their transportation components. Those located in downtown urban environments did not consider on-site parking in their design and operation, whereas facilities such as Bradley International Airport which are not located in urban environments include on-site parking. Within facilities, transfers between modes, such as between bus and rail, often involved traveling to different sections of the concourse or movements to different levels of the facility.

Summary of Development Projects

A review of local, City, and CTDOT projects was conducted to understand the projects in development around the STC and to take into account the impact these projects may have on the STC while developing the Master Plan. The study focused mainly on projects that fell within a quarter of a mile of the STC study area. Projects considered included recently completed projects (projects that have been completed since 2010), projects under construction, planned projects, and proposed projects. Planned projects have already received approvals to proceed and are in the planning or design stage, but are not yet under construction, while proposed projects have been proposed but are not yet approved.

The development projects included a wide range of residential, commercial, and mixed-use buildings, as well as the new STC parking garage. Commercial space includes retail, office, and hotel space. At the time of this review, in 2022, the identified projects encompassed a total of approximately 2,486 residential units and over 1.37 million square feet of commercial development. The City and CTDOT will continue to periodically review and update anticipated growth projections and development yields surrounding the STC.

Traffic Analysis

A traffic analysis completed in 2021 involved two main studies: a review of existing traffic volumes on the network and a review of crash history for the study area. The existing conditions traffic volume networks were developed using a combination of two previously approved OSTA studies to build the complete study area network. The work provided weekday peak morning and weekday peak evening traffic volumes, including pedestrian volumes, for the network surrounding the STC. Additional information can be found in Appendix F.

The Crash History Summaries and Diagrams focused on the intersections with the highest volume of crashes in the study area. These intersections included:

- Washington Boulevard at North State Street
- Washington Boulevard at South State Street
- Washington Boulevard at Station Place
- Washington Boulevard at Henry Street
- Washington Boulevard at Richmond Hill Avenue
- Atlantic Street at Station Place and Dock Street
- Atlantic Street at the STC parking garage
- Atlantic Street at Henry Street

None of the crashes at these intersections involved fatalities, and the majority of crashes at each intersection resulted in property damage only. The full Crash History Summaries and Diagrams are included in Appendix E.

Based on the initial findings of the 2021 traffic analysis, the project team also evaluated the impacts of the proposed traffic operations resulting from the STC Master Plan, which proposes to convert the two-way traffic flow on Station Place to one-way traffic flow, except retaining two-way traffic flow at the west and east ends for access to the existing Metro and State parking garages. (Appendix F)

As part of this evaluation the roadway network and over 20 intersections around the STC study area were studied by two (2) CTDOT projects, this Master Plan project, and the ongoing I-95 Stamford Planning and Environmental Linkages (PEL) study, with overlapping traffic operations analysis at several intersections in the STC proximity. Both projects compiled existing traffic volumes from various sources as well as conducted traffic counts in 2022 as part of the I-95 Stamford PEL study for intersections in the vicinity of the STC. (Appendix F)

For the proposed conversion of Station Place to one-way westbound traffic flow (with the exception of the contra flow access to the two garages), the analysis redistributed the existing two-way traffic flow traffic volumes to a one-way flow, resulting in changes to traffic volumes and patterns at the Washington Boulevard intersections with Station Place and South State Street and Atlantic Street intersections with South State Street and Station Place.

With the proposed new westbound flow on Station Place (except for the accesses to the garages), drivers wishing to access the STC from the west will now use South State Street to circumvent the one-way flow. Instead of turning left onto Station Place from Washington Boulevard, they will turn left onto South State Street, travel eastbound on South State Street, turning right onto Atlantic Street and then turning right onto Station Place. For drivers arriving from the south on Washington Boulevard, they will either follow the same route as described, or, alternatively, they may use Henry Street eastbound to Atlantic Street or they may alter their route entirely from the south and use Atlantic Street to access Station Place westbound. These drivers are expected to be a smaller proportion of the drivers arriving from the west, north and east.

The four intersections primarily affected by this change in traffic flow across Station Place include the quadrant intersections from the STC:

- Washington Boulevard at Station Place
- Washington Boulevard at South State Street
- Atlantic Street at South State Street
- Atlantic Street at Station Place

The redistributed traffic volumes were then inputted into the traffic models for the weekday morning and afternoon peak hours for all the intersections, with the focus on the four intersections noted above due to the significance of the traffic volume changes.

With the redistribution of the traffic volumes, it was found that the intersections continue to operate at acceptable Levels of Service, with some minor increases in delays on specific approaches due to the redistribution of the Station Place eastbound traffic volumes. Minor changes in traffic signal timings are anticipated to accommodate the redistribution of the Station Place eastbound traffic volumes.

In addition, with construction of the new State parking garage on South State Street, the relocated garage traffic from Station Place to South State Street is included in traffic analyses.

3

Plan Development

The Stamford Transportation Center (STC) Master Plan was developed over a four step, iterative process. As part of this process, an understanding of background conditions and important data factors contributed to the development of a shared, transformative vision that balances the practical needs of the STC and its users, while elevating its role as a civic institution in Downtown Stamford through enhanced architecture and open spaces. A critical step manifesting the vision was to develop alternative concept plans which explore the myriad opportunities for reimagining all major elements of the STC – ranging from traffic patterns approaching the station to services and amenities provided within.

Although many conceptual options were explored in collaboration with the City of Stamford and stakeholder groups, two alternatives were refined, and selected to be shared with the public. The public had the opportunity to review and comment on the alternatives presented and provide input of overall preferences and feedback on individual elements and components. After considering all feedback from stakeholders and the public, and in coordination with the City of Stamford, the Connecticut Department of Transportation (CTDOT) ultimately selected a preferred illustrative concept for Master Plan development.

STEP 1

IDENTIFY ISSUES AND OPPORTUNITIES

The project team began the STC Master Plan by conducting a thorough review of background information and data collection. This included reviewing a number of previous studies and plans conducted by the CTDOT, the City of Stamford, and the Western Connecticut Council of Governments (WestCOG). The project team met with the transportation agencies serving the STC and other stakeholders to obtain their perspectives on the current operations of the STC and their future plans for using the facility. A survey of existing customers of the STC was conducted to garner feedback on the conditions of the STC and what improvements are most important to them. The team also reviewed five comparable state-of-the-art intermodal facilities, including Bradley International Airport (Connecticut), Anaheim Regional Transportation Intermodal Center (ARTIC) (California), Raleigh Union Station (North Carolina), Denver Union Station (Colorado), and Moynihan Train Hall at Penn Station (New York). These projects provided guidance on best practices and successful aspects from each informed the transformative vision for the STC.

STEP 2

ESTABLISH A TRANSFORMATIVE VISION

Once an assessment and evaluation of the existing conditions of the STC and surrounding area was completed, planning efforts focused on developing a vision for the STC. This transformative vision for the STC and Station Place was informed by stakeholder and public feedback, leading to the development of the consultant team's recommendations for the different elements of the facility and adjacent areas, including traffic and station area roads, pedestrian paths of travel, customer waiting areas, wayfinding, bus and shuttle operations, TNC and taxi service. The overarching goal for the STC is to transform the station into a single, unified multimodal facility that is both dynamic and modern. The vision also anticipates future growth and ways that the STC can contribute to

economic development in the Downtown area through opportunities for TOD. Therefore, the transformative vision aims to create a more engaging, convenient, safe, and aesthetically pleasing multimodal customer experience.

STEP 3

DEVELOP CONCEPT PLANS

Stakeholder and public outreach were a key part of Step 2 and led to the development of two conceptual plans for the STC. These concepts were shared with the stakeholders and the public through a series of public meetings and two (2) customer surveys. Stakeholders and the public were asked to share their opinions on the concepts and their preferred elements, with feedback incorporated into this Master Plan. Major differentiators between the concepts considered were a range in size of the proposed Station Place plaza, options for the interior layout and amenities within the concourse, and the accommodation of TOD on the footprint of the original Station Place parking garage.

STEP 4

DEVELOP THE FINAL PLAN

The final step in the STC Master Plan development was to incorporate work from the previous steps, synthesize stakeholder and public input, and develop a plan and set of conceptual recommendations in support of the plans' goals and objectives. The final plan incorporates findings, conceptual design improvements and recommendations, and order of magnitude conceptual level cost estimates. The plan aims to guide the CTDOT's future investments in TOD and the STC to realize its transformation into a best-in-class intermodal facility. The results of these efforts are presented in Chapter 4.

Public Outreach

While the STC Master Plan was led by the CTDOT, the STC's owner, a number of key stakeholders, including the City of Stamford, participated in the plan's development. Robust and frequent coordination was present throughout plan development and the public outreach process. The Stamford Transportation Advocacy Team (STAT) was convened and met regularly during the plan development process. In addition to the City of Stamford, STAT members included Stamford Partnership, People's United Bank, Charter Communications, the University of Connecticut, People Friendly Stamford, Stamford Downtown, Stamford Hospital, and Waterside/NRZ. The STAT's purpose was to discuss the plan's findings and provide input on the development process and recommendations proposed for STC Master Plan.

There were also many opportunities for the community to learn about the proposed plan and to provide input to help shape that plan. Two (2) user surveys, a virtual public information meeting, and a public open house took place during the master planning process. The first survey, conducted during Summer 2021 targeted key stakeholders to help identify issues and opportunities as well as to gather input on priorities and alternatives. The second survey administered in Spring 2023, was an online public survey targeted at STC users to present the two alternative design concepts and understand their preferences.

A website was also created (**www.STCMasterplan.com**) to share information about the master plan in general and the alternative concepts developed for public feedback. The public was able to provide comments by email, through the online survey, by leaving a voice message on a hotline, or by mail.

In addition to the website, the public was afforded opportunity to view the two STC and Station Place concepts in person at an open house held on May 24, 2023, at the Stamford Transportation Center.

At the open house, project representatives were available to discuss the draft Master Plan design concepts as depicted on the project website. Project representatives were also able to offer background on the STC Master Plan, its primary elements, and further detail on the concepts for Station Place, the STC Concourse, and STC Tunnel Level. Attendees of the open house were encouraged to take an online survey to express their preferences and submit their comments.

Public Preference

At the conclusion of the public comment period the feedback received suggested a clear preference for certain Concourse/Ticketing Area and Tunnel Level Upgrades, but a more equal division of preferences between the two Station Place redesign concepts. Key feedback included:

Concourse/Ticketing Area: Concept 1, Grand Train Hall

The majority of the respondents preferred Concept 1, which proposed a vaulted ceiling across the concourse with ticketing kiosks along the west wall instead of in the center, and a new train information board on the opposite (east) wall. This was in lieu of Concept 2, which proposed a mezzanine level in the concourse housing additional food and beverage amenities.

The most common theme from public feedback on this section of the STC concerned improving the commercial dining and retail options on the concourse. These should be balanced along the perimeter of the concourse with the ticketing and information functions. Respondents also praised the open-concept and requests for better amenities like charging outlets and better elevator, escalator, and stairwell access.

FIGURE 5: CONCOURSE/TICKETING AREA CONCEPT 1

FIGURE 6: CONCOURSE/TICKETING AREA CONCEPT 2

Improvements at the Tunnel Level: Prioritize Restrooms

This section of the survey asked respondents to rank which improvements within the Tunnel Level area are most important to them. The options were restrooms, waiting areas, or the bus bays. Respondents favored restrooms as the first priority followed by waiting areas and the bus bays.

Station Place: No clear preference between Concept 1 and 2

The respondents did not express a clear preference between the larger public plaza (Concept 1) or a narrower plaza with below grade lanes for the south-side shuttles (Concept 2), with 51% favoring Concept 1 and 49% Concept 2. Through the open responses, several themes emerged. These included improvements to pedestrian access with better lighting and clearer wayfinding signage, incorporate electric vehicle charging, and a desire for including similar improvements on the north, or State Street, side of the STC.

Following review and of all public feedback received and evaluating the merits of each recommendation, CTDOT selected a combination of the preferred elements from the two conceptual alternatives that best meet the community's needs. This has become the preferred concept and the basis for the recommendations included in this Master Plan.

FIGURE 7: STATION PLACE CONCEPT 1

FIGURE 8: STATION PLACE CONCEPT 2

4

Plan Recommendations

Conceptual improvements recommended for the Stamford Transportation Center (STC) and the surrounding public realm were developed with a number of goals in mind aimed specifically at enhancing the existing conditions at Station Place, the STC Concourse building and its customer waiting areas, as well as the Bus and Shuttle areas with particular attention to the tunnel level access and connectivity. These recommendations, developed through an iterative process, aim to balance functional and operational enhancements for vehicles, rail, buses and shuttles serving the STC, while promoting a safer and more welcoming environment for pedestrians and bicyclists. Additionally, the Master Plan explores the opportunities that a reimagined and redesigned STC may contribute to a sense of place and strengthened civic urbanism and architecture for Downtown Stamford, including future Transit Oriented Development (TOD).

The recommendations for the STC are organized around elements that address traffic, the surrounding (station area) roadways, pedestrian paths of travel, customer waiting areas, wayfinding, bus and shuttle operations, and TNC and taxi services.

The existing STC building will be reimagined and significantly expanded to improve multi-modal connectivity between trains, buses, vehicles, cyclists and pedestrians, to provide upgraded passenger amenities, and to create a safe and inspiring 21st century transportation facility. At ground and platform levels, station access for pedestrians and vehicles will be enhanced with the introduction of a new public plaza, as well as added elevators, stairs and glass enclosed lobbies, augmented by clearly legible and contemporary wayfinding, and passenger information displays (PIDs) with real time train and bus schedule information. These elements will remain consistent throughout all components of the STC, including the basement level pedestrian tunnel.

A new Concourse addition at the station's upper level will connect existing escalators from the platforms to the expanded waiting area and various vertical circulation elements. Located at the east side of the building, the Concourse serves as a pedestrian bridge facilitating north-south pedestrian movements between South State Street and Station Place Plazas at each end.

To the north of the STC building, the bus and shuttle facilities will also be improved, with a focus on safety, access, and connectivity. The extension of the existing lower-level tunnel to Station Place will also provide an alternate path for the north-south pedestrian movements between South State Street and Station Place plazas, including connections to the new south-side shuttle facility. Improvements to the bicycle infrastructure serving STC users, including new dedicated bike lanes, storage facilities and lockers, will further promote ease of access to the reimaged STC.

FIGURE 9: ILLUSTRATIVE SITE PLAN OF THE STC, SHOWING RECOMMENDED SITE PLAN IMPROVEMENTS, INCLUDING ROADWAY RECONFIGURATION AND NEW PLAZA DESIGN.

Traffic and Station Area Roads

The basis for these recommendations began by analyzing traffic volumes and crash history data for the station area roadways at and around the STC including the Stamford Urban Transitway, Atlantic Street., North State Street., South State Street., Washington Boulevard., and Station Place.

With traffic volumes on Station Place between Washington Boulevard and Atlantic Street falling below initial projections, and the planned demolition of the original section of the Station Place Parking Garage further reducing volumes, there is an opportunity to reimagine that segment of roadway and its relationship to the STC facility. Hence, the Master Plan recommends a complete redesign and realignment of Station Place to accommodate a new public plaza, serving as the primary entrance, or "front porch," to the STC. A new south-side shuttle facility is proposed beneath the new public plaza with direct connection to the existing shuttle facility via basement-level tunnel expansion.

The Master Plan proposes a conversion of Station Place to one-way westbound traffic flow (with the exception of the contra flow access to the two garages.) This change aims to improve access for all roadway users and better organizing vehicular drop-offs (arrival) and pick-ups (departure) by mode. Another benefit is a reduction in crossings, or conflict points, between pedestrians and vehicles, with designated mid-block crossings. One-way traffic reduces conflicts between vehicles because all cars are moving in the same direction. This increases safety for pedestrians in several ways:

1. **Predictability:** Pedestrians know the direction from which cars will come. This makes crossing streets less dangerous because pedestrians only have to look in one direction.
2. **Reduced Speed:** One-way streets often have lower speed limits, making it safer for pedestrians if a collision does occur.
3. **Less Complex Intersections:** Intersections on one-way streets are simpler, with fewer "conflict points" where pedestrians and vehicles might collide.
4. **Easier Decision Making:** On one-way streets, drivers only need to focus on traffic from one direction, which can decrease the likelihood of sudden stops or swerves that could endanger pedestrians.

The safety enhancements made possible by the one-way conversion of Station Place will enhance the public realm and allow the new Station Place Plaza to become a focal point of the reimagined STC. The Plaza will mitigate the existing change in grade along Station Place and provide direct access from the southern-most rail platform level, down to "grade," or roadway level, through a series of steps and ramps. The Plaza will serve as a civic hub, prioritizing the pedestrian experience, while adding to the suite of amenities proposed for the STC, including enhanced signage and wayfinding, lighting, landscaping, ADA compliance, and bicycle and pedestrian infrastructure.

A reoriented and enlarged entrance to the STC on South State Street is also proposed in order to maximize the pedestrian spaces along that street frontage. One-way traffic will have the option to use left side travel lanes to bypass the STC or the right-side loading lanes serving general public drop-off. On North State Street, an enhanced Gateway façade will increase the visibility and brand identity of the STC and functional access to the Bus and Shuttle Facility. Additional recommendations to all surrounding area roads include improvements to existing bicycle and pedestrian infrastructure, a focus on safety at all crossings and intersections, and essential ADA upgrades.

Key Considerations

- The highest crash volumes at the studied intersections are Washington Boulevard & North State Street (50 in a 3-year period), followed by Washington Boulevard at South State Street (40+ in a 3-year period).
- North and South State Streets have constrained rights-of-way, limiting opportunities to increase public realm amenities, such as additional bike-ped facilities.
- A major challenge for TNC vehicles is the lack of dedicated boarding/waiting areas, not just a lane.
- Station Place and the new Station Place Plaza to become a Downtown civic hub and "front porch" leading to the STC.

FIGURE 10: TRAFFIC DIAGRAM, DEPICTING REIMAGINED STATION PLACE

Master Plan Recommendations

- Separating directional traffic surrounding the STC:
  - Convert a major portion of Station Place into a one-way pair with South State Street (creating a circulation loop.)
  - Maintain two-way access to existing parking garage entrances on Station Place at intersections with Washington Boulevard and Atlantic Street.
- Establish and enforce organization of drop-off and pick-up traffic flows by mode:
  - General Public: drop-off allowed on South State Street and drop-off and pick up allowed Station Place, with a focus on routing all pick-ups to the new Station Place Plaza.
  - TNC and Taxi Service: drop-off/pick up at Station Place Plaza only.
  - South-side Shuttles: use new basement-level facility below Station Place Plaza.
  - North-side Shuttles and Buses: use existing facility on North State Street.
- Create a new south-side shuttle basement-level facility below the Station Place Plaza, with direct access to the Concourse and Bus and Shuttle facility via an extension of the existing tunnel.
- Consider repurposing at least a portion of the ground floor of the Station Place parking garage to serve as a "cell phone waiting lot."
- Implement improvements to operations and movements at the South State Street and Station Place intersections with Washington Boulevard and Atlantic Street.
- Reimagine the streetscape to create a more welcoming and safer pedestrian environment.
- Introduce separate and/or buffered bicycle lanes which connect to both existing and proposed bicycle facilities.

Pedestrian and Bicycle Paths of Travel

The pedestrian and bicycle paths of travel, both within and around the STC, underwent a comprehensive study and analysis with the objective of optimizing usability. A chief priority was to enhance the pedestrian experience by minimizing walking distances, while also bolstering security and seamless access. Recommendations focus on promoting convenient connectivity and access to station amenities, retail, ticketing, and transportation services, providing a seamlessly integrated multi-modal travel hub.

Key Considerations

- The majority of sidewalks being utilized at a rate of more than 90 trips per day.
- Public perception is that the majority of vehicles travel at unsafe speeds, fail to stop at red lights, and/or yield at crosswalks indicate major safety concerns around the STC.
- City's proposed continuous bike lane on Atlantic Street and Washington Boulevard northbound.
- Large number of steps passengers are currently required to navigate to access the STC.

Master Plan Recommendations (Exterior Paths)

- Enhance the walk to and from Downtown and surrounding areas:
  - Explore activation of gateway areas (e.g., pop-up eateries, outdoor seating, etc.) along North State Street and on the new Station Place Plaza.
  - Improve aesthetics of pedestrian approaches to the STC with enhanced lighting and landscape elements.
  - Increase pedestrian safety by employing traffic calming measures, as well as the addition of lighting and wayfinding.
  - Upgrade all study area travel paths and access points to current ADA standards.
  - Create pedestrian-only zones, separating pedestrian circulation from vehicle circulation, at the Station Place Plaza.

- Relocate and enhance the existing bicycle network:
  - Add designated bicycle lanes along Station Place.
  - Add bicycle facilities at Station Place Plaza, serving STC users, with parking, lockers and storage.
  - Designate additional bicycle parking, plus lockers and storage, on the ground floor of new garage building.
- Add speed tables/raised crosswalks at key points along Station Place.
- Provide wider sidewalks within the study area to increase pedestrian capacity.
- Integrate new/enhanced wayfinding into street and sidewalk infrastructure.
- Integrate new/enhanced features at Station Place Plaza, such as fountains, benches, public art, architectural lighting, and wayfinding.
- Establish a process for the selection and integration of public art installations in partnership with the Stamford Downtown Special Services District.

Master Plan Recommendations (Interior Paths)

- Decentralize point of sales (POS) and ticketing locations with improved access at all major entry points.
- Widen and extend basement level tunnel to the new Station Place Plaza, thereby providing a direct connection to Station Place.
- Improve access and transition from shuttle and bus facility to the basement tunnel level.
- Minimize passenger stair steps wherever possible.
  - Add elevators and escalators and key locations.
- Add connection to northern rail platform.
- Integrate new/enhanced wayfinding into floor finishes to signal pedestrian paths to transportation modes.

FIGURE 11: ILLUSTRATIVE RENDERING, DEPICTING NEW PEDESTRIAN CROSSINGS AND BIKE STORAGE FACILITY

FIGURE 12: ILLUSTRATIVE RENDERING, DEPICTING NEW GATEWAY ENTRANCE AT NORTH STATE STREET

Customer Waiting Areas

Physical condition, functional performance, capacity and clarity of access and use, as well as connectivity and overall quality of the customer experience were evaluated in a number of methods, including stakeholder and customer surveys conducted during the master planning process. The resulting conceptual design improvements and recommendations are intended to improve the customer experience, sense of comfort and safety, and convenience for STC users.

The existing concourse waiting area will be transformed into a modern and grand "train hall" with a variety of seating areas, new food and retail kiosks, and other added amenities. Ticketing will become a modern experience, with the addition of digital kiosks and compatibility with smart phone technology. Opposite the ticketing area will hang a digital message board showing the rail and transit schedule times and locations. Architecturally, the new waiting area will feature vaulted wood ceilings, curtainwall views to Stamford's downtown skyline, and integrate placemaking artwork and sculptures. The experience will be light-filled, airy and spacious.

A building addition adjacent to the waiting area will house new accessible and equitable restrooms, new staff and management offices, and much needed storage rooms. A partial level above the north side of the waiting room level will house Metropolitan Transportation Authority (MTA) *Police* offices, mechanical spaces and more storage.

Enhancements to the bus and shuttle facility waiting areas will focus on customer security, sense of comfort and modernization. These include the addition of a new south-side shuttle facility beneath the proposed Station Place Plaza, improvements to connectivity by expanding the basement level tunnel, and general upgrades to aesthetic and physical comfort elements.

Key Considerations

- Time passengers are spending in respective customer waiting areas,
- Consider efficiency and quality of experience, as well as a sense of comfort and safety

FIGURE 13: REIMAGINED CONCOURSE WAITING ROOM, LOOKING WEST

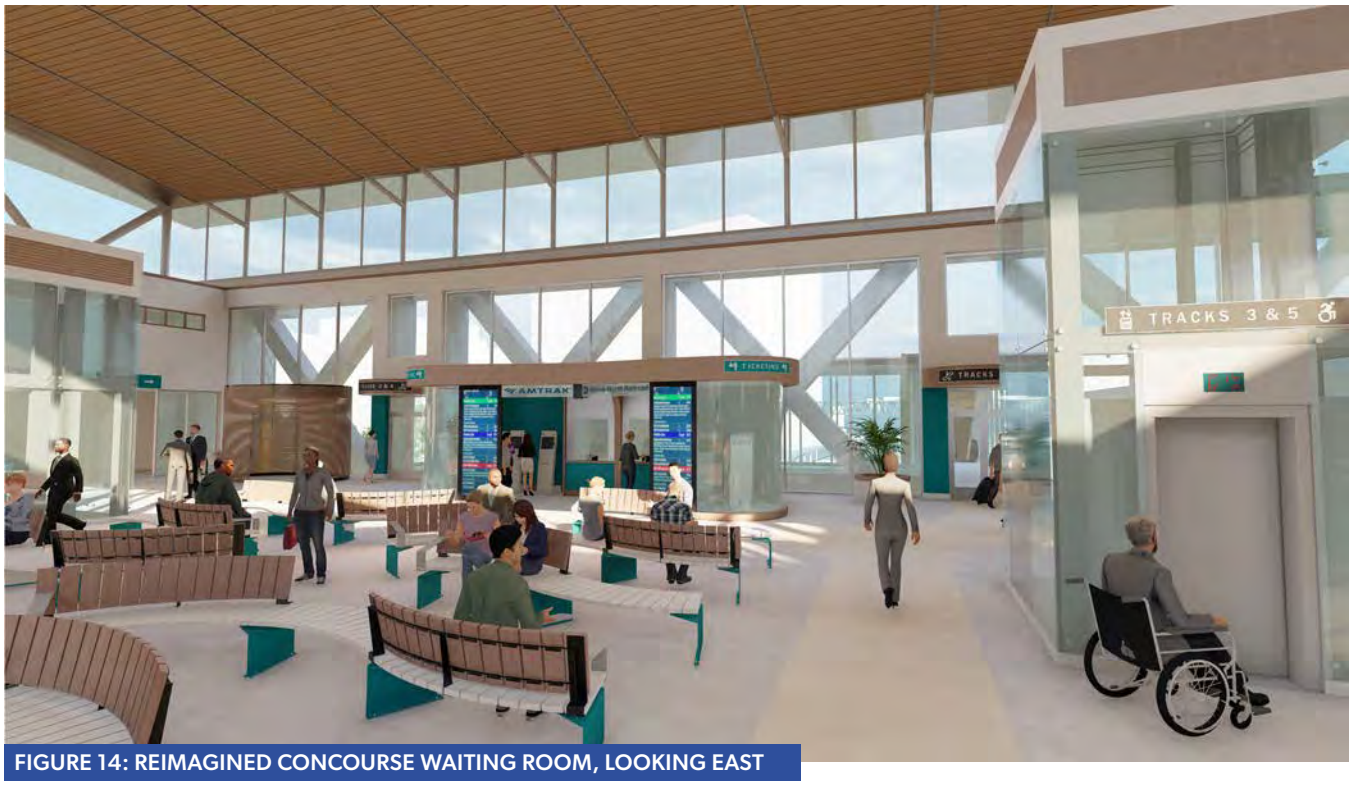


FIGURE 14: REIMAGINED CONCOURSE WAITING ROOM, LOOKING EAST

Master Plan Recommendations

CONCOURSE BUILDING

- Propose "new look" for Concourse building, with both interior and exterior architectural elements:
  - Introduce a redesigned barrel vault style roof, maximizing volume in the reimagined train hall and allowing natural light in through new clerestory windows.
- Explore architectural ideas for modernized exterior and interior finishes and systems.
- Improve and emphasize South State Street entrance.
- Create a grand waiting room "train hall."
- New "Concourse Bridge" connects along east/north face of station over the tracks to provide full horizontal/vertical circulation between streets, platforms, and concourses, with glass towers providing vertical circulation at the Station Place and South State Street ends.
- New building addition to accommodate relocated and expanded restroom facilities.
- Remove Metro-North Railroad (MNR) ticketing "box" from center of concourse.
- Create consistent ticketing presence for both MNR and Amtrak, with a vision of single-point ticketing (one place for all carriers, rail and bus)
- Upgrade platform elevators at center of concourse.
- Move passenger seating into a central gathering space and replace and expand standard seating and waiting areas with charging kiosks and high tops/bar style seating with ample outlets.
- Expand food service and retail options, including fixed and pop-up vendors.
- Provide passenger amenities throughout (seating, information display screens, charging kiosks, restrooms).
- Capitalize on city views from the reimagined concourse "train hall".

GARAGE PEDESTRIAN BRIDGES

- Integrate new/enhanced wayfinding and public information displays.

FIGURE 15: VIEW OF REIMAGINED BUS AND SHUTTLE CONCOURSE WAITING AREA

TUNNELS

- Extend tunnel to new Station Place Plaza entrance and south side shuttle facility at basement level.
- Widen the tunnel to better accommodate passenger flows.
- Add new direct entrances to the bus and shuttle areas.

BUS AND SHUTTLE CONCOURSE

- Expand the customer waiting area and provide direct access to the bus and shuttle bays.
- Add public restrooms.
- Add food service/café.
- Coordinate relocatation of MTA *Police* vehicles to provide improved access and connectivity to buses.
- Reimagine the bus area, adding improved architectural finishes, lighting and amenities.
- Provide passenger amenities in customer waiting area (such as seating, passenger information displays, etc.)
- Improve lighting, heating in winter conditions.
- Improve and enlarge shelters, windbreaks for bus platforms along North State Street.
- Improve and provide more secure bicycle parking.
- Relocate the Stamford Trolley stop.

Wayfinding and Signage

Wayfinding refers to information systems that guide people through a physical environment and enhance their ability to navigate a space and experience. Conceptual wayfinding improvements, both interior and exterior to the STC are recommended. Enhanced and streamlined static and electronic dynamic signage are both proposed throughout the site. Areas proposed to receive improvements include the station building, roadway network, pick-up/drop-off zones, and bus/shuttle connections. The proposed wayfinding will also serve to support a notion of brand awareness and identity of the STC while coordinating efforts with the City's wayfinding initiatives for optimum commuter navigation upon arrival and departure at the STC.

Key Considerations

- Current conditions:
  - Lack of signage in surrounding area.
  - No consistency of existing signage within the concourse building (different types, colors).
- STC has three to four main entrance points and approaches to the site, and can see the train platforms from any approach, complicating how to message.
- Varying layers of directional information need to be clear – Metro-North Railroad, *Police*, CT*transit*, etc.

Master Plan Recommendations

- Develop ideas for brand identity.
  - C*Trail*, CT*transit*, Amtrak, Metro-North Railroad, etc.
- Add City of Stamford destination information on signs (i.e. downtown, waterfront, etc.)
- Make signage visible, comprehensive, and consistent across the STC.
- Implement new, centralized electronic passenger information displays – for all carriers serving the STC.
- Create better wayfinding program for customers arriving by train and exiting to other modes, local areas of interest (needs to begin on platforms or platform egress points.)
- Add garage information and wayfinding throughout the pedestrian bridges (designed to coordinate with centralized passenger information displays in concourse building.)
- Add walk-distance, for-hire vehicle travel time information signage so arriving passengers know there are cases where it may be faster to walk to places from the STC.
- Interior wayfinding.
  - Use color-coding for pathing.
  - Use color to differentiate paths to parking garages within the STC.
- Add wayfinding elements on North State Street entrance.
- Add wayfinding on pedestrian bridges connecting to parking garages.

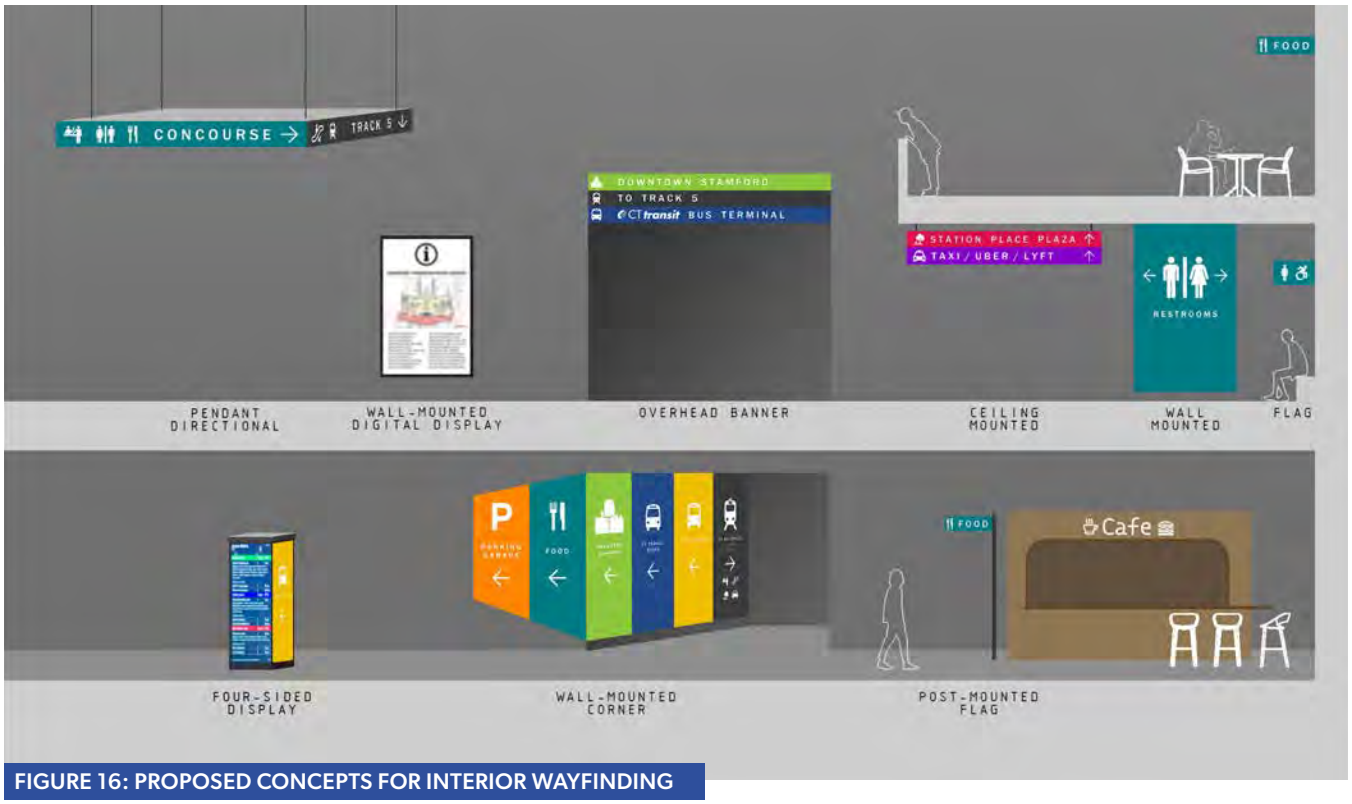


FIGURE 16: PROPOSED CONCEPTS FOR INTERIOR WAYFINDING

FIGURE 17: PROPOSED CONCEPTS FOR EXTERIOR WAYFINDING

- Brand station on the exterior as seen from I-95:
  - Take advantage of the new garage for more STC branding.
  - Opportunity to also brand the eastern STC pedestrian bridge.

Bus and Shuttle Operations

Recommendations to the bus and shuttle operations build on the previous 2016 Stamford Bus and Shuttle Study to provide recommendations of management plans to be implemented to improve customer safety, convenience and comfort in the bus and shuttle areas below I-95 and other identified locations at and around the STC. Connectivity, aesthetic and physical comfort were also addressed in proposed modification to architectural elements including the waiting area, office locations and tunnel expansion.

With the proposed addition of a new Station Street Plaza, there is an opportunity to integrate a new, secondary south-side shuttle facility below the plaza with direct connection to the existing bus and shuttle facility via the extension of the basement level tunnel. The addition of this new shuttle facility holds two significant advantages. Firstly, it anticipates and provides for an increase in transportation activity at both the existing and new shuttle facilities. This may be due to population growth, expansion of the transportation networks, or increased demand for shuttle services. Secondly, traffic movements are simplified, because the shuttles can use this basement-level facility when servicing customers at the STC. Convenience, efficient use of space, and improved movement of vehicle traffic could therefore be seen as the main benefits of this proposal.

Key Considerations

- Prioritize safety and efficiency.
- Consider optimizing operational function with relocation of south-side shuttles.

Master Plan Recommendations

- Separate shuttles from parking areas – limit parking to only Guernsey Street.
- Separate north-side and south-side shuttle areas.
  - North-side shuttle operations to remain in the existing shuttle facility.
  - South-side shuttle operations to be relocated to the proposed new shuttle facility under Station Place Plaza.

FIGURE 18: ILLUSTRATIVE SITE PLAN VIEW OF BUS AND SHUTTLE FACILITY

FIGURE 19: ILLUSTRATIVE RENDERING OF BUS FACILITY

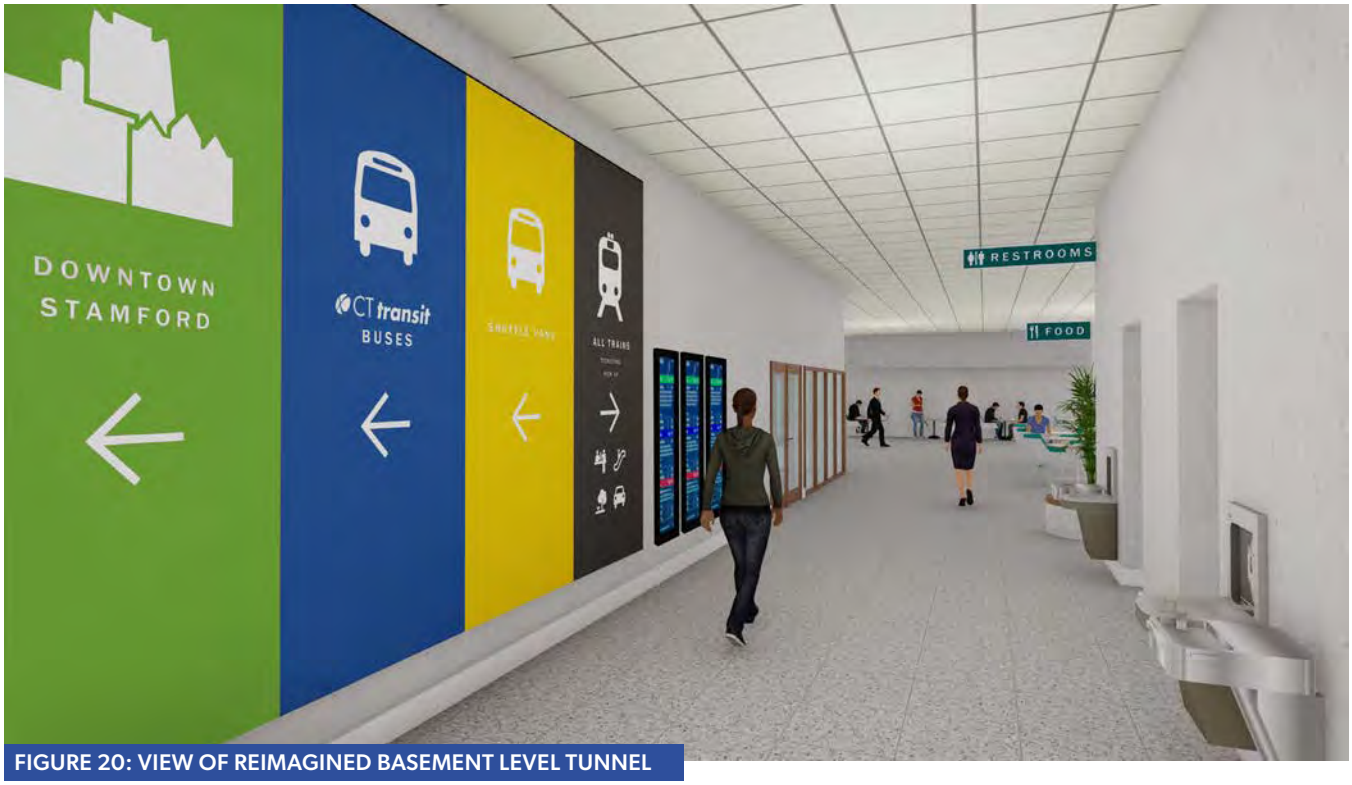


FIGURE 20: VIEW OF REIMAGINED BASEMENT LEVEL TUNNEL

- Improve safety by adding marked customer crossings on all active bus and shuttle travel lanes.
- Add real time bus and shuttle information signs.
- Add controlled vehicle access on North State Street and Station Place.
- Relocate the Stamford Trolley stop from the shuttle concourse to the transit bus concourse or Station Place.
- Coordinate relocatation of MTA *Police* vehicle parking.

TNC and Taxi Services

Existing Transportation Network Companies (TNC, such as Uber or Lyft) and taxi service operations at and around the STC were evaluated and improvements to customer access and safety, convenience, as well as comfort at and approaching the STC are recommended. These align with the recommended modifications to traffic patterns and roadway configurations, resulting in a more organized and safer environment for those who travel to and from the STC via TNC or taxi.

Key Considerations

- Major North State pedestrian crossing by the STC entrance also has an automated pedestrian detector.

Master Plan Recommendations

- Route all TNC and Taxi vehicles to Station Place
- Organize queuing by mode.
- Further consider transit-only access to North State Street between Atlantic Street and Washington Boulevard including vehicle queuing space to improve operations.
- Add dedicated bus and shuttle lanes on Washington Boulevard between Tresser Boulevard and Henry Street.
- Add south-side shuttle boarding/alighting lane to Station Place Plaza, lower level.
- Add a designated TNC pick-up/drop off lane to Station Place.

FIGURE 21: ILLUSTRATIVE RENDERING, SHOWING TNC AND TAXI DROP-OFF/PICK-UP LANES AT STATION PLACE PLAZA

Moving Forward

The Stamford Transportation Center (STC), is the busiest passenger rail station in Connecticut. However, its heavy usage alongside spatial constraints posed by neighboring development and railway infrastructure creates a need for a reimagined, modernized facility and careful coordination of enhancements for customer access and the overall commuter experience. This need led to the development of the STC Master Plan, a partnership between the CTDOT, City of Stamford and general public to provide operational and design recommendation to transform the STC into a best-in-class, multi-modal passenger facility. By focusing on creating a safe, efficient and comfortable experience for all users, the STC Master Plan aims to redesign and modernize the station's roadways, pedestrian pathways, waiting areas, signage and bus & shuttle operations to suit today's – and the future - urban needs. Future steps following the development of this Master Plan include further studies and design development to better understand feasibility and move towards the implementation of the recommendations contained herein.

5

Order-of-Magnitude Opinion of Probable Construction Cost

An order-of-magnitude opinion of probable construction cost for the STC preferred concept has been developed in accordance with the CTDOT June 2023 Cost Estimating Guidelines (2023 CEG) for a project in the Programming phase of development. Major elements of the estimate include the following:

- Modifications and improvements to the STC proper, including expansion of the facility itself, extension of the existing tunnel level to Station Place, and a new tunnel within the facility.
- Realignment and reconstruction of Station Place, including a new civic plaza and a basement-level facility, below the plaza, to accommodate south-side shuttles.
- Improvements to Washington Boulevard, Atlantic Street, North State Street, and South State Street, including modifications to better accommodate vehicular, pedestrian, and bicycle traffic.
- Improvements to the Bus and Shuttle area, between North and South State Street, under I-95.
- Improvements to interior and exterior wayfinding.

In addition to the items noted above, the overall estimate includes an allowance for Minor Items, Recurring Lump Sum Items, Contingencies, Utilities, Railroad Force Account, and Design/Engineering. Not included are costs related to environmental work, permitting, rights-of-way, or inflation.

For projects in the Programming phase of development, the 2023 CEG recommends percentage ranges for the Minor Items and Contingency allowances. As such, these factors were used to establish "low" and "high" estimates for the STC preferred concept, thereby developing an anticipated range for the probable construction cost.

Minor Items

In accordance with the CTDOT 2023 CEG, an allowance is carried in the overall construction phase cost estimate for Minor Items. Minor items are those who are known to be needed on a project but whose quantities are too small to be calculated during the Programming phase. In addition, the STC Master Plan estimate is based on conceptual plans and not on any specific engineering analysis or design. As such, factors of 15% and 30%, respectively, have been applied to the "low" and "high" estimates to the estimated construction costs for the station area roads as well as the STC building and associated work.

Recurring Lump Sum Items

Recurring Lump Sum Items are those items included in most CTDOT-bid projects, but whose costs can vary widely from one project to the next. The cost of these items is estimated as a percentage of total project costs. These items include Clearing and Grubbing, Maintenance and Protection of Traffic, Mobilization and Project Closeout, and Construction Surveying.

The CTDOT 2023 CEG provides the range and average percentages for these items based on recent bid history for single-location highway and bridge construction projects. Since this study focuses on both roadway and vertical construction work within a highly constrained area, engineering judgement was used to determine the percentages to be applied.

Incidentals

Incidentals represent the cost of Construction Engineering and consist of the various activities required to administer the construction contract. These include inspection, materials testing, construction phase design support and other functions required by both state and consultant forces.

In accordance with the CTDOT 2023 CEG, incidentals are estimated using a sliding scale percentage based on the contract cost and type of project. While there is roadway reconstruction as part of the STC Master Plan, the largest cost is for improvements and modifications to the STC proper and associated work. As such, an incidental factor of 30% for a Facilities project has been applied.

Contingencies

Contingencies are an element of estimated cost included to account for risk and uncertainty with a project.

In accordance with the CTDOT 2023 CEG, contingencies are estimated as a percentage of anticipated work based on the development phase of the project at the time the cost estimate is developed. Uncertainty and risk diminish as development progresses toward design completion, so this value also decreases as the design development advances. For a project in the Programming phase, it is recommended that a factor of 20-30% be included for Contingencies. As with the Minor Items allowance, since the estimates are based on concepts only, and not on any specific engineering analysis or design, a factor of 20% has been applied to the "low" estimate, while a factor of 30% has been applied to the "high" estimate. Unlike Minor Items, Contingency factors are applied to the overall construction costs, including the Recurring Lump Sum Items.

Utilities

A percentage of the total cost of roadway-related work has been added to the estimate to account for impacts to utilities within the roadways which may be impacted. Utility work related to improvements and upgrades to the STC building are included as part of those costs.

Railroad Force Account

To account for work required by railroad forces during design and construction, a 30% factor has been applied to the total of all work related to the STC building as well as the reconstruction/realignment of Station Place. The latter was included due to the proximity of the proposed basement-level facility, below the plaza, to the railroad infrastructure.

Design/Engineering

To account for design and engineering work associated with the STC Master Plan preferred concept, an 8% factor was applied to the total of the Major Elements plus the Recurring Lump Sum Items. This factor is not applied to the Incidentals, Contingencies, Railroad Force Account, or Utilities amounts.

Order-of-Magnitude Opinion of Probable Construction Cost

The estimated order-of-magnitude construction cost is currently expected to be in the range of $182M to $214M. A high-level summary of the estimate can be found in the table below while expanded summaries and a breakdown of the estimate, detailing the items noted above, can be found in Appendix G.

SUMMARY ORDER-OF-MAGNITUDE OPINION OF PROBABLE CONSTRUCTION COST

Item Description	"Low" Estimate	"High" Estimate
Station Area Roads	$16,977,000	$19,191,000
STC Building/Other Work	$72,962,000	$82,478,000
Subtotal 1	**$89,939,000**	**$101,669,000**
Lump Sum Items	$10,108,000	$11,427,000
Subtotal 2	**$100,047,000**	**$113,096,000**
Engineering Percentages	$81,646,000	$100,745,000
Subtotal 3	**$181,693,000**	**$213,841,000**
Total (Rounded)	**$182,000,000**	**$214,000,000**

Appendix List

A. Illustrative Drawings: Renderings of STC Master Plan Concept

B. Illustrative Drawings: Architectural Plans and Elevations of STC Building

C. Illustrative Drawings: Proposed Traffic Diagrams

D. Illustrative Drawings: Proposed Wayfinding Plan

E. Existing Conditions Traffic Volumes Reports & Crash History

F. Traffic Analysis of STC Master Plan

G. Order-of-Magnitude Conceptual Construction Cost Estimate Detail

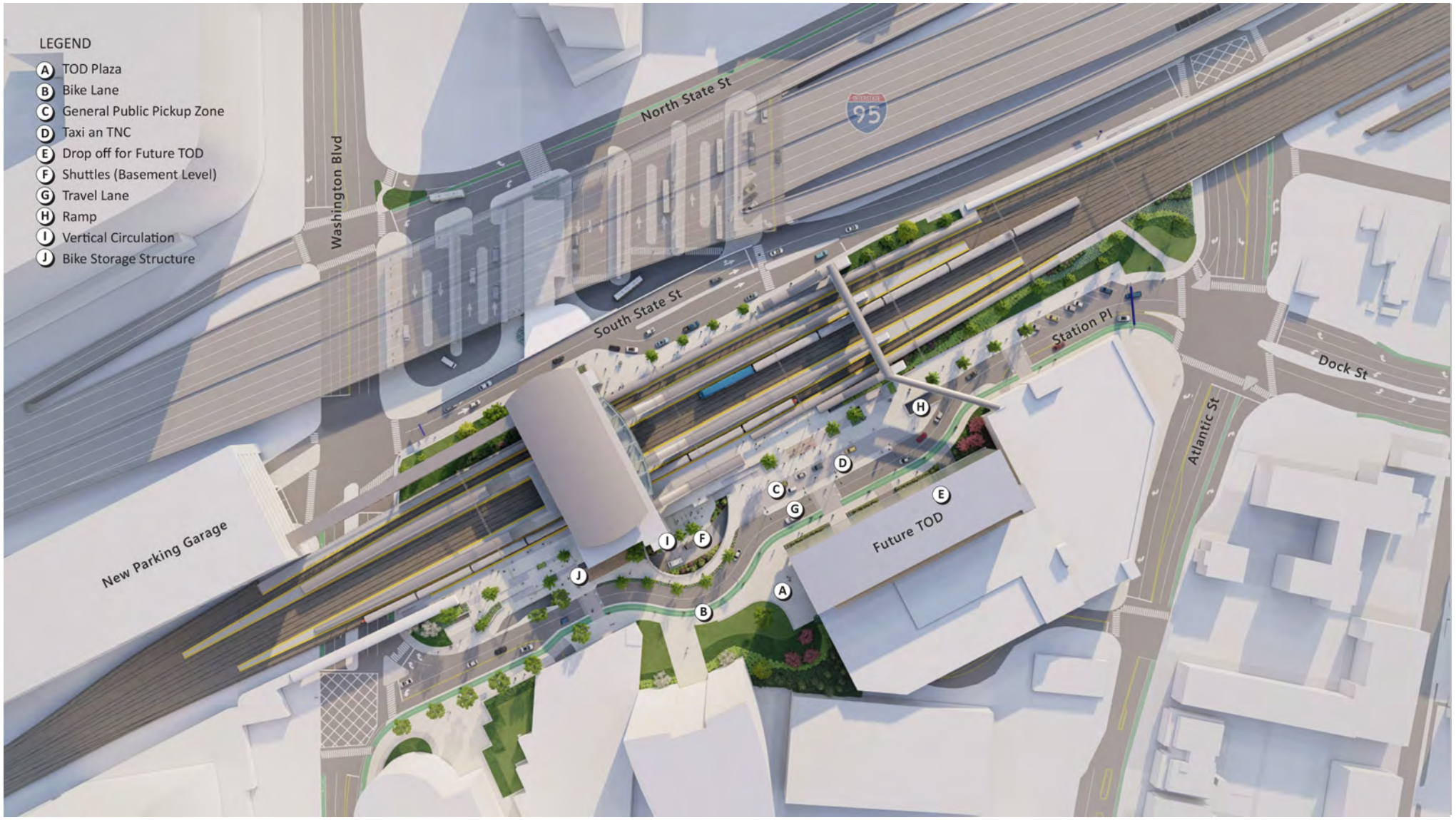
H. Research of Comparable State-of-the-Art Projects

I. Summary of Development Projects

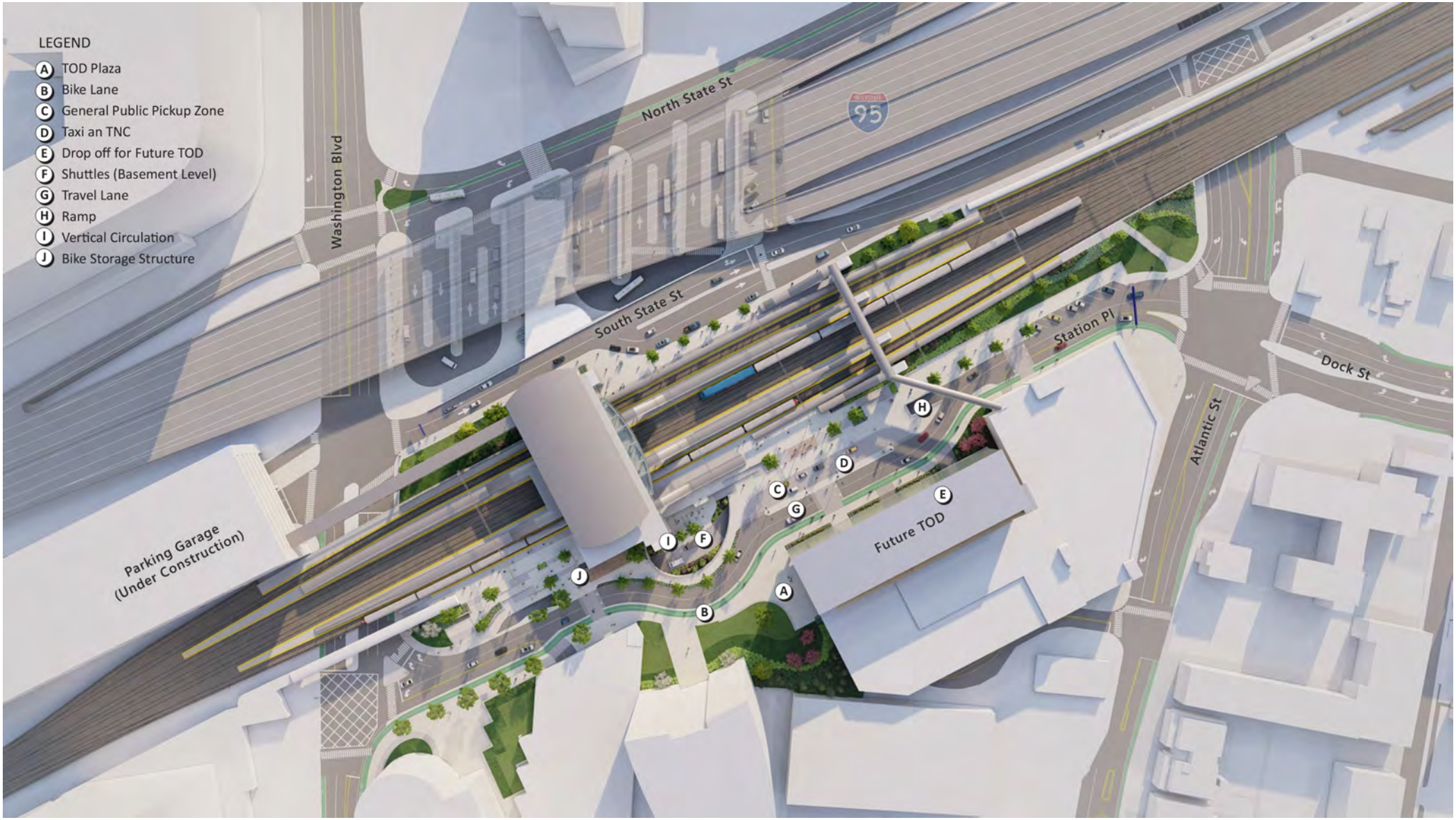
APPENDIX A

Illustrative Drawings: Renderings of STC Master Plan Concept

STAMFORD TRANSPORTATION CENTER MASTER PLAN



STAMFORD TRANSPORTATION CENTER MASTER PLAN



STAMFORD TRANSPORTATION CENTER MASTER PLAN

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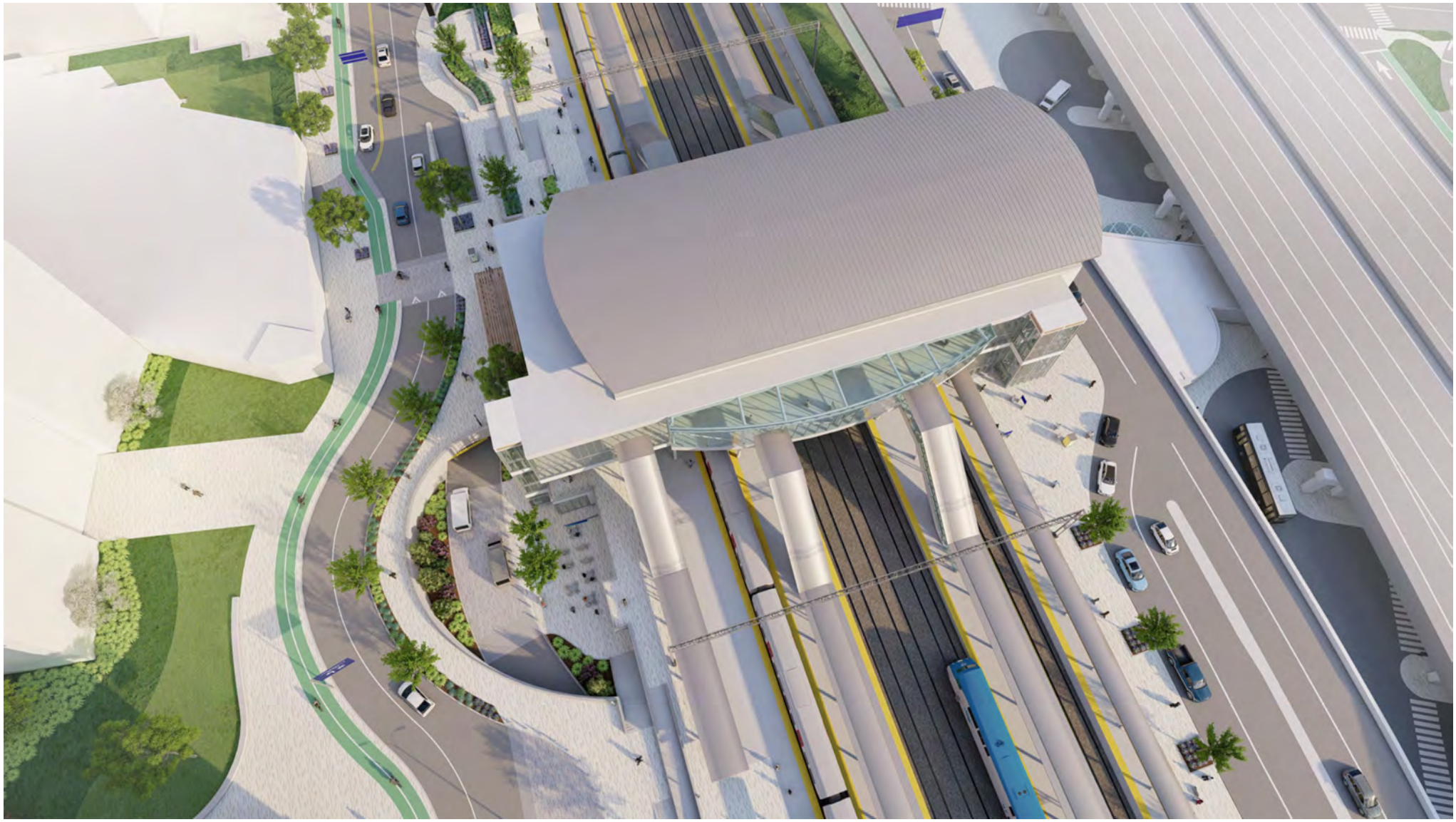


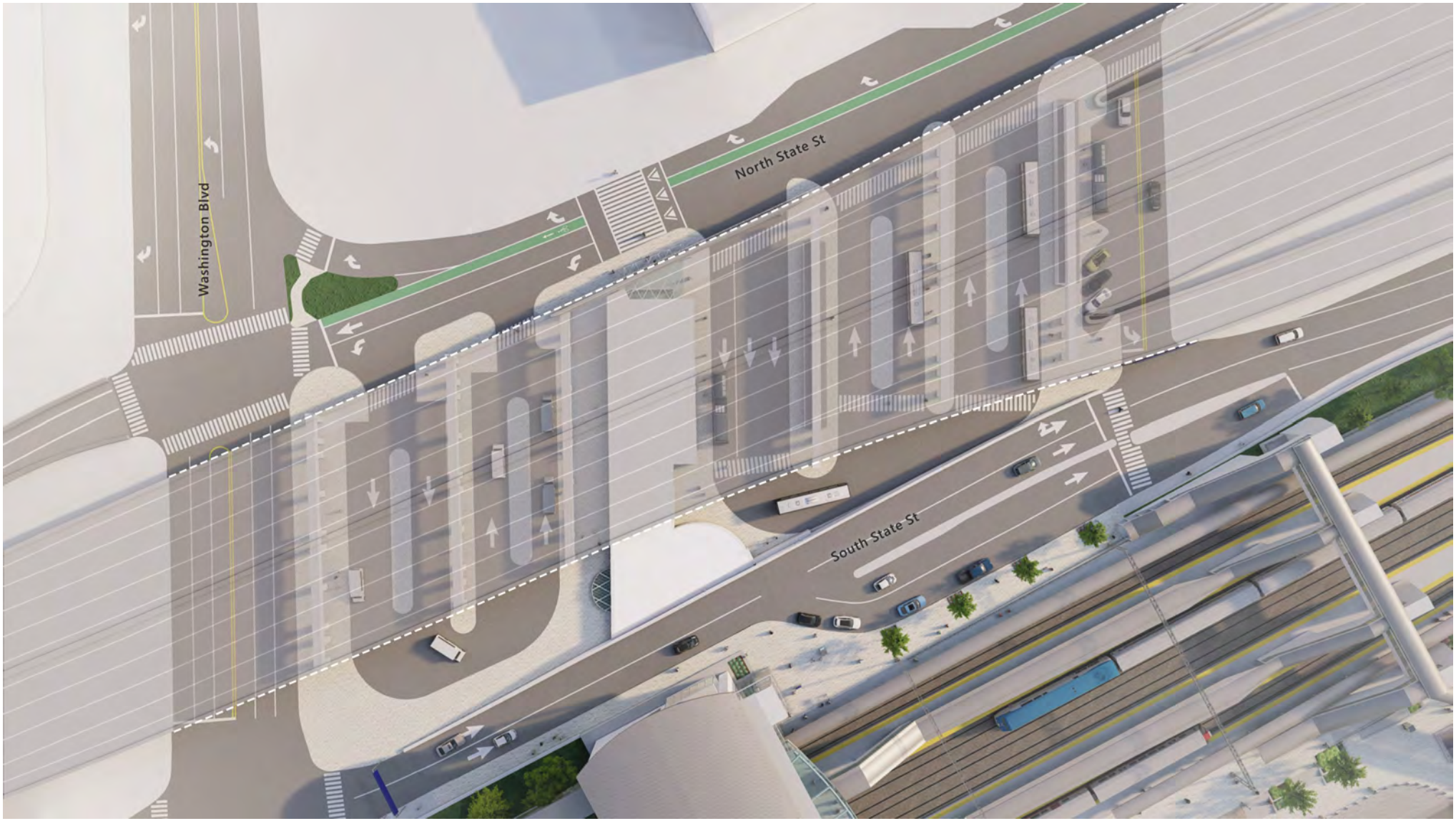
STAMFORD TRANSPORTATION CENTER MASTER PLAN

STAMFORD TRANSPORTATION CENTER MASTER PLAN


DOWNTOWN
STAMFORD
CT transit
BUSES
SHUTTLE VANS
ALL TRAINS
TICKETING
PICK UP
RESTROOMS
FOOD

STAMFORD TRANSPORTATION CENTER MASTER PLAN

STAMFORD TRANSPORTATION CENTER MASTER PLAN



STAMFORD TRANSPORTATION CENTER MASTER PLAN

STAMFORD TRANSPORTATION CENTER MASTER PLAN

STAMFORD TRANSPORTATION CENTER MASTER PLAN

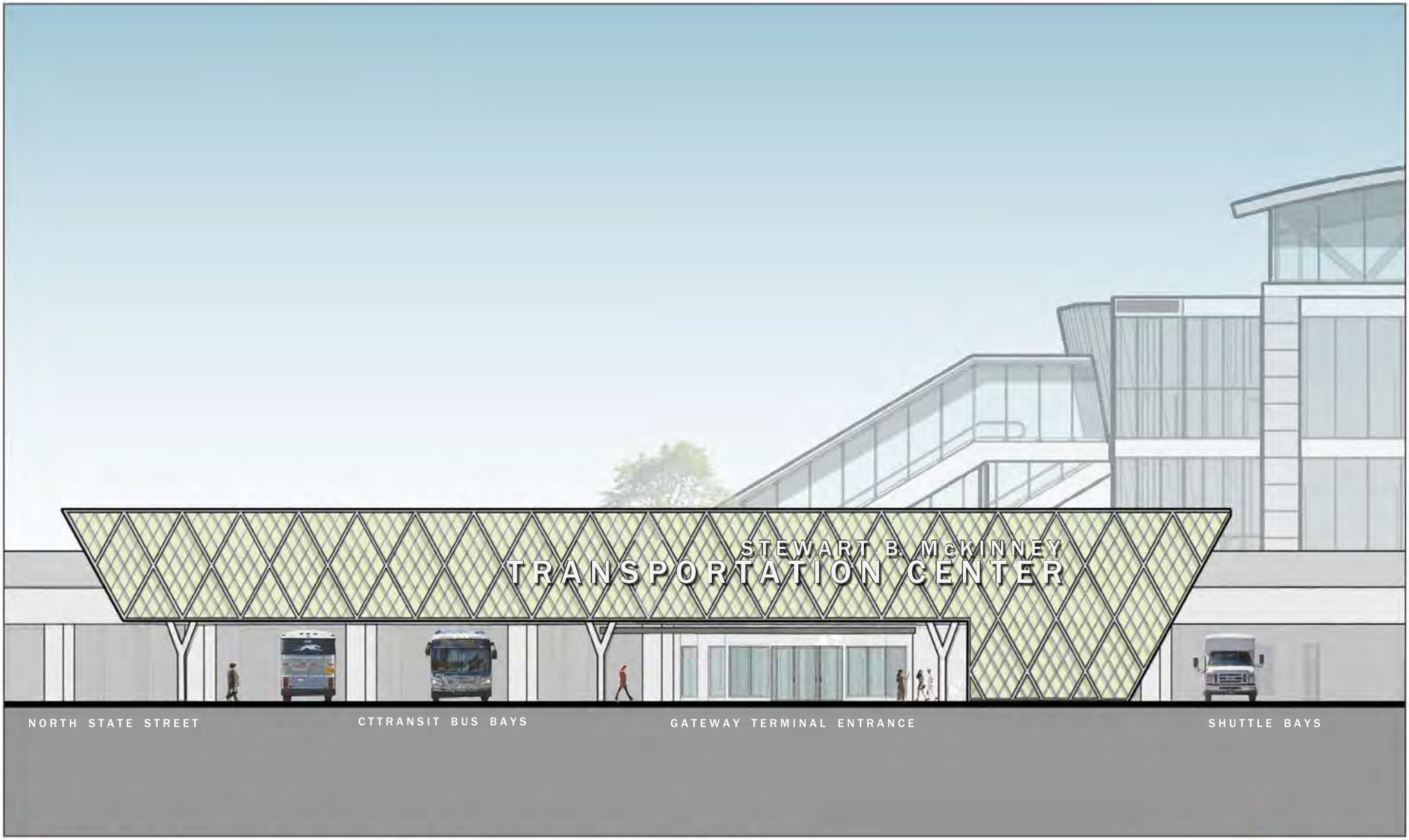
APPENDIX B

Illustrative Drawings: Architectural Plans and Elevations of STC Building

STAMFORD TRANSPORTATION CENTER MASTER PLAN

TRANSFORMATIVE VISION FOR STC | EAST ELEVATION / SECTION

0' 10' 20' 40' 80'



STAMFORD TRANSPORTATION CENTER MASTER PLAN

TRANSFORMATIVE VISION FOR STC | GATEWAY ENTRANCE

0' 5' 10' 20' 40'

SOUTH ELEVATION
STATION PLACE

NORTH ELEVATION
SOUTH STATE STREET

STAMFORD TRANSPORTATION CENTER MASTER PLAN

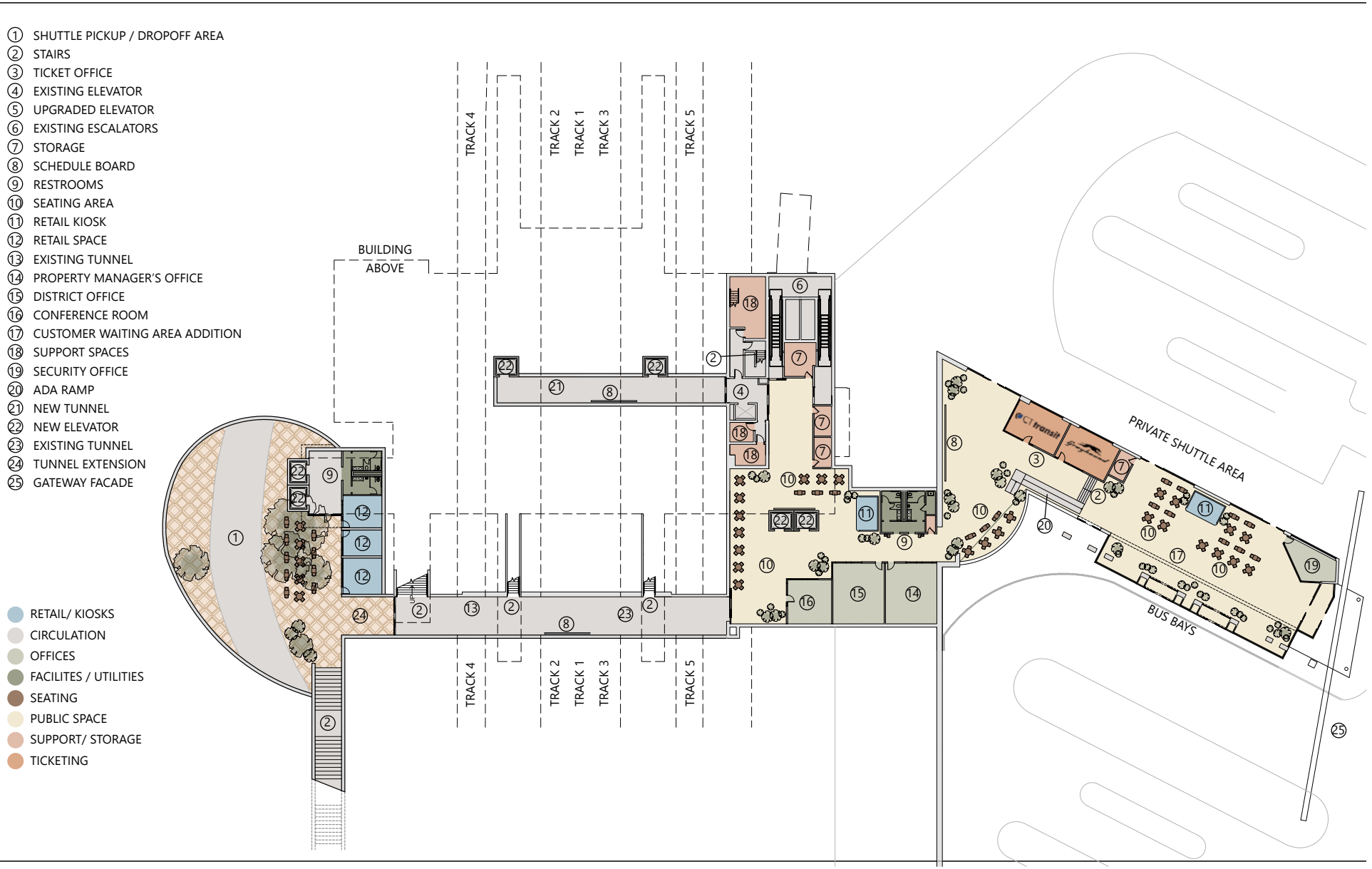
TRANSFORMATIVE VISION FOR STC | NORTH & SOUTH ELEVATIONS

0' 10' 20' 40' 80'

STAMFORD TRANSPORTATION CENTER MASTER PLAN

TRANSFORMATIVE VISION FOR STC | WEST ELEVATION

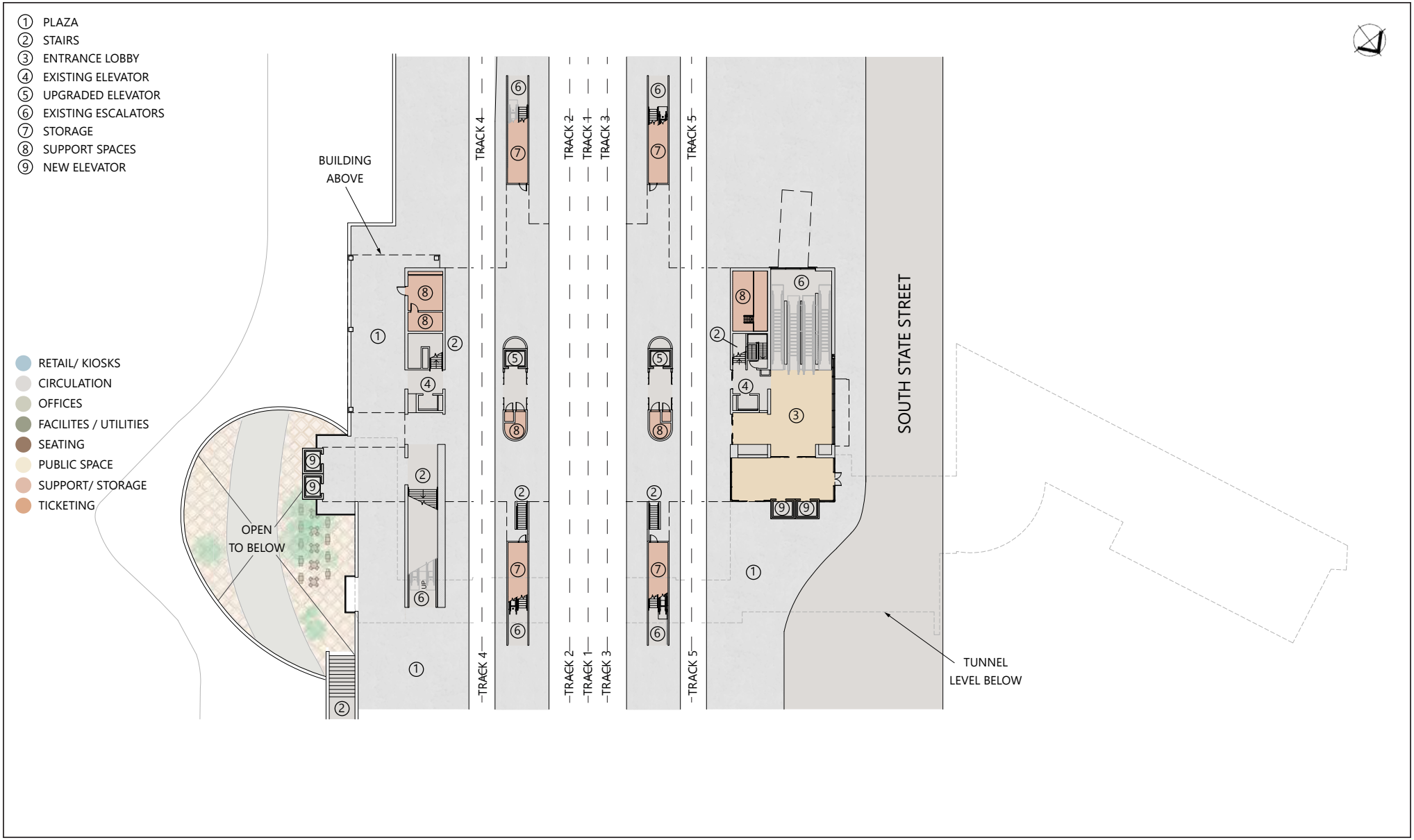
0' 10' 20' 40' 80'



STAMFORD TRANSPORTATION CENTER MASTER PLAN

TRANSFORMATIVE VISION FOR STC | TUNNEL LEVEL PLAN

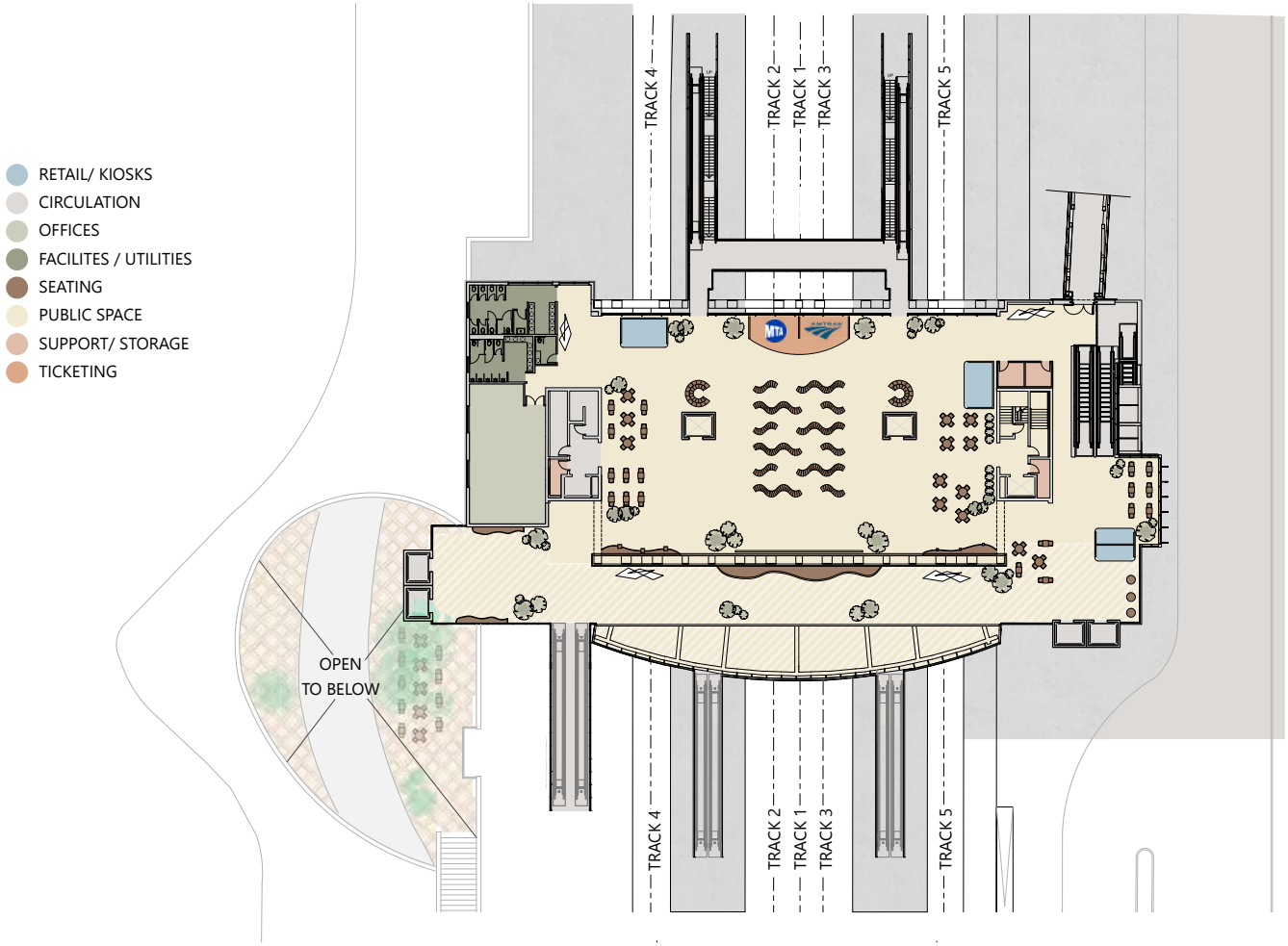
0 25 50 100



STAMFORD TRANSPORTATION CENTER MASTER PLAN

TRANSFORMATIVE VISION FOR STC | PLATFORM LEVEL PLAN

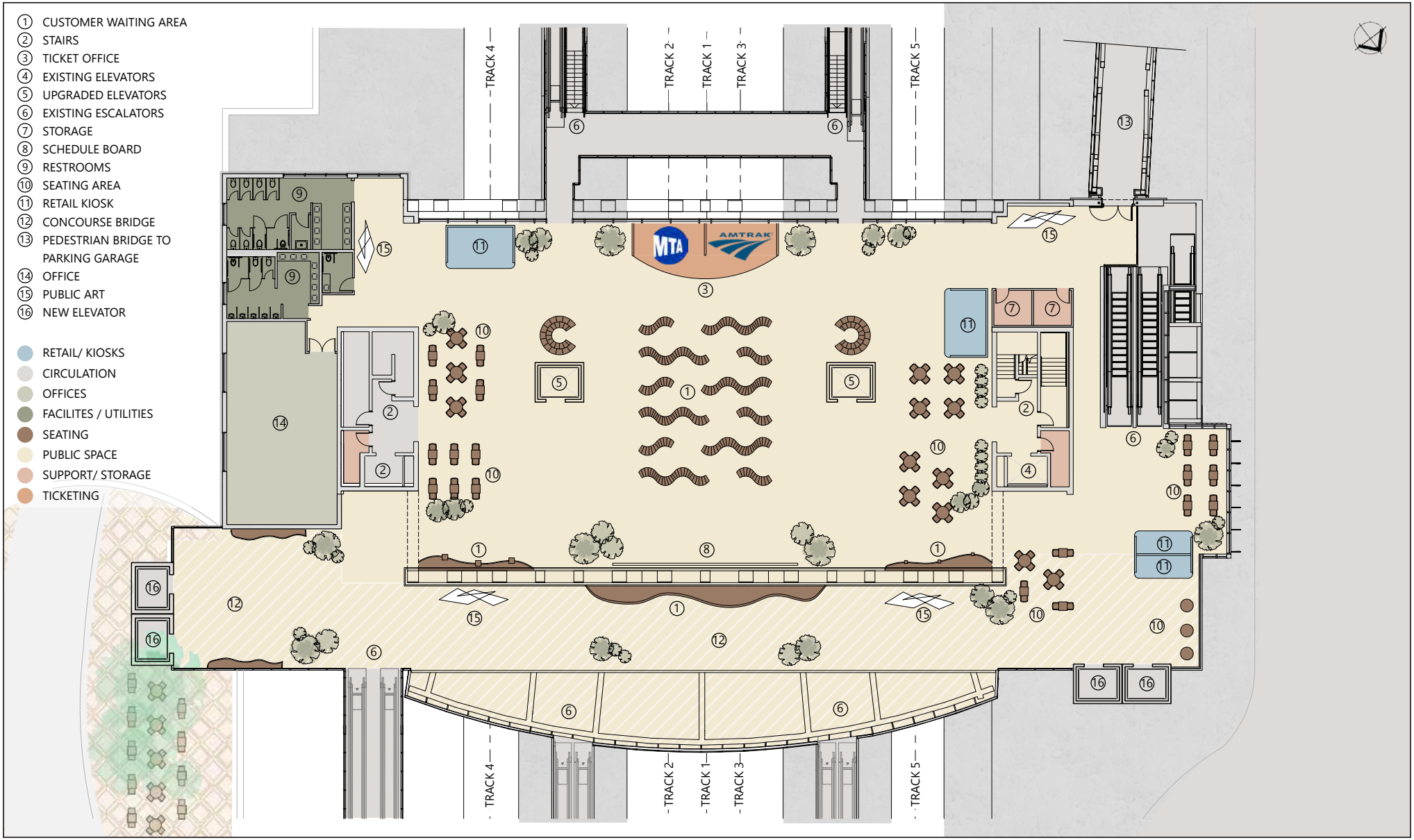
0 25 50 100



STAMFORD TRANSPORTATION CENTER MASTER PLAN

TRANSFORMATIVE VISION FOR STC | CONCOURSE LEVEL PLAN

0 25 50 100



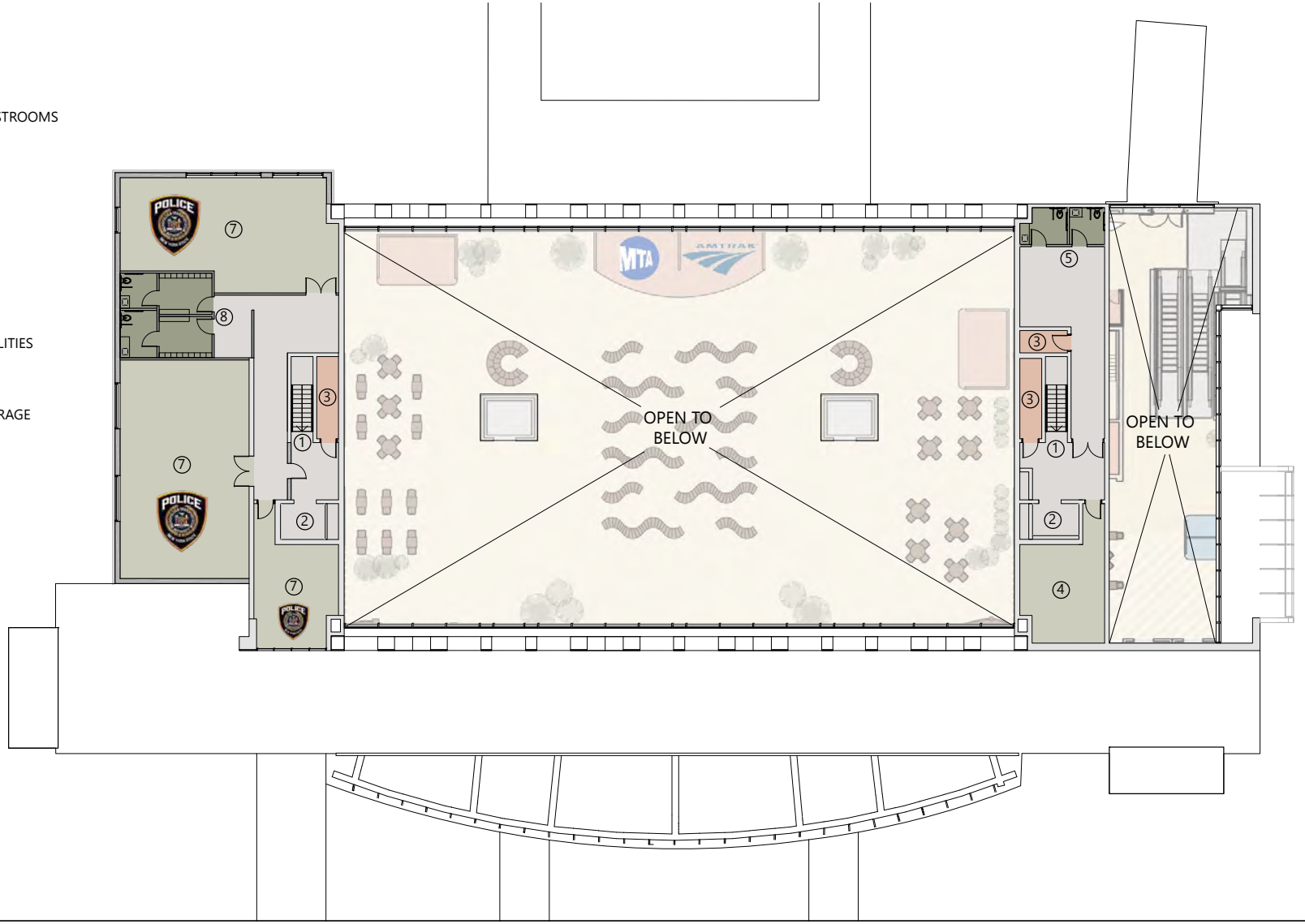
STAMFORD TRANSPORTATION CENTER MASTER PLAN

TRANSFORMATIVE VISION FOR STC | CONCOURSE LEVEL PLAN - ENLARGED

0 25 50 100

① STAIRS
② EXISTING ELEVATORS
③ STORAGE
④ OFFICES
⑤ RESTROOMS
⑥ CLERESTORY
⑦ MTA POLICE
⑧ LOCKERS & RESTROOMS

RETAIL/ KIOSKS
CIRCULATION
OFFICES
FACILITES / UTILITIES
SEATING
PUBLIC SPACE
SUPPORT/ STORAGE
TICKETING



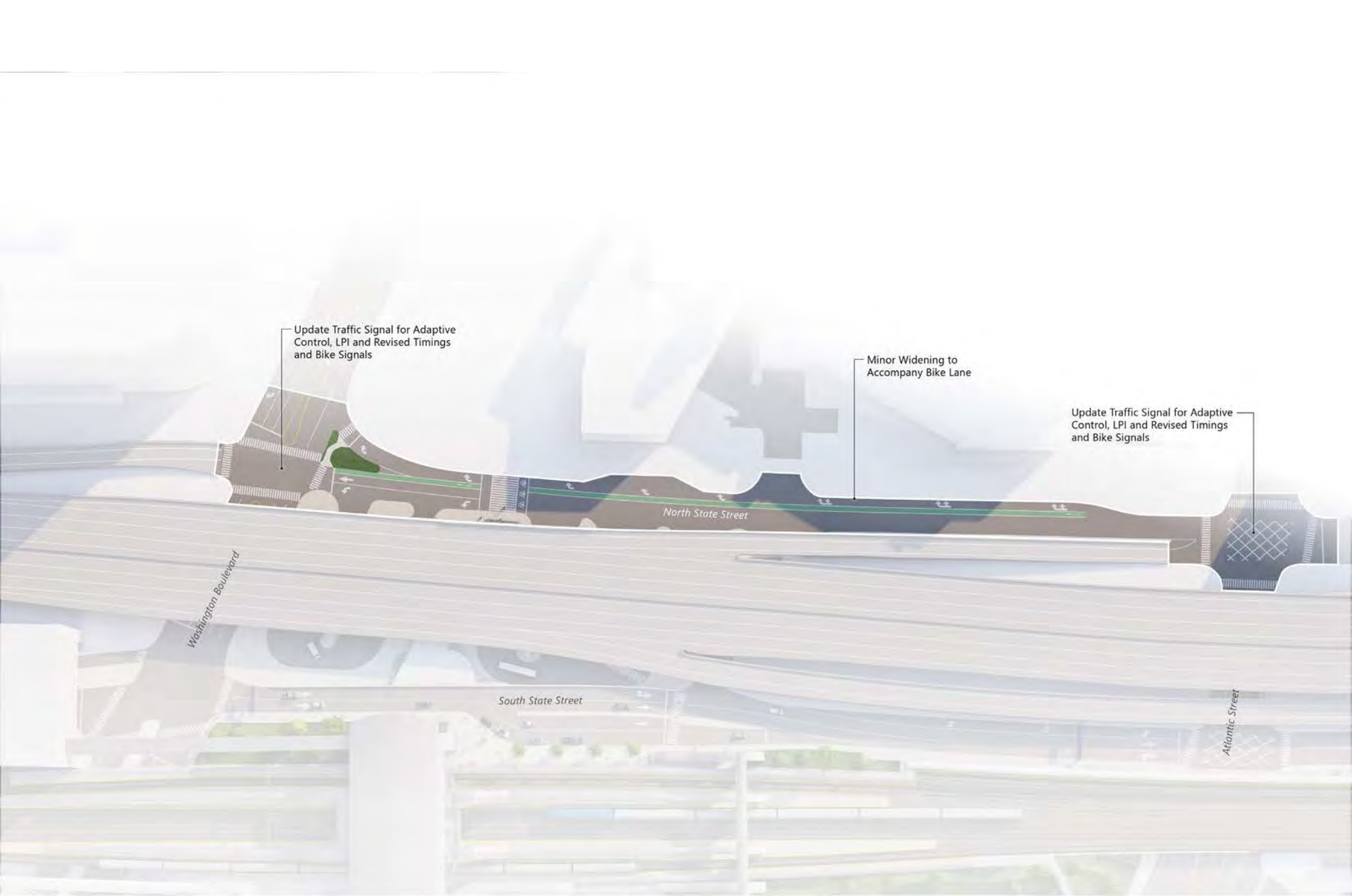
STAMFORD TRANSPORTATION CENTER MASTER PLAN

TRANSFORMATIVE VISION FOR STC | SECOND LEVEL PLAN

0 25 50 100

APPENDIX C

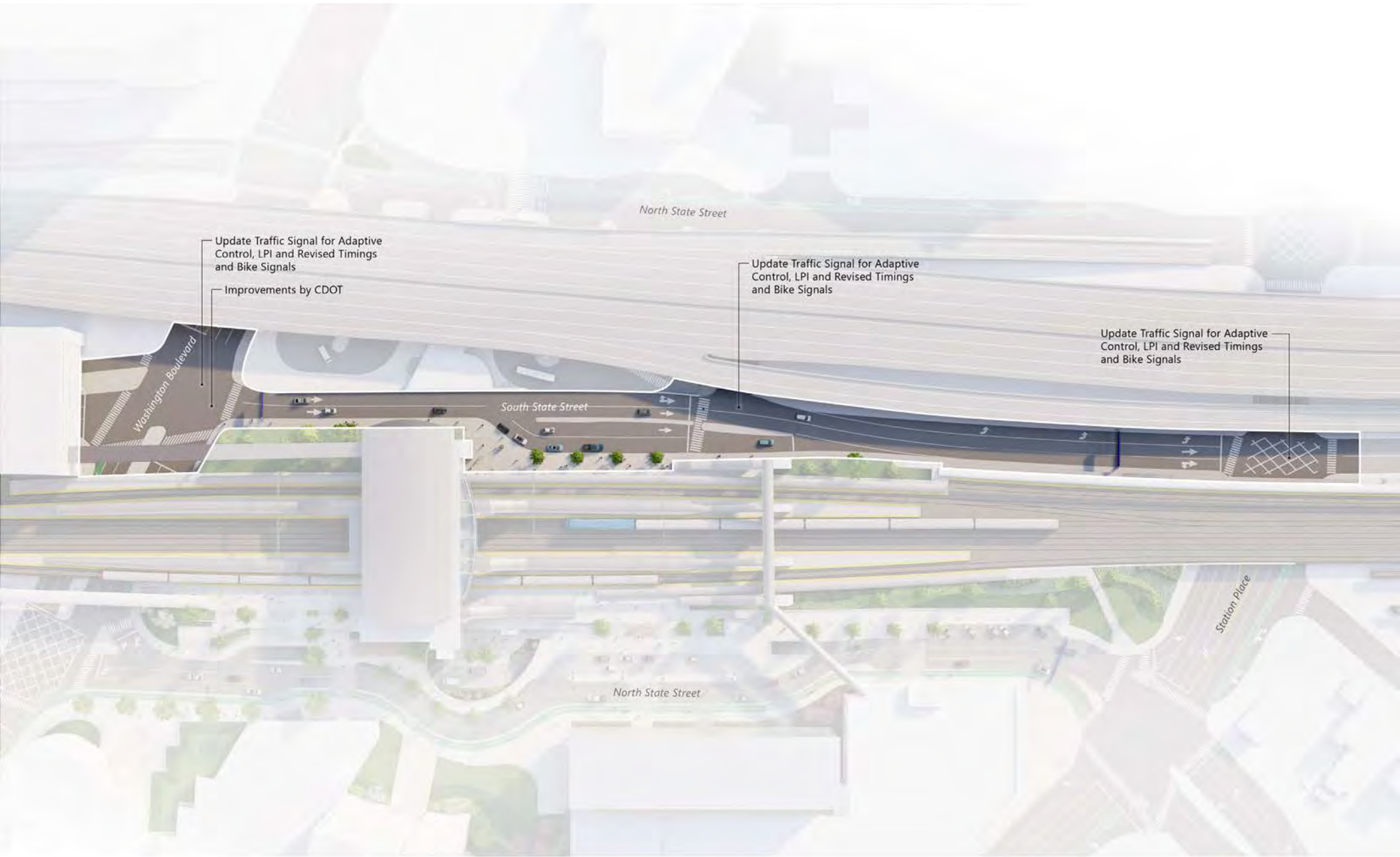
Illustrative Drawings: Proposed Traffic Diagrams



STAMFORD TRANSPORTATION CENTER MASTER PLAN

ROADWAY CONCEPT PLAN | NORTH STATE STREET

0 100 200



STAMFORD TRANSPORTATION CENTER MASTER PLAN

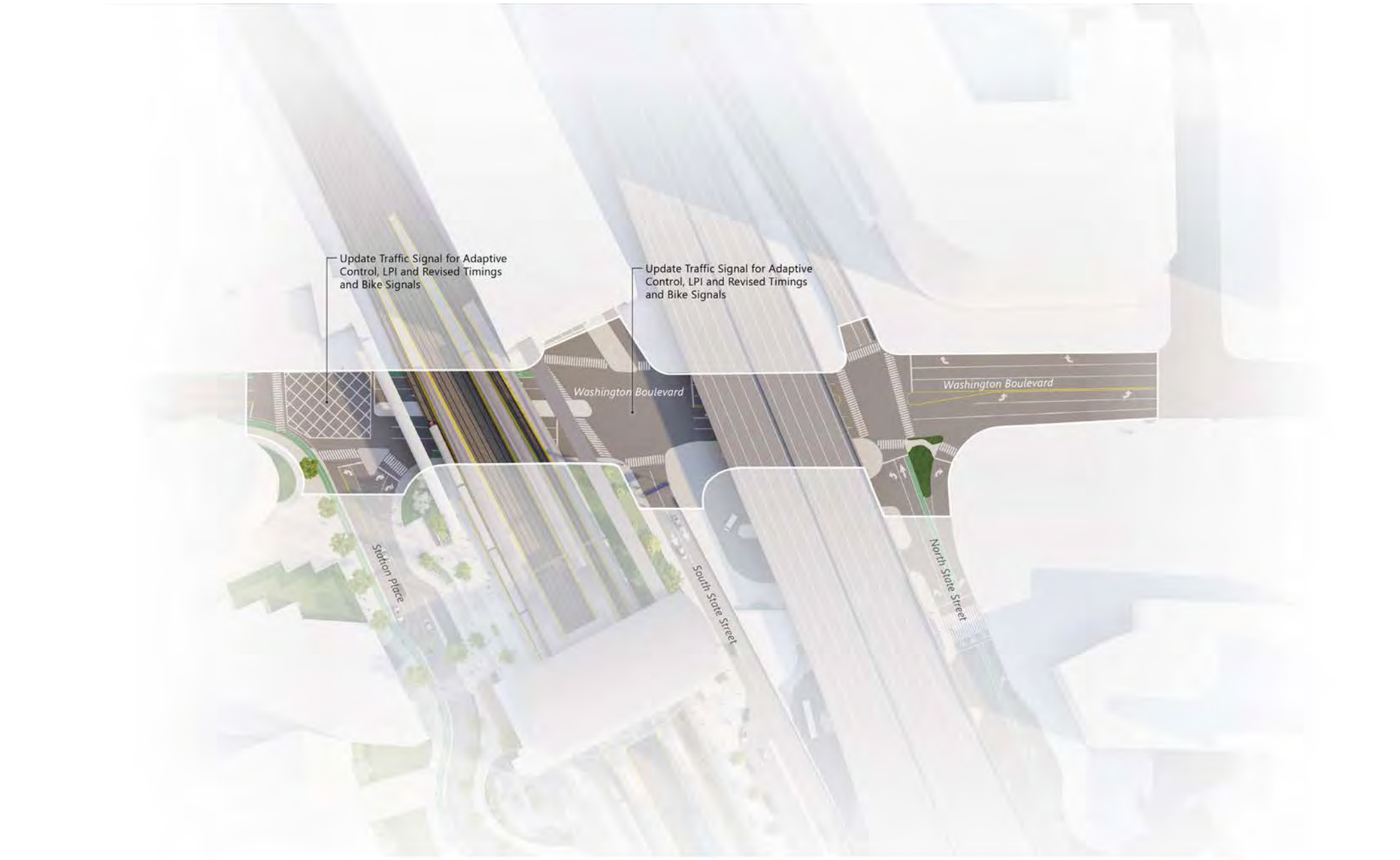
ROADWAY CONCEPT PLAN | SOUTH STATE STREET

0 100 200

STAMFORD TRANSPORTATION CENTER MASTER PLAN

ROADWAY CONCEPT PLAN | STATION PLACE

0 100 200



STAMFORD TRANSPORTATION CENTER MASTER PLAN

ROADWAY CONCEPT PLAN | WASHINGTON BOULEVARD

0 100 200

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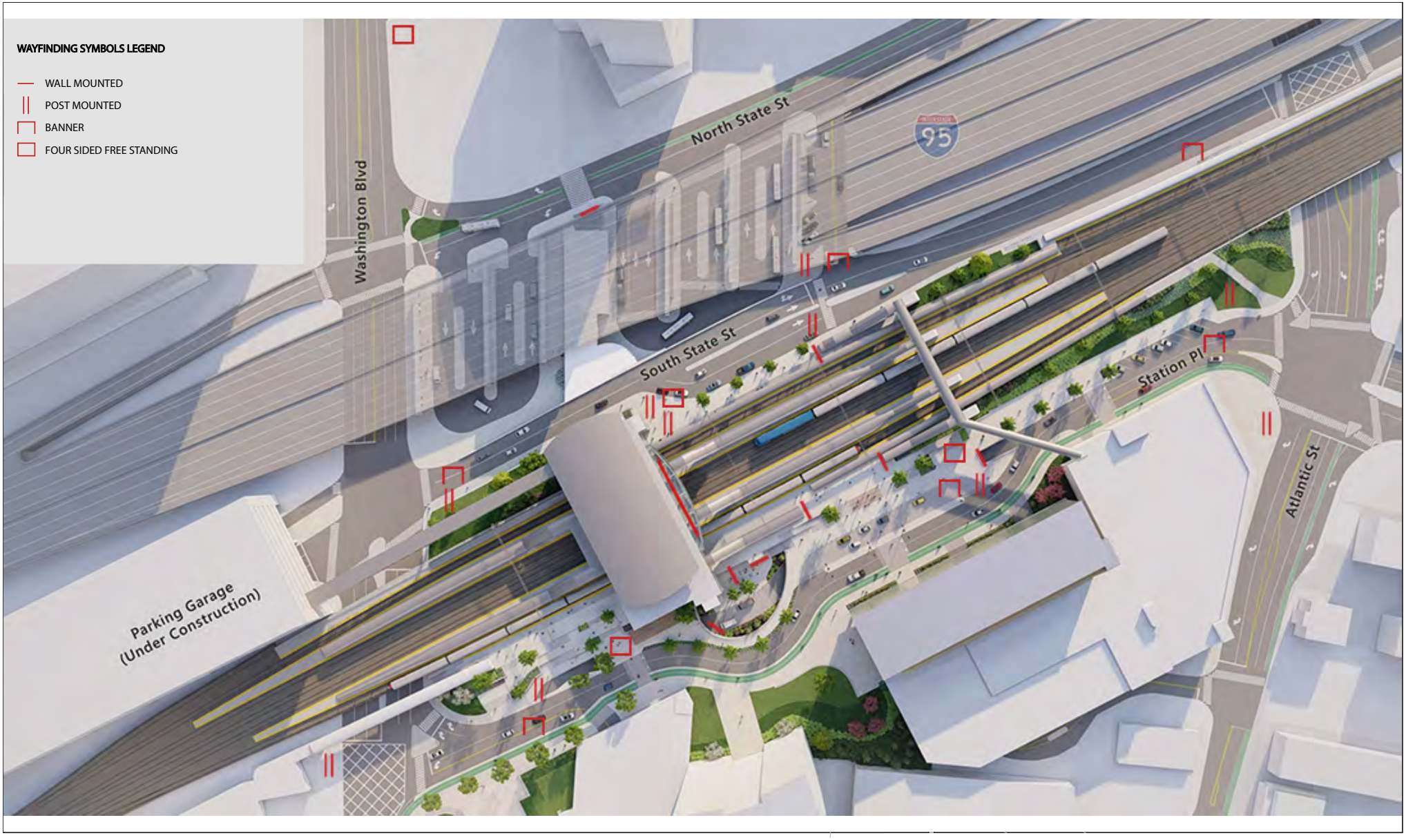
APPENDIX D

Illustrative Drawings: Proposed Wayfinding Plan

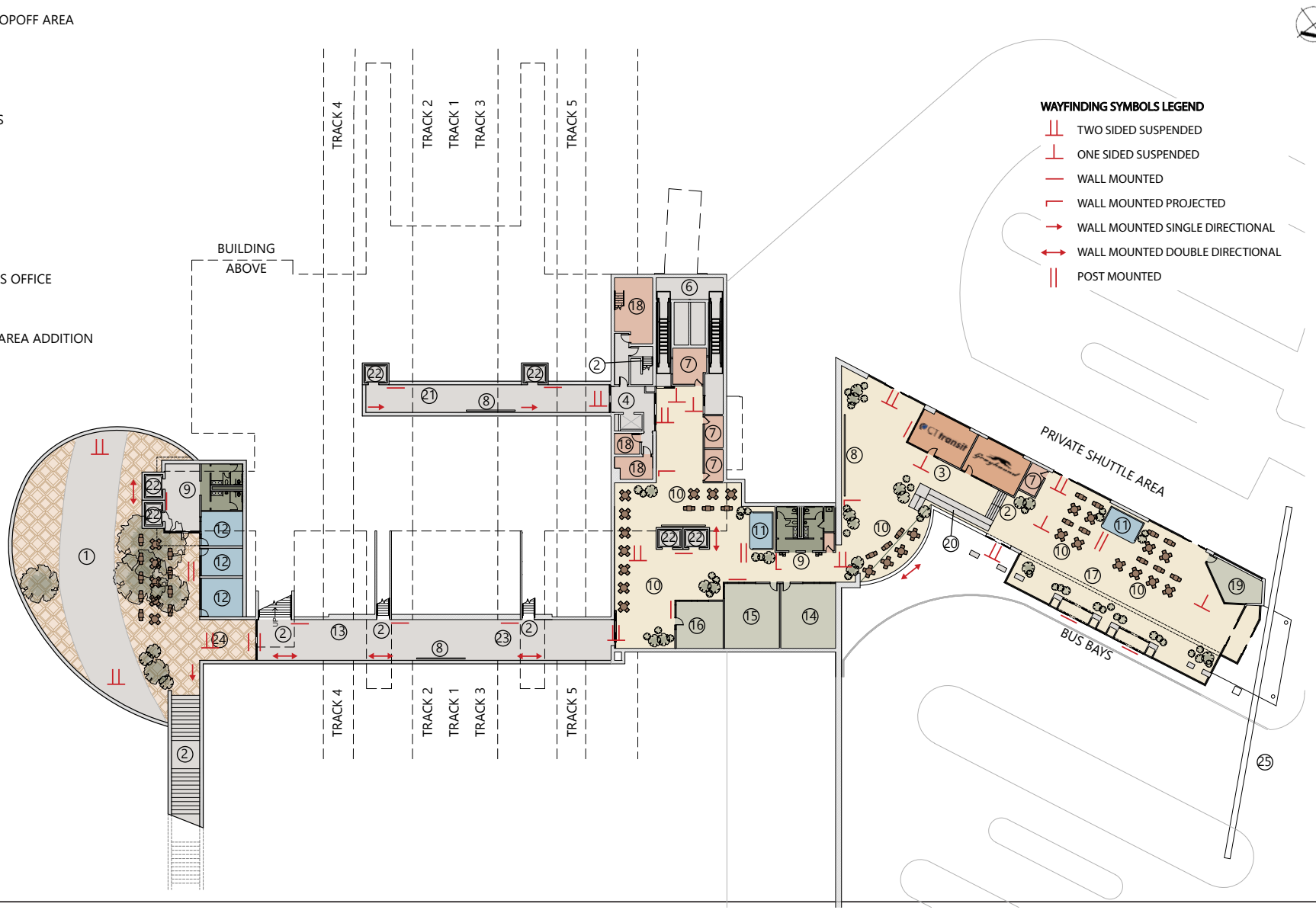


STAMFORD TRANSPORTATION CENTER MASTER PLAN

TRANSFORMATIVE VISION FOR STC | EXTERIOR WAYFINDING PLAN

1. SHUTTLE PICKUP / DROPOFF AREA
2. STAIRS
3. TICKET OFFICE
4. EXISTING ELEVATOR
5. UPGRADED ELEVATOR
6. EXISTING ESCALATORS
7. STORAGE
8. SCHEDULE BOARD
9. RESTROOMS
10. SEATING AREA
11. RETAIL KIOSK
12. RETAIL SPACE
13. EXISTING TUNNEL
14. PROPERTY MANAGER'S OFFICE
15. DISTRICT OFFICE
16. CONFERENCE ROOM
17. CUSTOMER WAITING AREA ADDITION
18. SUPPORT SPACES
19. SECURITY OFFICE
20. ADA RAMP
21. NEW TUNNEL
22. NEW ELEVATOR
23. EXISTING TUNNEL
24. TUNNEL EXTENSION
25. GATEWAY FACADE

- RETAIL/ KIOSKS
- CIRCULATION
- OFFICES
- FACILITES / UTILITIES
- SEATING
- PUBLIC SPACE
- SUPPORT/ STORAGE
- TICKETING



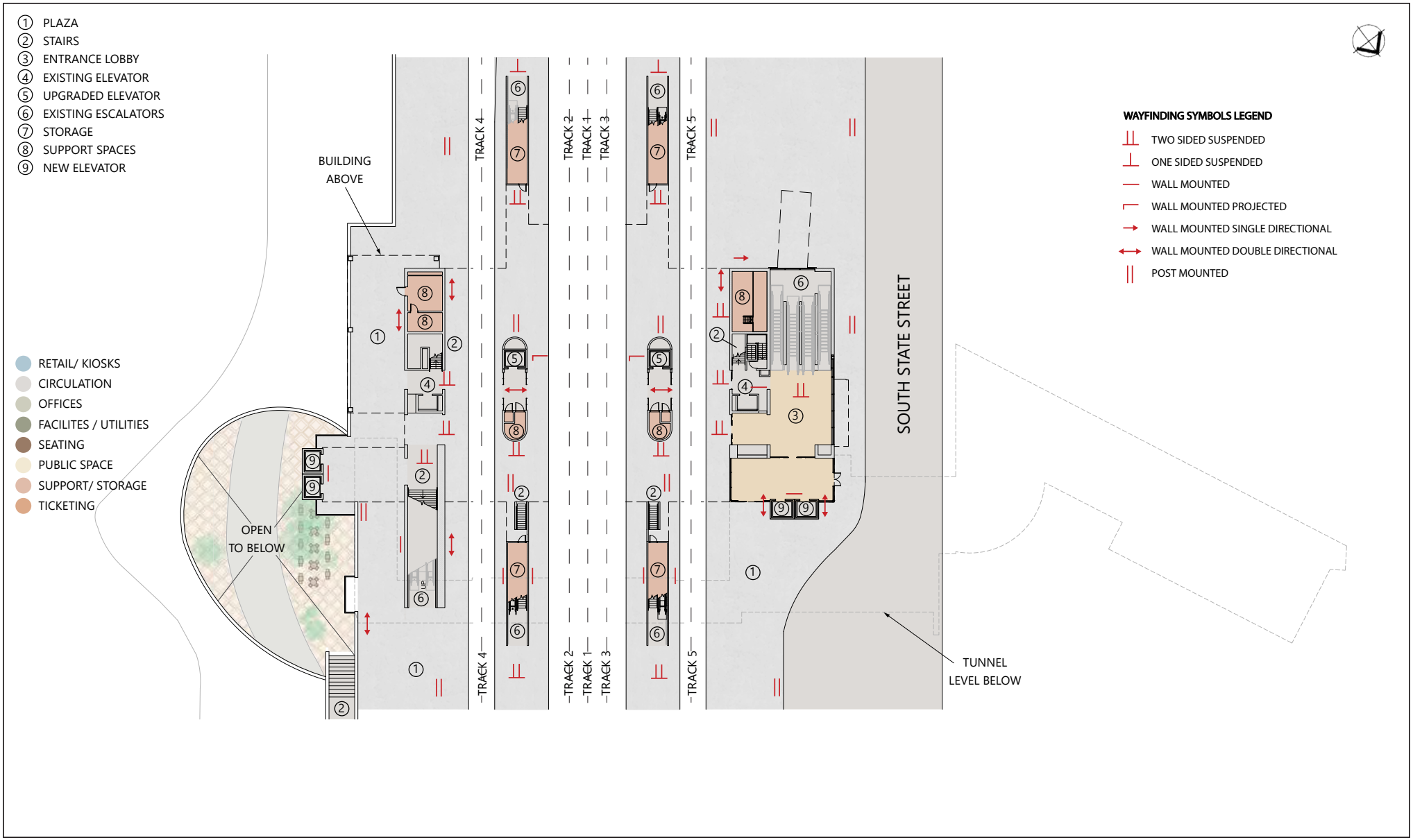
WAYFINDING SYMBOLS LEGEND

- TWO SIDED SUSPENDED
- ONE SIDED SUSPENDED
- WALL MOUNTED
- WALL MOUNTED PROJECTED
- WALL MOUNTED SINGLE DIRECTIONAL
- WALL MOUNTED DOUBLE DIRECTIONAL
- POST MOUNTED

STAMFORD TRANSPORTATION CENTER MASTER PLAN

TRANSFORMATIVE VISION FOR STC | TUNNEL LEVEL WAYFINDING PLAN

0 25 50 100



STAMFORD TRANSPORTATION CENTER MASTER PLAN

TRANSFORMATIVE VISION FOR STC | PLATFORM LEVEL WAYFINDING PLAN

0 25 50 100

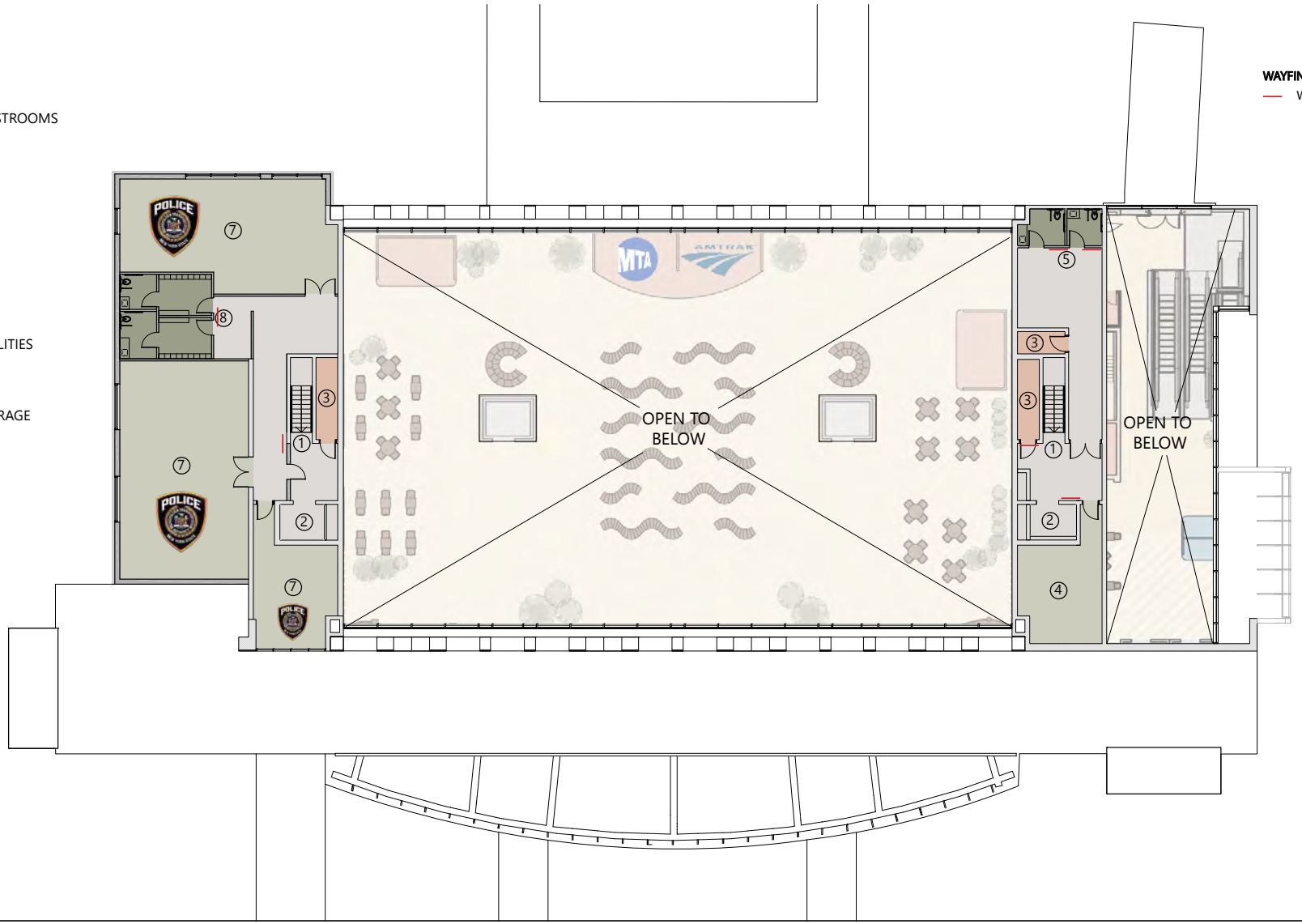
STAMFORD TRANSPORTATION CENTER MASTER PLAN

TRANSFORMATIVE VISION FOR STC | CONCOURSE LEVEL WAYFINDING PLAN

0 25 50 100

① STAIRS
② EXISTING ELEVATORS
③ STORAGE
④ OFFICES
⑤ RESTROOMS
⑥ CLERESTORY
⑦ MTA POLICE
⑧ LOCKERS & RESTROOMS

RETAIL/ KIOSKS
CIRCULATION
OFFICES
FACILITES / UTILITIES
SEATING
PUBLIC SPACE
SUPPORT/ STORAGE
TICKETING

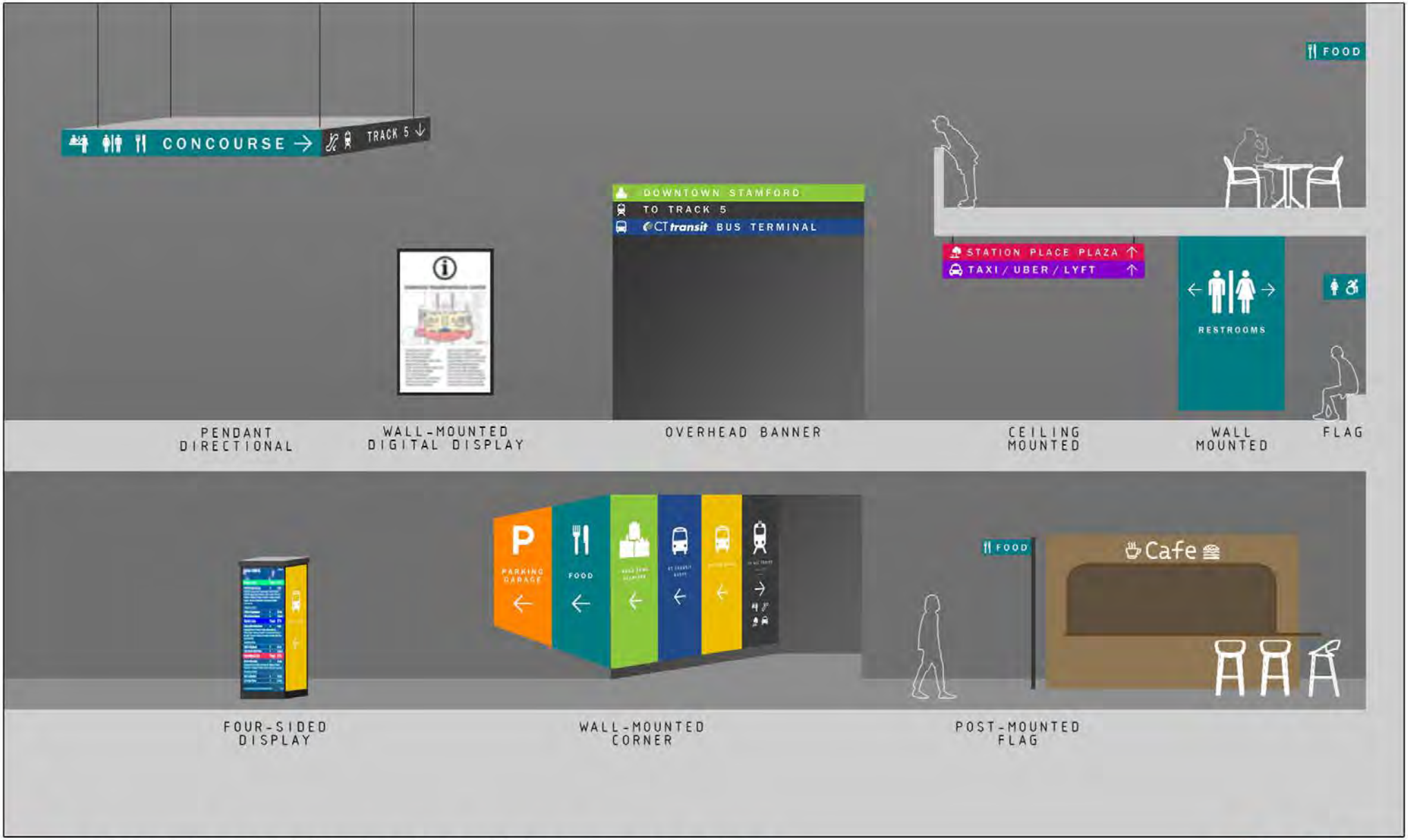


WAYFINDING SYMBOLS LEGEND
WALL MOUNTED

STAMFORD TRANSPORTATION CENTER MASTER PLAN

TRANSFORMATIVE VISION FOR STC | SECOND LEVEL WAYFINDING PLAN

0 25 50 100



STAMFORD TRANSPORTATION CENTER MASTER PLAN

TRANSFORMATIVE VISION FOR STC | INTERIOR WAYFINDING

STAMFORD TRANSPORTATION CENTER MASTER PLAN

TRANSFORMATIVE VISION FOR STC | EXTERIOR WAYFINDING

APPENDIX E

Existing Conditions Traffic Volumes Reports & Crash History

Memorandum

To: Tony Sardilli, P.E.

Date: May 24, 2022

Project #: 42402.02

From: Joe Balskus, P.E., PTOE, RSP-1
Molly Pause, E.I.T.

Re: Crash History Summaries and Diagrams
State Project No. 301-0512 - Stamford Transportation Center Master Plan

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In support of Task 8 of State Project No. 301-0512 – Stamford Transportation Center Master Plan, the historic crash data for the study period of 2016 through 2018 was collected from the UConn Crash Data Repository and has been tabulated with the four highest frequency crash locations diagramed.

The study period from 2016 to 2018 was utilized for the 14 study area intersections as this time frame was before the closure of Atlantic Street under State Project No. 135-0301. From 2019 to early 2020, the crash data for the surrounding intersections would be affected due to detours resulting from the closure of Atlantic Street. As noted in the table, the data for the Atlantic Street intersections may also have been impacted by State Project No. 135-0326, the Atlantic Street Bridge Replacement. To remain conservative, the crash data for these intersections were not included as part of the collision diagrams. Construction of State Project No. 135-0326 began in 2016 and ended in 2018.

The four intersections included in the collision diagrams were the intersections with the highest reported frequency of crashes within the study period. As previously noted, due to possible effects of State Project No. 135-0326, the Atlantic Street intersections were not included in these diagrams. Figures 1 through 4 included in this submittal package detail each of the selected intersections. It should be noted that the numbers on the diagrams refer to individual crashes shown in the included spreadsheets.

The additional four intersections of Atlantic Street at STC Garage, Atlantic Street at Henry Street, Washington Boulevard at Henry Street, and Washington Boulevard at Richmond Hill Avenue were tabulated for the crashes associated with each intersection. No collision diagrams were produced for these intersections as they maintain a low level of crash history. The four additional intersections can be found in the Crash Analysis Summary table submitted as part of this package.

Crash Characteristics-Collision Diagrams

Washington Boulevard at North State Street

At this intersection, a total of 50 crashes were reported. No crashes resulted in a fatality, and two crashes included non-motorists within the three-year period at this location.

Approximately 88% of the crashes resulted in property damage only, while four crashes involved possible injuries. Nearly 52% of the crashes were rear-end crashes. The crashes occurred at varying times and under primarily dry pavement and daylight conditions.

100 Great Meadow Road
Suite 200
Wethersfield, CT 06109
P 860.807.4300

Washington Boulevard at South State Street

At this intersection, a total of 41 crashes were reported. No crashes resulted in a fatality, and three crashes included non-motorists within the three-year period at this location.

Approximately 83% of the reported crashes resulted in property damage only, while the remaining seven crashes involved possible injuries. Crash types varied at this location with 18 of the crashes being side swipe crashes, 13 being rear-end, six being angle crashes, and four of an unknown type. The crashes occurred at varying times and under primarily dry pavement conditions during daylight hours.

Washington Boulevard at Station Place

At this intersection, a total of 14 crashes were reported. No crashes resulted in a fatality, while one crash included non-motorists within the three-year period at this location.

All but one of the crashes resulted in property damage only, with the remaining crash involving possible injuries. Nearly 57% of the crashes were rear-end crashes. The crashes occurred at varying times and under primarily dry pavement conditions and daylight conditions.

Atlantic Street at Station Place and Dock Street

At this intersection, a total of 24 crashes were reported. No crashes resulted in a fatality, and one crash included non-motorists within the three-year period at this location.

79% of the crashes resulted in property damage only, while the remaining crashes involved possible injuries. One-third of the crashes were rear-end crashes, with one-third of the crashes being angle type collisions. The remaining third of the crashes were a variety of sideswipe, and head-on collisions. The crashes occurred at varying times and under primarily dry pavement and daylight conditions.

Table **Crash Analysis Summary- Stamford Master Plan Study Area**

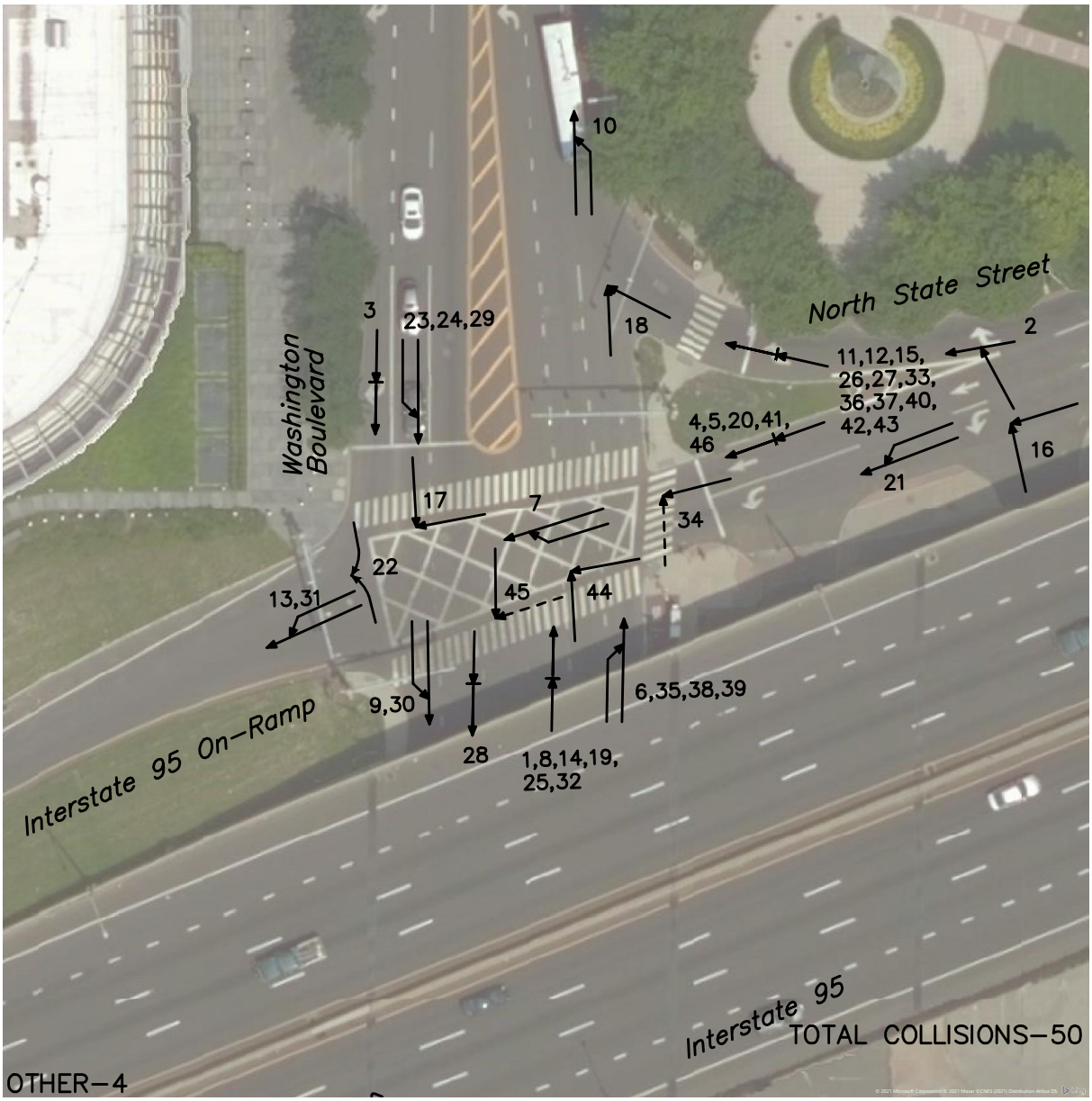
	Washington Blvd at N State St	**Washington Blvd at S State St**	**Washington Blvd at Station Pl**	**Atlantic St at Station Pl and Dock St**	Atlantic St at S State St*	Atlantic St at N State St*	S State St at Guernsey Ave	Station Pl at Western Garage Entrance	Station Pl at Eastern Garage Entrance	Station Pl at Garage Egress	Atlantic Street at STC Garage	Atlantic Street at Henry Street	Washington Blvd at Henry Street	Washington Blvd at Richmond Hill Ave
Year														
2016	12	13	6	8	25	38	3	3	1	0	1	6	2	6
2017	18	14	3	7	22	14	3	3	4	1	0	4	7	4
2018	20	14	5	9	16	22	6	6	2	4	0	3	3	5
Total	50	41	14	24	63	74	12	12	7	5	1	13	12	15
Collision Type														
Angle	7	6	1	8	9	27	3	3	0	1	0	5	2	4
Head-on	0	0	0	1	3	1	0	1	0	1	0	0	0	0
Rear-end	26	13	8	8	23	16	3	0	2	1	1	2	7	6
Sideswipe, same direction	14	18	4	1	19	23	2	5	4	1	0	3	1	3
Sideswipe, opposite direction	1	0	0	4	1	1	0	0	0	0	0	3	2	1
Rear to side	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	2	4	1	2	8	6	4	3	1	1	0	0	0	1
Total	50	41	14	24	63	74	12	12	7	5	1	13	12	15
Severity														
Fatal Injury	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Fatal Injury	6	7	1	5	18	19	2	2	0	1	0	4	2	6
Property Damage Only	44	34	13	19	45	55	10	10	7	4	1	9	10	9
Not Reported/Unknown	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	50	41	14	24	63	74	12	12	7	5	1	13	12	15
Time of day														
Weekday, 7:00 AM - 9:00 AM	6	14	5	1	5	8	2	2	0	1	0	0	2	0
Weekday, 4:00 – 6:00 PM	9	1	1	4	7	7	1	3	1	0	1	1	0	6
Saturday, 11:00 AM – 2:00 PM	2	0	0	0	3	2	0	1	0	0	0	0	0	0
Weekday, other time	24	15	5	12	40	37	8	4	5	4	0	11	3	6
Weekend, other time	9	11	3	7	8	20	1	2	1	0	0	1	7	3
Total	50	41	14	24	63	74	12	12	7	5	1	13	12	15
Season														
Dec – Feb	9	10	3	8	16	16	2	3	2	2	0	3	5	4
Mar – May	15	5	5	7	18	25	4	2	0	0	0	0	4	6
June – Aug	14	12	5	3	16	16	3	2	3	3	0	6	2	2
Sept – Nov	12	14	1	6	13	17	3	5	2	0	1	4	1	3
Total	50	41	14	24	63	74	12	12	7	5	1	13	12	15
Pavement Conditions														
Dry	38	29	11	23	54	62	10	8	7	1	1	11	8	12
Wet	10	11	3	1	8	11	1	3	0	3	0	2	1	1
Snow/Slush	1	1	0	0	1	1	1	1	0	1	0	0	1	1
Ice	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Other	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Total	50	41	14	24	63	74	12	12	7	5	1	13	12	15
Light Conditions														
Daylight	33	29	10	15	44	50	9	8	4	4	0	8	8	12
Dawn/Dusk	2	1	0	1	2	1	0	0	0	0	0	1	0	1
Dark, Not Lighted	1	3	0	0	1	4	0	0	0	0	0	0	0	0
Dark, Lighted	14	8	4	8	16	19	3	4	3	1	1	4	4	2
Total	50	41	14	24	63	74	12	12	7	5	1	13	12	15
Non-Motorist (Bike, Pedestrian)	**2**	**3**	**1**	**1**	**4**	**4**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**1**

Source: UConn Connecticut Crash Data Repository 2016-2018.

*State Project No. 135-326 (Atlantic Street Bridge Replacement) may have impacted the Atlantic Street intersection crash reporting.

Crash data is recorded from 2016 -2018 and prior to the closure of Atlantic Street under Phase 2 of State Project No. 135-301

Intersections in bold correspond to the intersection collision diagrams submitted in this package.



SYMBOLS

- MOVING VEHICLE
- TURNING VEHICLE
- BACKING VEHICLE
- PEDESTRIAN
- BICYCLE
- PARKED VEHICLE
- FIXED OBJECT

TYPES OF COLLISION

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- ANGLE

SOURCE:
UNIVERSITY OF CONNECTICUT, CONNECTICUT CRASH DATA REPOSITORY (CTCDR). CRASH DATA DATES FROM JANUARY 2016 THROUGH DECEMBER 2018. NUMBERED CRASHES IN ABOVE DIAGRAM CORRESPOND TO INDIVIDUAL CRASHES IN THE INTERSECTION SPREADSHEET.

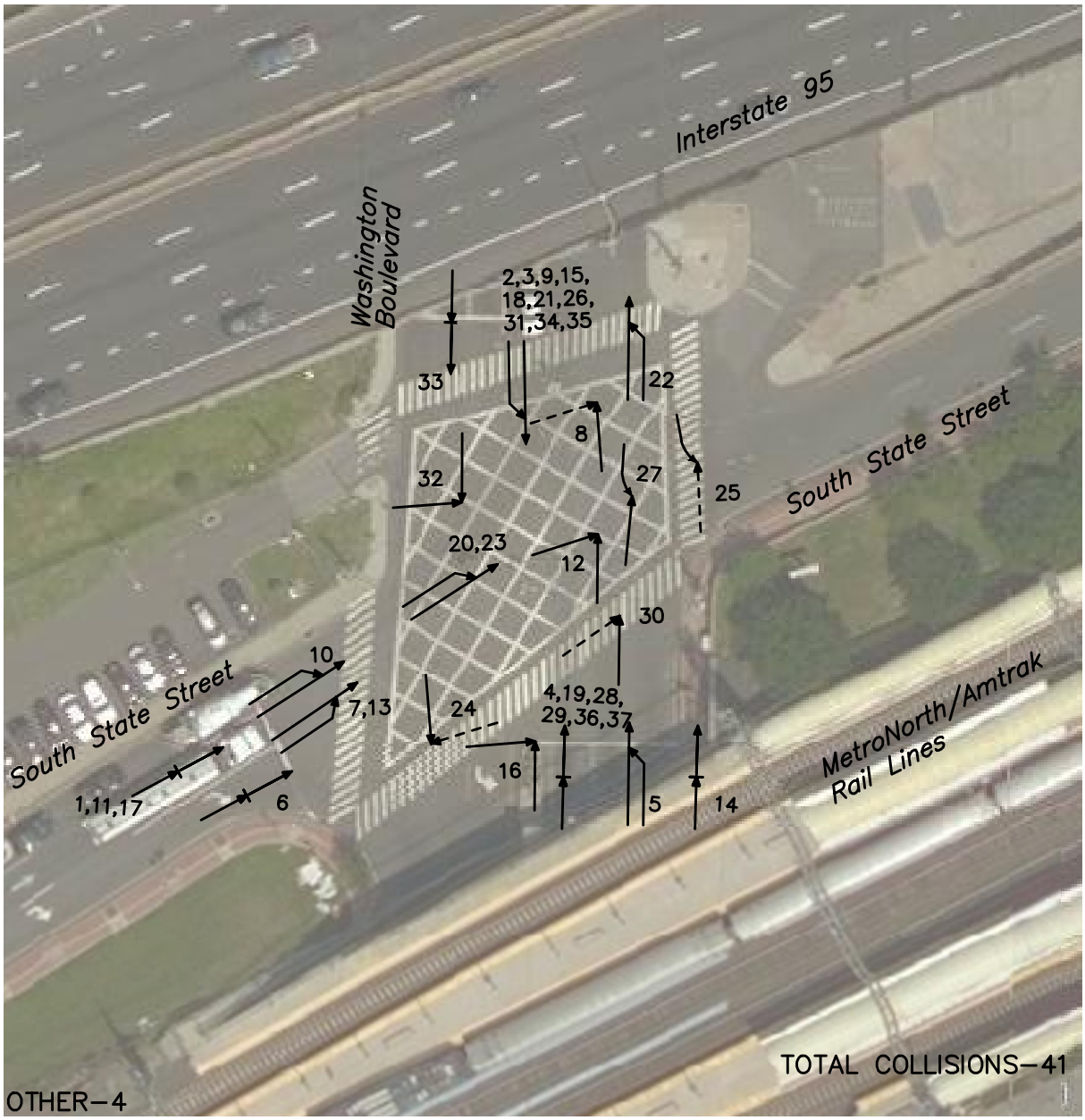
0 25 50 Feet

Figure 1

Collision Diagram
Washington Boulevard at North State Street
Stamford Master Plan
Stamford, CT

2016-2018 Crash Data: Washington Boulevard at North State Street

Number on Diagram	CrashId	Town Name	Date Of Crash	Time of Crash	Crash Severity	First Harmful Event	Manner of Crash / Collision Impact	Weather Condition	Light Condition	Road Surface Condition
other	254395	Stamford	1/21/2016	19:49:00	Property Damage Only	Motor Vehicle in Operation	Angle	Clear	Dark-Unknown Lighting	Dry
other	263633	Stamford	4/29/2016	0:58:00	Property Damage Only	Other Non-Collision	Front to rear	Cloudy	Dark-Lighted	Wet
1	263796	Stamford	5/14/2016	1:35:00	Injury of any type (Serious, Minor, Possible)	Motor Vehicle in Operation	Front to rear	Cloudy	Dark-Lighted	Dry
2	263848	Stamford	5/19/2016	0:23:00	Property Damage Only	Motor Vehicle in Operation	Rear to side	Clear	Dark-Lighted	Dry
3	264025	Stamford	6/3/2016	16:04:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Cloudy	Daylight	Wet
4	264465	Stamford	7/25/2016	9:29:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
5	264546	Stamford	8/13/2016	12:40:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
6	265815	Stamford	9/1/2016	20:56:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Cloudy	Dark-Lighted	Wet
7	310193	Stamford	10/14/2016	17:36:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
8	318171	Stamford	10/15/2016	15:25:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
9	331850	Stamford	11/30/2016	18:20:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Rain	Dark-Lighted	Wet
10	342062	Stamford	11/22/2016	21:15:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Dark-Lighted	Dry
11	356825	Stamford	1/21/2017	11:01:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
12	358811	Stamford	1/20/2017	17:54:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Rain	Dark-Lighted	Wet
13	395277	Stamford	5/26/2017	9:58:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
14	408915	Stamford	3/21/2017	15:09:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
15	424840	Stamford	4/9/2017	23:41:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Dark-Lighted	Dry
16	424966	Stamford	4/25/2017	7:24:00	Property Damage Only	Motor Vehicle in Operation	Angle	Rain	Daylight	Wet
17	425619	Stamford	5/22/2017	12:47:00	Property Damage Only	Motor Vehicle in Operation	Angle	Rain	Daylight	Wet
18	425672	Stamford	6/28/2017	18:21:00	Property Damage Only	Motor Vehicle in Operation	Angle	Clear	Daylight	Dry
19	425861	Stamford	8/3/2017	20:41:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Dark-Lighted	Dry
20	426221	Stamford	5/8/2017	16:21:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
21	426225	Stamford	5/8/2017	17:58:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Other
22	429601	Stamford	8/18/2017	11:00:00	Property Damage Only	Motor Vehicle in Operation	Angle	Rain	Daylight	Wet
23	435414	Stamford	9/12/2017	17:32:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
24	439592	Stamford	6/14/2017	10:06:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
25	454055	Stamford	9/11/2017	19:08:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Dark-Lighted	Dry
26	489432	Stamford	1/31/2018	9:16:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
27	493802	Stamford	2/20/2018	9:40:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
28	504307	Stamford	9/25/2017	17:26:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
29	514021	Stamford	9/14/2017	21:27:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Dark-Lighted	Dry
other	518291	Stamford	7/27/2017	19:23:00	Property Damage Only	Motor Vehicle in Operation	Angle	Clear	Dusk	Dry
30	518305	Stamford	1/2/2018	19:11:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Dark-Lighted	Dry
31	531596	Stamford	4/11/2018	10:20:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
32	533108	Stamford	5/30/2018	8:06:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
33	533819	Stamford	6/17/2018	14:26:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
34	541211	Stamford	8/3/2018	7:34:00	Injury of any type (Serious, Minor, Possible)	Pedestrian	Not Applicable	Cloudy	Daylight	Dry
35	545034	Stamford	5/17/2018	8:17:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
36	545127	Stamford	6/16/2018	16:42:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
37	545502	Stamford	7/19/2018	8:31:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
38	546832	Stamford	8/6/2018	8:59:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
39	589714	Stamford	12/13/2018	13:21:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Blowing Snow	Daylight	Snow
44	723234	Stamford	10/27/2018	20:12:00	Injury of any type (Serious, Minor, Possible)	Motor Vehicle in Operation	Angle	Freezing Rain or Freezing Drizzle	Dark-Lighted	Wet
40	730257	Stamford	1/7/2018	19:13:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Dark-Lighted	Dry
other	730865	Stamford	11/13/2018	13:11:00	Injury of any type (Serious, Minor, Possible)	Motor Vehicle in Operation	Front to rear	Cloudy	Daylight	Dry
41	733270	Stamford	4/4/2018	11:13:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Cloudy	Daylight	Dry
42	733364	Stamford	5/26/2018	9:27:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
43	733380	Stamford	6/6/2018	17:28:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
45	733594	Stamford	11/3/2018	17:03:00	Injury of any type (Serious, Minor, Possible)	Pedestrian	Not Applicable	Clear	Dusk	Dry
46	739525	Stamford	12/21/2018	16:21:00	Injury of any type (Serious, Minor, Possible)	Motor Vehicle in Operation	Front to rear	Rain	Daylight	Wet



SYMBOLS

- MOVING VEHICLE
- TURNING VEHICLE
- BACKING VEHICLE
- PEDESTRIAN
- BICYCLE
- PARKED VEHICLE
- FIXED OBJECT

TYPES OF COLLISION

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- ANGLE

SOURCE:
UNIVERSITY OF CONNECTICUT, CONNECTICUT CRASH DATA REPOSITORY (CTCDR). CRASH DATA DATES FROM JANUARY 2016 THROUGH DECEMBER 2018. NUMBERED CRASHES IN ABOVE DIAGRAM CORRESPOND TO INDIVIDUAL CRASHES IN THE INTERSECTION SPREADSHEET.

0 25 50 Feet

Figure 2

Collision Diagram
Washington Boulevard at South State Street
Stamford Master Plan
Stamford, CT

2016-2018 Crash Data: Washington Boulevard at South State Street

Number on Diagram	CrashId	Town Name	Date Of Crash	Time of Crash	Crash Severity	First Harmful Event	Manner of Crash / Collision Impact	Weather Condition	Light Condition	Road Surface Condition
1	246211	Stamford	7/26/2016	6:36:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
2	246252	Stamford	7/29/2016	9:04:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Rain	Daylight	Wet
3	246402	Stamford	8/13/2016	8:08:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
4	263815	Stamford	5/16/2016	8:56:00	Injury of any type (Serious, Minor, Possible)	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
5	264301	Stamford	7/6/2016	8:38:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
6	264472	Stamford	7/25/2016	18:34:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Rain	Daylight	Wet
7	265776	Stamford	8/30/2016	10:24:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
8	283911	Stamford	9/27/2016	8:07:00	Injury of any type (Serious, Minor, Possible)	Pedestrian	Not Applicable	Cloudy	Unknown	Wet
9	283972	Stamford	10/1/2016	23:34:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Cloudy	Dark-Lighted	Dry
10	321784	Stamford	11/1/2016	19:31:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Dark-Lighted	Dry
11	335368	Stamford	12/12/2016	0:58:00	Injury of any type (Serious, Minor, Possible)	Motor Vehicle in Operation	Front to rear	Rain	Dark-Lighted	Wet
12	354268	Stamford	1/12/2017	8:07:00	Property Damage Only	Motor Vehicle in Operation	Angle	Cloudy	Daylight	Wet
13	371251	Stamford	2/18/2017	17:37:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Dusk	Dry
14	418464	Stamford	9/2/2016	15:09:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
15	418489	Stamford	11/22/2016	7:17:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
16	424941	Stamford	4/20/2017	9:40:00	Property Damage Only	Motor Vehicle in Operation	Angle	Rain	Daylight	Wet
17	425539	Stamford	5/5/2017	8:26:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Rain	Daylight	Wet
18	425614	Stamford	5/22/2017	7:28:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
other	426279	Stamford	5/27/2017	0:05:00	Property Damage Only	Other Non-Collision	Angle	Clear	Dark-Lighted	Dry
other	432870	Stamford	9/6/2017	9:42:00	Property Damage Only	Parked Motor Vehicle	Sideswipe, same direction	Cloudy	Daylight	Dry
19	433330	Stamford	9/3/2017	23:55:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Dark-Lighted	Dry
20	464107	Stamford	2/16/2017	8:26:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
21	486480	Stamford	1/20/2018	9:41:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
22	489430	Stamford	1/31/2018	7:37:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
23	507186	Stamford	12/1/2017	12:48:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
24	507835	Stamford	12/14/2017	11:38:00	Injury of any type (Serious, Minor, Possible)	Pedestrian	Not Applicable	Clear	Daylight	Slush
25	512552	Stamford	12/27/2017	20:16:00	Injury of any type (Serious, Minor, Possible)	Pedestrian	Not Applicable	Clear	Dark-Not Lighted	Dry
26	514100	Stamford	11/6/2017	7:21:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Rain	Daylight	Wet
27	514123	Stamford	11/7/2017	16:42:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Rain	Unknown	Wet
28	533164	Stamford	6/23/2018	21:28:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Cloudy	Dark-Lighted	Dry
29	545529	Stamford	8/6/2018	8:46:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
30	576793	Stamford	9/25/2018	15:42:00	Injury of any type (Serious, Minor, Possible)	Pedestrian	Not Applicable	Rain	Daylight	Wet
31	591498	Stamford	12/19/2018	8:16:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
other	724738	Stamford	9/28/2018	18:08:00	Property Damage Only	Motor Vehicle in Operation	Angle	Cloudy	Daylight	Dry
35	733447	Stamford	7/27/2018	22:20:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Rain	Dark-Lighted	Wet
other	733554	Stamford	10/20/2018	9:15:00	Property Damage Only	Motor Vehicle in Operation	Angle	Clear	Daylight	Dry
34	739900	Stamford	7/9/2018	7:46:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
36	739963	Stamford	9/15/2018	15:27:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
33	740623	Stamford	7/8/2018	23:05:00	Injury of any type (Serious, Minor, Possible)	Immersion, Full or Partial	Front to rear	Clear	Dark-Lighted	Dry
37	740695	Stamford	11/11/2018	14:49:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
32	802538	Stamford	8/13/2018	8:13:00	Property Damage Only	Motor Vehicle in Operation	Angle	Cloudy	Daylight	Dry

SYMBOLS

- MOVING VEHICLE
- TURNING VEHICLE
- BACKING VEHICLE
- PEDESTRIAN
- BICYCLE
- PARKED VEHICLE
- FIXED OBJECT

TYPES OF COLLISION

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- ANGLE

SOURCE:
UNIVERSITY OF CONNECTICUT, CONNECTICUT CRASH DATA REPOSITORY (CTCDR). CRASH DATA DATES FROM JANUARY 2016 THROUGH DECEMBER 2018. NUMBERED CRASHES IN ABOVE DIAGRAM CORRESPOND TO INDIVIDUAL CRASHES IN THE INTERSECTION SPREADSHEET.

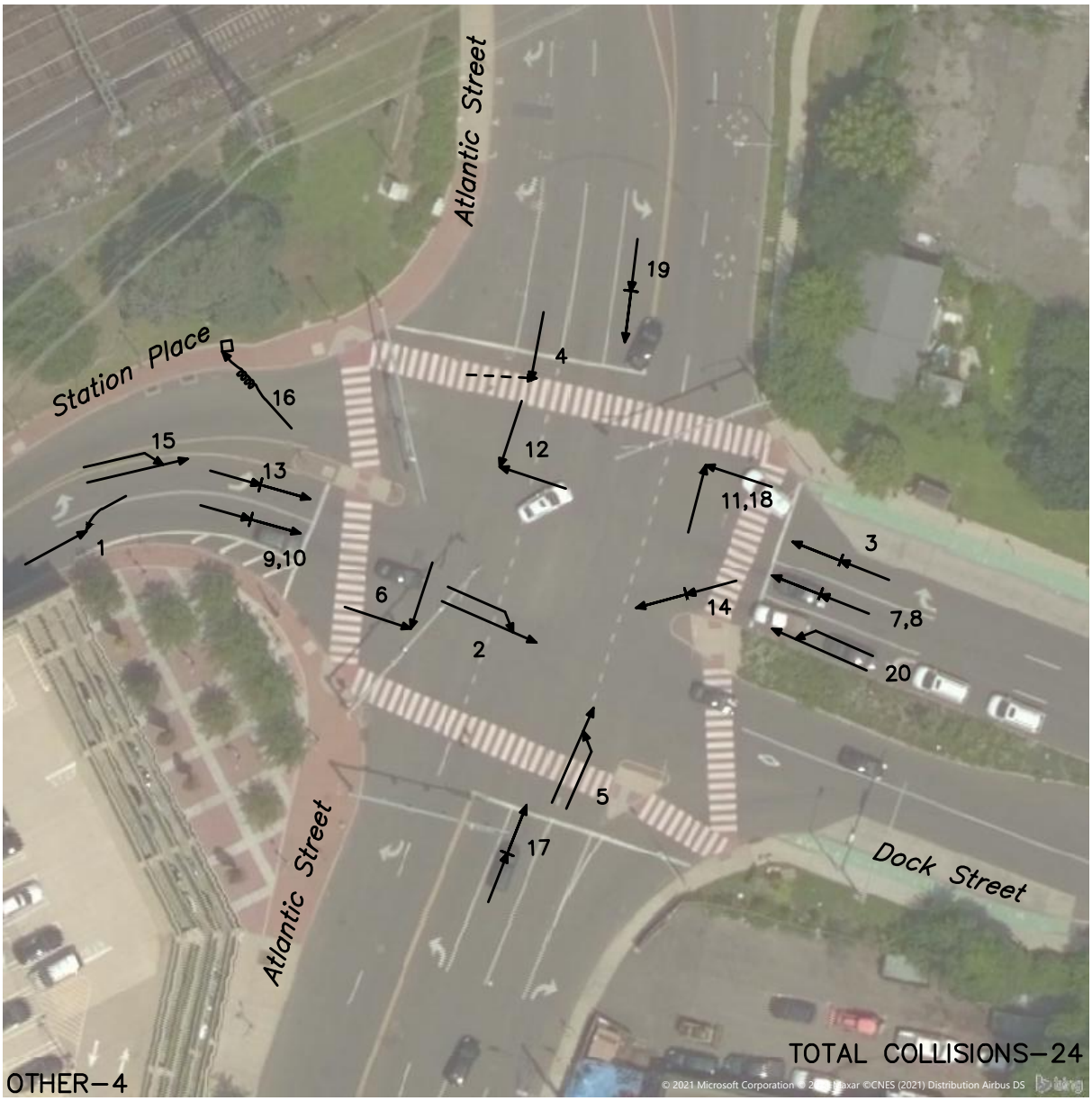
0 25 50 Feet

Figure 3

Collision Diagram
Washington Boulevard at Station Place
Stamford Master Plan
Stamford, CT

2016-2018 Crash Data: Washington Boulevard at Station Place

Number on Diagram	CrashId	Town Name	Date Of Crash	Time of Crash	Crash Severity	First Harmful Event	Manner of Crash / Collision Impact	Weather Condition	Light Condition	Road Surface Condition
1	233914	Stamford	3/20/2016	0:30:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Dark-Lighted	Dry
2	263656	Stamford	5/1/2016	16:09:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Rain	Daylight	Wet
3	264509	Stamford	8/3/2016	3:33:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Dark-Lighted	Dry
4	265760	Stamford	8/29/2016	7:52:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
5	320743	Stamford	10/28/2016	17:52:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
6	335378	Stamford	12/12/2016	21:04:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Dark-Lighted	Dry
7	424927	Stamford	4/18/2017	18:30:00	Injury of any type (Serious, Minor, Possible)	Pedalcycle/Pedalcyclist	Angle	Clear	Daylight	Dry
8	426373	Stamford	7/29/2017	5:06:00	Property Damage Only	Curb	Not Applicable	Rain	Dark-Lighted	Wet
9	438938	Stamford	6/20/2017	9:08:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Daylight	Dry
10	496232	Stamford	3/1/2018	7:55:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
11	519012	Stamford	1/16/2018	7:21:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Cloudy	Daylight	Dry
12	531125	Stamford	4/6/2018	7:53:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Cloudy	Daylight	Dry
13	538225	Stamford	7/25/2018	20:47:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Rain	Daylight	Wet
14	586339	Stamford	2/27/2018	7:30:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry



SYMBOLS

- MOVING VEHICLE
- TURNING VEHICLE
- BACKING VEHICLE
- PEDESTRIAN
- BICYCLE
- PARKED VEHICLE
- FIXED OBJECT

TYPES OF COLLISION

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- ANGLE

SOURCE:
UNIVERSITY OF CONNECTICUT, CONNECTICUT CRASH DATA REPOSITORY (CTCDR). CRASH DATA DATES FROM JANUARY 2016 THROUGH DECEMBER 2018. NUMBERED CRASHES IN ABOVE DIAGRAM CORRESPOND TO INDIVIDUAL CRASHES IN THE INTERSECTION SPREADSHEET.

0 25 50 Feet

Figure 4

Collision Diagram
Atlantic Street at Station Place and Dock Street
Stamford Master Plan
Stamford, CT

2016- 2018 Crash Data: Atlantic Street at Station Place and Dock Street

Number in Diagram	CrashId	Town Name	Date Of Crash	Time of Crash	Crash Severity	First Harmful Event	Manner of Crash / Collision Impact	Weather Condition	Light Condition	Road Surface Condition
1	244645	Stamford	6/16/2016	20:24:00	Property Damage Only	Motor Vehicle in Operation	Angle	Clear	Daylight	Dry
2	246271	Stamford	7/31/2016	16:25:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, opposite direction	Clear	Daylight	Dry
3	263420	Stamford	4/5/2016	16:13:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
4	263804	Stamford	5/14/2016	22:30:00	Injury of any type (Serious, Minor, Possible)	Pedestrian	Not Applicable	Clear	Dark-Lighted	Dry
5	264490	Stamford	7/29/2016	0:41:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, opposite direction	Cloudy	Dark-Lighted	Dry
6	265925	Stamford	9/12/2016	19:02:00	Injury of any type (Serious, Minor, Possible)	Motor Vehicle in Operation	Angle	Clear	Dusk	Dry
7	265981	Stamford	9/16/2016	16:27:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
8	356604	Stamford	12/15/2016	20:45:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Dark-Lighted	Dry
9	356844	Stamford	1/28/2017	7:56:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
other	358796	Stamford	1/18/2017	13:50:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, opposite direction	Cloudy	Daylight	Wet
other	360442	Stamford	2/16/2017	12:18:00	Injury of any type (Serious, Minor, Possible)	Motor Vehicle in Operation	Angle	Clear	Daylight	Dry
10	360448	Stamford	2/17/2017	22:05:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Dark-Lighted	Dry
other	425653	Stamford	5/30/2017	17:52:00	Property Damage Only	Motor Vehicle in Operation	Angle	Cloudy	Daylight	Dry
11	508821	Stamford	12/23/2017	18:01:00	Property Damage Only	Motor Vehicle in Operation	Angle	Clear	Daylight	Dry
12	518331	Stamford	1/9/2018	13:52:00	Property Damage Only	Motor Vehicle in Operation	Angle	Clear	Daylight	Dry
13	532138	Stamford	5/13/2018	7:30:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
14	577128	Stamford	9/15/2018	16:54:00	Injury of any type (Serious, Minor, Possible)	Motor Vehicle in Operation	Front to rear	Clear	Daylight	Dry
15	591492	Stamford	12/18/2018	18:17:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, opposite direction	Clear	Dark-Lighted	Dry
16	644273	Stamford	4/30/2017	11:41:00	Injury of any type (Serious, Minor, Possible)	Curb	Not Applicable	Clear	Daylight	Dry
20	730906	Stamford	11/29/2018	17:27:00	Property Damage Only	Motor Vehicle in Operation	Sideswipe, same direction	Clear	Dark-Lighted	Dry
Other	733236	Stamford	3/15/2018	19:10:00	Property Damage Only	Motor Vehicle in Operation	Angle	Cloudy	Dark-Lighted	Dry
19	734232	Stamford	11/15/2018	8:58:00	Property Damage Only	Motor Vehicle in Operation	Front to rear	Cloudy	Daylight	Dry
17	740611	Stamford	5/15/2018	10:16:00	Property Damage Only	Motor Vehicle in Operation	Front to front	Clear	Daylight	Dry
18	778445	Stamford	11/7/2018	19:21:00	Property Damage Only	Motor Vehicle in Operation	Angle	Clear	Dark-Lighted	Dry

Memorandum

To: Tony Sardilli, P.E.

Date: May 17, 2021

Project #: 42402.02

From: Joe Balskus, P.E., PTOE, RSP-1

Re: Existing Weekday AM & PM Traffic Volumes
State Project No. 301-0512 - Stamford Transportation Center 2020 Master Plan

---

In support of Task 8 of State Project No. 301-0512 – Stamford Transportation Center 2020 Master Plan, the existing conditions traffic volume networks were developed using a combination of two (2) previously approved OSTA studies to build a complete study area network. Both of these studies were supplied to VHB by the CTDOT.

The study conducted by Fuss and O'Neill in February 2019 provided a 2021 traffic network which included changes to the Gateway Office Tower as well as a multitude of background development projects. Volumes along Station Place were not included as part of this study. In order to represent these volumes, the 2021 network in the CHA April 2018 study were utilized. The CHA study also provided volumes at the intersection of South State Street at Guernsey Avenue. The volumes in the two (2) prior studies were balanced within the combined network but were not grown as they represented 2021 volumes. Due to the COVID-19 pandemic, traffic volumes remain lower than previous years, and the 2021 networks in the CHA and Fuss and O'Neill studies provide a conservative representation.

The Station Place garage exits have been modified from the CHA 2018 study to reflect the current garage driveway operations. The West Driveway operates as right-turn in only with separate exiting traffic. The East Driveway operates as entrance only and the driveway furthest to the east operates as right-turn out only.

Lastly when building the networks, site generated traffic from the Frederick P. Clark Associates March 2019 study, for a mixed-use development at 523 Canal Street, was added to the above described combined network. The Frederick P Clark Associates study was not listed as a background project in the Fuss and O'Neill February 2019 study however, to remain conservative and give an accurate depiction of the roadway network, the site generated trips from the March 2019 study were included in the combined 2021 existing conditions network.

Figures 1 and 2, attached, show the 2021 Existing Conditions for the weekday morning and weekday evening peak hours respectively. The networks from the Fuss and O'Neill, CHA, and Frederick P. Clark Associates studies that were used to create the base network are also included in the Attachments.

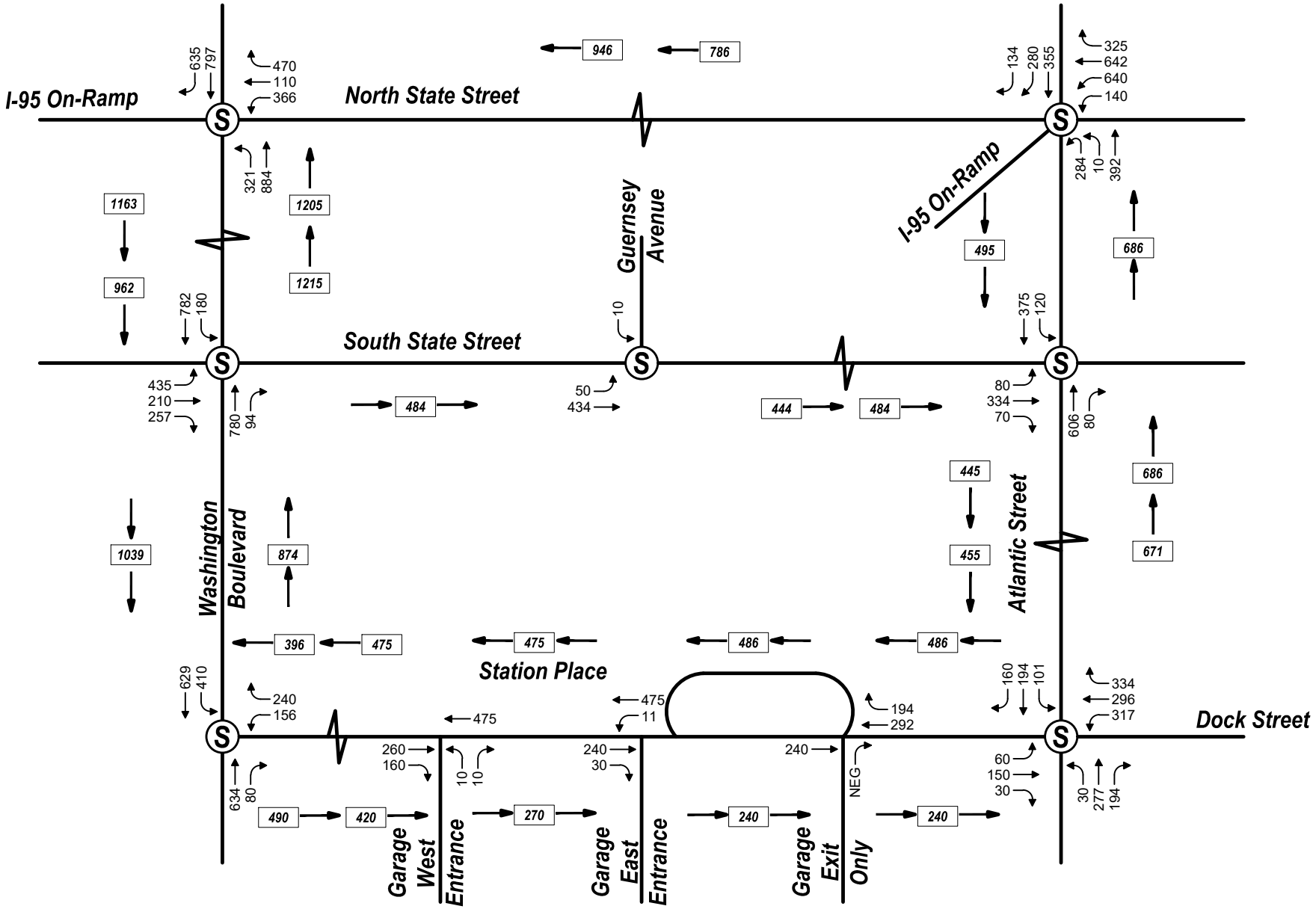
100 Great Meadow Road
Suite 200
Wethersfield, CT 06109
P 860.807.4300

Attachments

Graphics

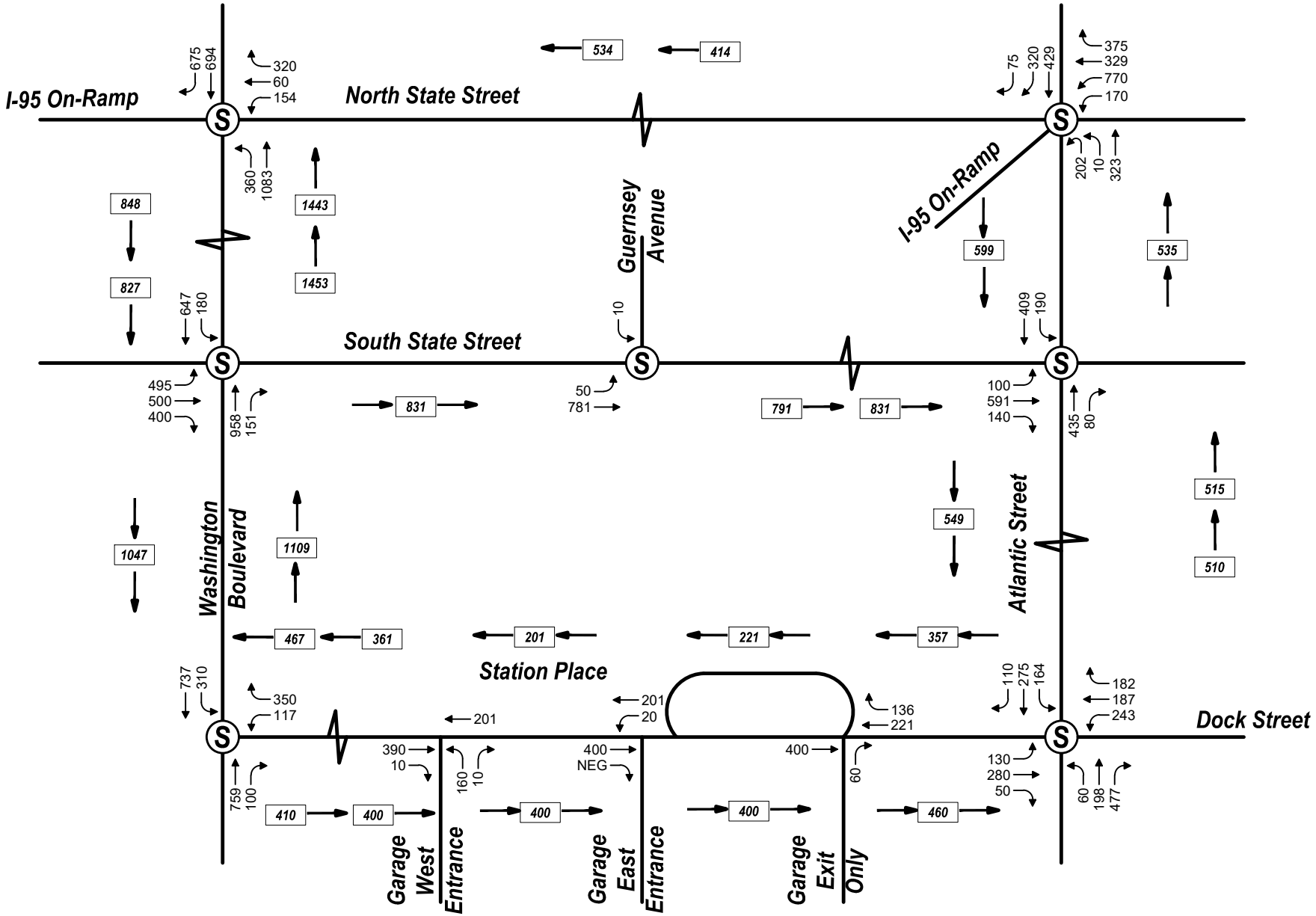
Networks Used to Create 2021 Existing Conditions

Graphics



Stamford Master Plan
2021 Existing Conditions
Weekday Morning Peak Hour Traffic Volumes
Stamford, CT

Figure 1



Legend

XX → **Weekday Evening Traffic Volume**

NEG **(Negligible)**

Ⓢ **Signalized**

NOT TO SCALE

Stamford Master Plan
2021 Existing Conditions
Weekday Evening Peak Hour Traffic Volumes
Stamford, CT

Figure 2

Networks Used to Create 2021 Existing Conditions

D = AM

/ = PM

W MAIN ST.

TRESSER BLVD.

N STATE ST.

S STATE ST.

HENRY ST.

DOCK ST.

STATION PL.

SEE INSERT "A"

PULASKI ST.

ATLANTIC ST.

CANAL ST.

ELM ST.

GREENWICH AVE.

WASHINGTON BLVD.

GUERNSEY AVE.

RICHMOND HILL AVE.

FIRST STAMFORD PL.

I-95

PROPOSED GARAGE

GARAGE ACCESS

GARAGE ACCESS 4

I-95 EXIT 7 SB ON RAMP

I-95 EXIT 7 NB OFF RAMP

I-95 EXIT 7 SB OFF RAMP

I-95 EXIT 8 SB ON RAMP

I-95 EXIT 8 NB OFF RAMP

I-95 EXIT 8 NB ON RAMP

volumes add up

LEGEND:
AM (PM)

INSERT "A"

Drawing Copyright © 2017

CHA

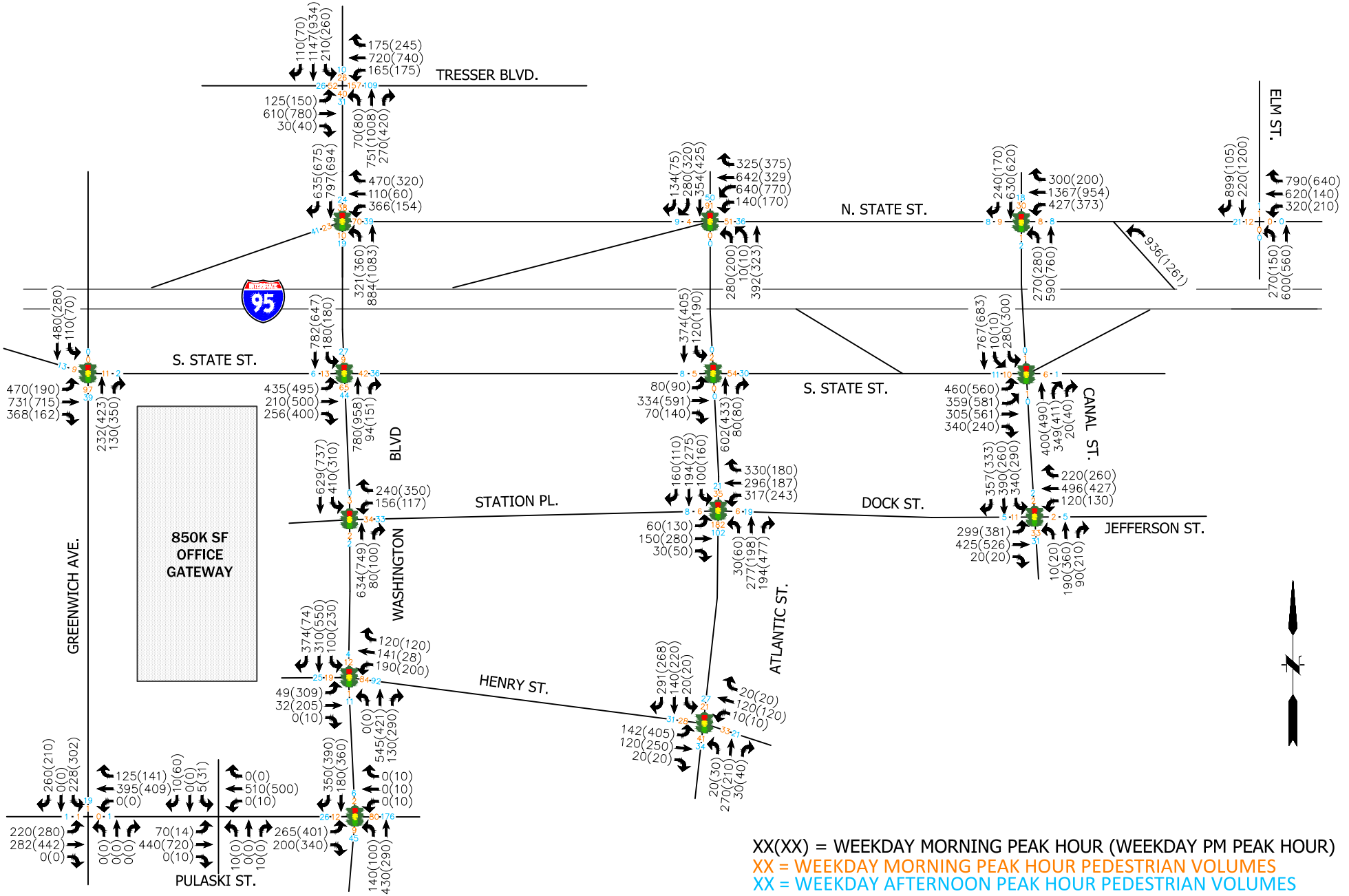
200 Corporate Place, Suite 110
Rocky Hill, CT 06067
860.257.4557 • www.chacompanies.com

STAMFORD
2021 BUILD VOLUMES

STAMFORD
PARKING GARAGE

FIGURE
13

DATE: 4/18

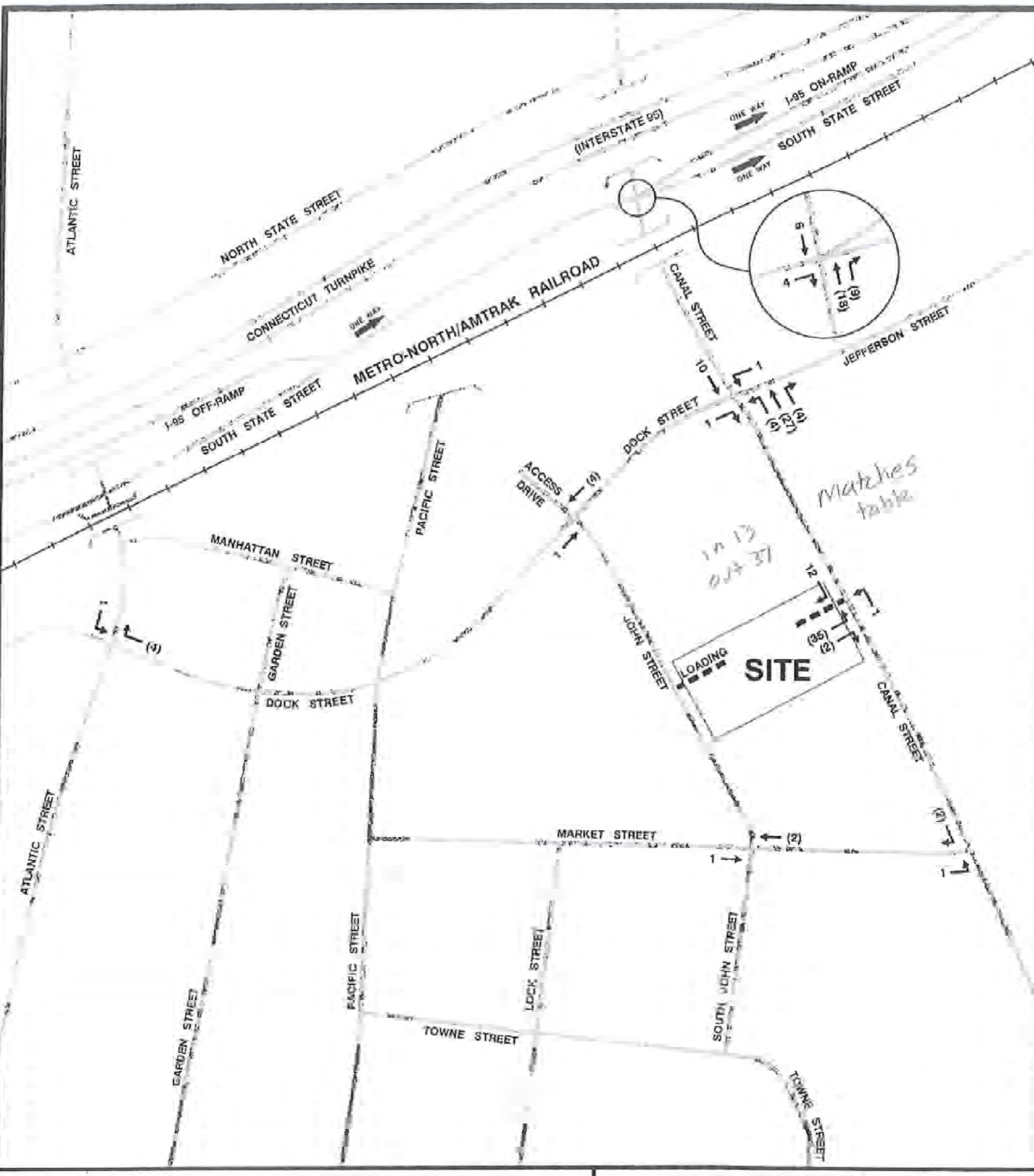


XX(XX) = WEEKDAY MORNING PEAK HOUR (WEEKDAY PM PEAK HOUR)
XX = WEEKDAY MORNING PEAK HOUR PEDESTRIAN VOLUMES
XX = WEEKDAY AFTERNOON PEAK HOUR PEDESTRIAN VOLUMES

FUSS & O'NEILL
146 HARTFORD ROAD
MANCHESTER, CONNECTICUT 06040
860.646.2469
www.fando.com

FIGURE 9: 2021 COMBINED TRAFFIC VOLUMES

PROJ. NO: 20100591.T85 | GATEWAY TRAFFIC STUDY, STAMFORD, CT | February 2019



SITE TRAFFIC GENERATION AND ASSIGNMENT WEEKDAY MORNING PEAK HOUR

MIXED-USE DEVELOPMENT
523 Canal Street
Stamford, Connecticut

TRAFFIC DIRECTION	TOTAL TRIP ENDS	SITE TRAFFIC GENERATION AND ADJUSTMENTS — SPLIT MODE: TRANSIT AND RIDE SHARING TRIP ENDS (20%)	EXTERNAL VEHICLE TRIP ENDS
Enter	16	3	13
Exit	(46)	(9)	(37)
Total	62	12	50

LEGEND

▬ ▬ ▬ ▬ PROPOSED SITE ACCESS

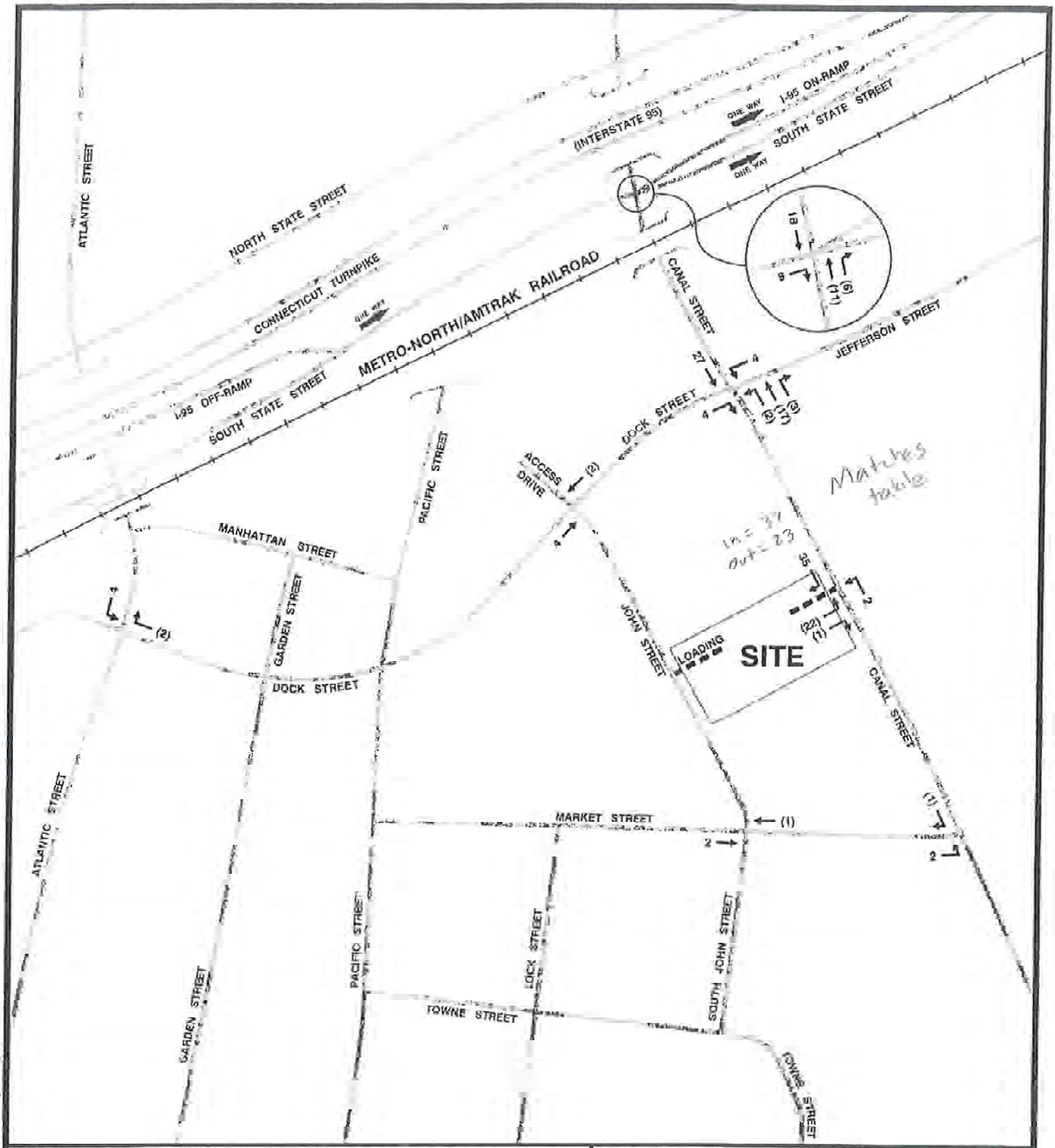
FREDERICK P. CLARK ASSOCIATES, INC.
PLANNING, TRANSPORTATION, ENVIRONMENT AND DEVELOPMENT
RYE, NEW YORK FAIRFIELD, CONNECTICUT

10

Not to Scale

Date: 3/18/19

File: G:\1645.000 Mixed-Use 523 Canal Street Stamford\AutoCad\Figures\Fig 10



TRAFFIC DIRECTION	SITE TRAFFIC GENERATION AND ADJUSTMENTS		
	TOTAL TRIP ENDS	SPLIT MODE	
		TRANSIT AND RIDE SHARING TRIP ENDS (20%)	EXTERNAL VEHICLE TRIP ENDS
Enter	46	9	37
Exit	(29)	(6)	(23)
Total	75	15	60

LEGEND

PROPOSED SITE ACCESS

SITE TRAFFIC GENERATION AND ASSIGNMENT WEEKDAY AFTERNOON PEAK HOUR

MIXED-USE DEVELOPMENT
523 Canal Street
Stamford, Connecticut

N

FREDERICK P. CLARK ASSOCIATES, INC.
PLANNING, TRANSPORTATION, ENVIRONMENT AND DEVELOPMENT
RYE, NEW YORK FAIRFIELD, CONNECTICUT

11

Not to Scale Date: 3/18/19

File: G:\945.000 Mixed-Use, 523 Canal Street Stamford\AutoCad\Figures\Fig 11

APPENDIX F

Traffic Analysis of STC Master Plan

Memorandum

To: Tony Sardilli, P.E.

Date: August 31, 2023

Project #: 42402.02

From: Joe Balskus, P.E., PTOE, RSP1

Re: Traffic Analysis Summary
State Project No. 301-0512 - Stamford Transportation Center Master Plan

---

This memorandum has been prepared to summarize the proposed traffic operations resulting from the Stamford Transportation Center (STC) Master Plan. The Master Plan proposes to convert the two-way traffic flow on Station Place to one-way traffic flow, except retaining two-way traffic flow at the west and east ends for access to the existing Metro and State parking garages.

The roadway network and over 20 intersections around the STC were studied by two (2) Connecticut Department of Transportation (CTDOT) projects, this Master Plan project, and the ongoing I-95 Stamford PEL study, with overlapping traffic operations analysis at several intersections in the STC proximity. Both projects compiled existing traffic volumes from various sources as well as conducted traffic counts in 2022 as part of the I-95 Stamford PEL study for intersections in the vicinity of the STC.

Both projects' traffic operations analyses indicated that all studied intersections during the Existing Conditions had Levels Of Service D or better for the roadways surrounding the STC for both weekday morning and afternoon peak hours, with the exception of the Washington Boulevard at North State Street/I-95 Southbound on ramp intersection, which was found to be LOS E during the morning peak hour.

The most recent traffic count data from the I-95 Stamford PEL study shows these results in the attached figures, as excerpted from the study.

For the proposed conversion of Station Place to one-way westbound traffic flow (with the exception of the contra flow access to the two garages), VHB redistributed the existing two-way traffic flow traffic volumes to a one-way flow, resulting in changes to traffic volumes and patterns at the Washington Boulevard intersections with Station Place and South State Street and Atlantic Street intersections with South State Street and Station Place.

With the proposed Master Plan westbound flow on Station Place (except for the accesses to the garages), drivers wishing to access the STC from the west will now use South State Street to circumvent the one-way flow. Instead of turning left onto Station Place from Washington Boulevard, they will turn left onto South State Street, travel eastbound on South State Street, turning right onto Atlantic Street and then turning right onto Station Place.

For drivers arriving from the south on Washington Boulevard, they will either follow the same route as described, or, alternatively, they may use Henry Street eastbound to Atlantic Street or they may alter their route entirely from the south and use Atlantic Street to access Station Place westbound. These drivers are expected to be a smaller proportion of the drivers arriving from the west, north and east.

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The four intersections primarily affected by this change in traffic flow across Station Place include the quadrant intersections from the STC:

- Washington Boulevard at Station Place
- Washington Boulevard at South State Street
- Atlantic Street at South State Street
- Atlantic Street at Station Place

The redistributed traffic volumes were then inputted into the traffic models for the weekday morning and afternoon peak hours for all the intersections, with the focus on the four intersections noted above due to the significance of the traffic volume changes.

As shown in the I-95 Stamford PEL study and the traffic analyses conducted for the STC, the study area intersections all operate at acceptable LOS D or better for existing conditions. With the redistribution of the traffic volumes, the intersections continue to operate at acceptable Levels Of Service, with some minor increases in delays on specific approaches due to the redistribution of the Station Place eastbound traffic volumes. Minor changes in traffic signal timings are anticipated to accommodate the redistribution of the Station Place eastbound traffic volumes.

In addition, with construction of the new State parking garage on South State Street, the relocated garage traffic from Station Place to South State Street is included in traffic analyses.

4.6 Existing Intersection Traffic Operations

This section discusses the development of traffic simulation models to evaluate traffic operations within the study area as well as the result of the existing conditions analysis for mainline (I-95) segments, ramps, and intersections.

4.6.1 Intersection Operations

Traffic operations were evaluated for the study area local roadway intersections during the weekday morning, weekday midday, weekday evening, and Saturday midday peak hours. Peak hour volumes at each intersection were tabulated and the entire roadway network was balanced based on peak hour volumes at each intersection. These volumes can be found in Appendix A. This method provides a conservative result for each intersection. Capacity and queue analyses were conducted using Trafficware Synchro Studio 11 – Traffic Analysis Software based on the methodology provided in the *Highway Capacity Manual (HCM), 6th Edition*. The analyses quantify the operations of the intersections under the existing conditions to identify locations that operate well and under capacity, and those that are operating close to or over capacity.

4.6.2 Intersection Analysis Methodology

An intersection's operational condition is assessed by average control delay per vehicle and volume to capacity ratio (V/C). Average control delay is measured in seconds of delay that occurs at an intersection, per vehicle, due to the traffic control. The V/C ratio is a measurement of the volume of particular traffic movement or approach in comparison with the capacity of the movement/approach. V/C ratios closer to zero represent that the approach has significant capacity remaining while approaches with V/C values approaching or exceeding 1.0 indicates that the approach is near or at capacity and not able to accommodate the traffic flow.

The average control delay and V/C ratio are combined to assign a LOS to a particular intersection or intersection approach movement. LOS is defined by HCM, using average control delay and V/C, to assign letter grades A through F to indicate the efficiency of the traffic control at an intersection. The definitions of the letter grades in terms of average control delay and V/C are provided in Table 5 below.

Table 5: Highway Capacity Manual (HCM) Level of Service (LOS) Definitions

Level of Service	**Signalized Intersection Criteria** Average Control Delay (Seconds per Vehicle)	**Unsignalized Intersection Criteria** Average Control Delay (Seconds per Vehicle)	**V/C Ratio >1.00[a]**
A	≤10	≤10	F
B	>10 and ≤20	>10 and ≤15	F
C	>20 and ≤35	>15 and ≤25	F
D	>35 and ≤55	>25 and ≤35	F
E	>55 and ≤80	>35 and ≤50	F
F	>80	>50	F

Note: [a]For approach-based and intersection-wide assessments, LOS is defined solely by control delay.

Source: *Highway Capacity Manual, 6th Edition: A Guide for Multimodal Mobility Analysis.* Washington, D.C.: Transportation Research Board, 2016. Exhibit 19-8, Pg. 19-16.

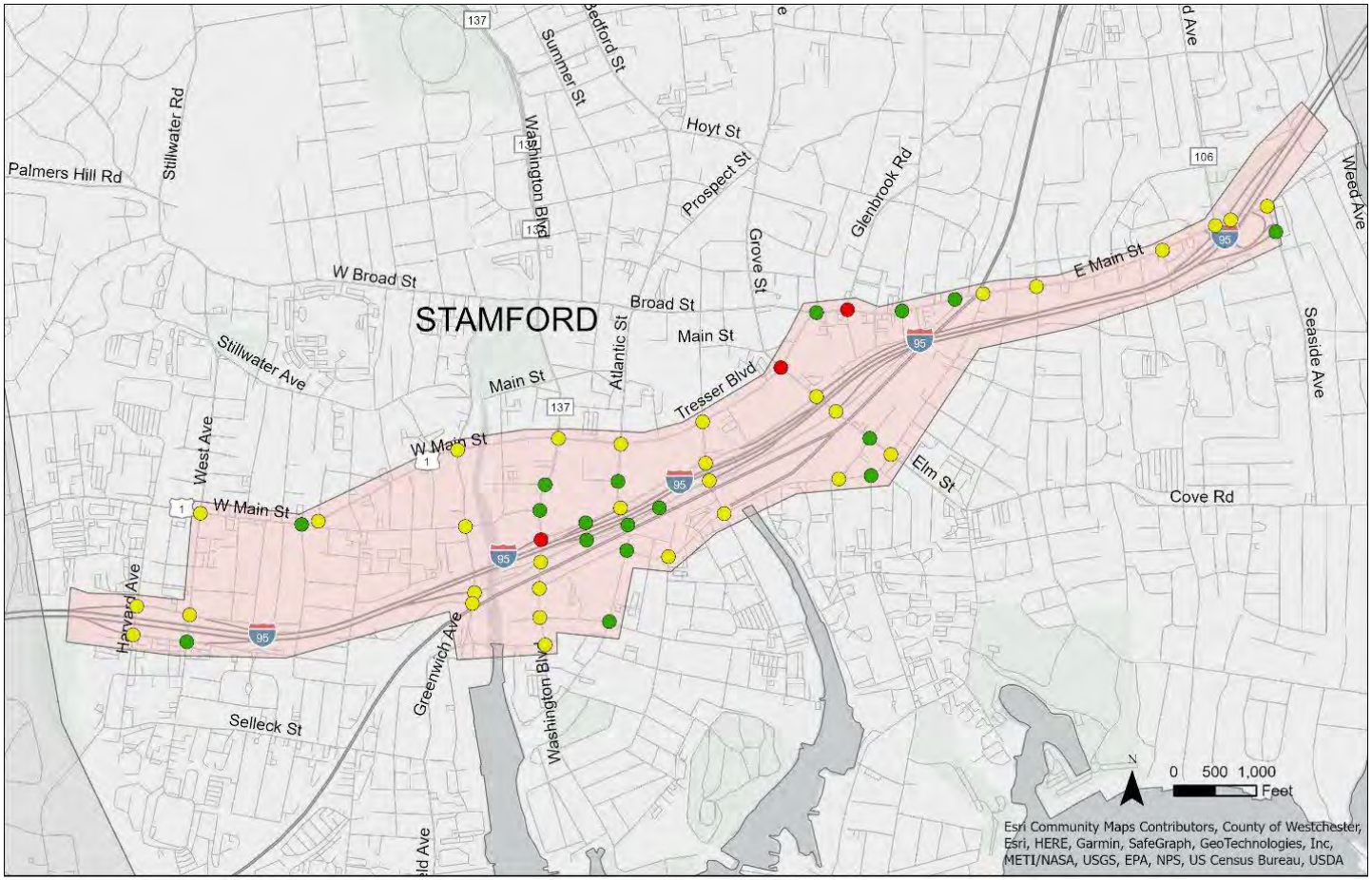
In general, intersections that exhibit LOS A or B are considered to have excellent to good operating conditions with little congestion or delay. LOS C indicates an intersection with acceptable operations. LOS D indicates an intersection that has tolerable operations with average delays approaching one minute. Intersections with LOS E or F are operating with poor or failing conditions and typically warrant a more thorough review and possible improvement to mitigate the capacity issues.

In addition to LOS, the HCM methodology also allows for the calculation of queues. Queues are the expected length of vehicles waiting at an intersection due to the delay incurred by the traffic control. The 50th percentile queues, or average queues, are the average number of vehicles expected on an approach at any given time. The 95th percentile, or design queues, are the maximum expected queues on a given approach. For unsignalized intersections, queues are quantified for 95th percentile (design) queues. For signalized intersections, queues are quantified by 95th percentile (design) and 50th percentile (average) queues.

4.6.3 Intersection Analysis Results

The LOS, volume-to-capacity ratio, and queue results for the intersections under 2022 Existing conditions are presented in Appendix A. The tables depict the results by lane group and overall intersection for the weekday AM, weekday midday, weekday evening, and Saturday midday peak hours. The results are also summarized geographically for weekday AM and PM in Figure 25 and Figure 26, respectively.

Figure 25: Intersection Level of Service – Weekday AM



Legend

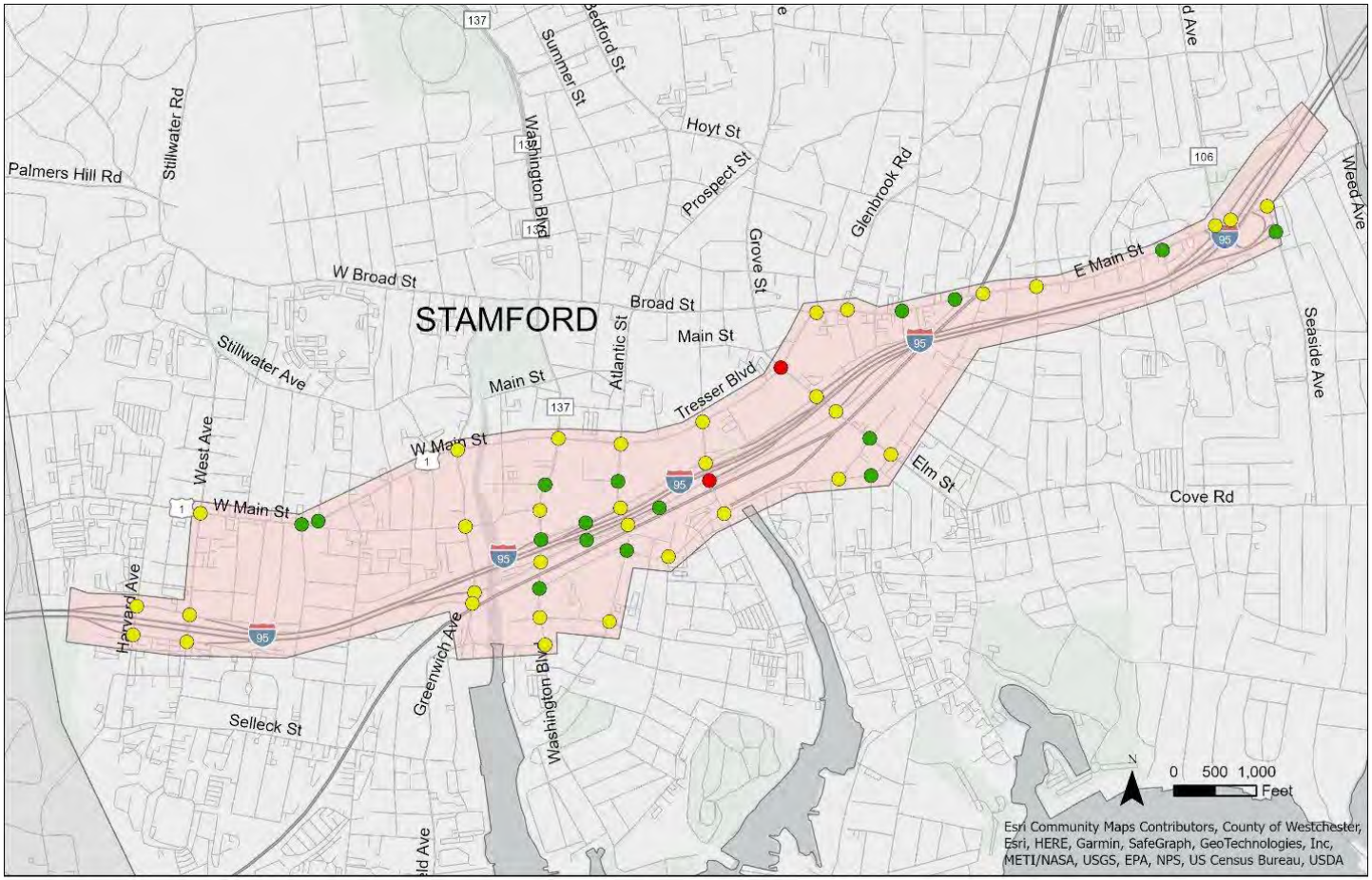
Study Area

Level Of Service - Weekday AM

- LOS A/B
- LOS C/D
- LOS E/F

I-95 Stamford
Planning and Environmental Linkages Study

Figure 26: Intersection Level of Service – Weekday PM



Legend

Study Area

Level Of Service - Weekday PM

- LOS A/B
- LOS C/D
- LOS E/F

I-95 Stamford
Planning and Environmental Linkages Study

APPENDIX G

Order-of-Magnitude Conceptual Construction Cost Estimate Detail

Stamford Transportation Center Master Plan

State Project No. 301-0512

Summary Order-of-Magnitude Opinion of Probable Construction Cost (Low)

February 2024

Item Description	Total
Station Place (Including Civic Plaza)	$8,982,000
North State Street	$177,000
South State Street	$803,000
Adaptive Traffic Control Signals (Upgrade Existing)	$4,800,000
Minor Items (15% of Station Area Roads)	$2,215,000
SUBTOTAL STATION AREA ROADS	**$16,977,000**
STC Building	$54,550,000
Bus and Shuttle Terminal	$4,945,000
Wayfinding	$3,950,000
Minor Items (15% of STC Building/Other Work)	$9,517,000
SUBTOTAL STC BUILDING/OTHER WORK	**$72,962,000**
SUBTOTAL	**$89,939,000**
Clearing and Grubbing (0.5% of Station Area Roads Subtotal)	$85,000
Maintenance and Protection of Traffic (5% of Station Area Roads Subtotal)	$849,000
Mobilization and Project Closeout (10%)	$8,994,000
Construction Surveying (0.2%)	$180,000
SUBTOTAL LUMP SUM ITEMS	**$10,108,000**
SUBTOTAL	**$100,047,000**
Incidentals (30%)	$30,015,000
Contingencies (20%)	$20,010,000
Railroad Force Account (30% on Station Place and STC Building Work)	$21,919,000
Utilities (10% of Station Area Roads Subtotal)	$1,698,000
Design/Engineering (8%)	$8,004,000
SUBTOTAL ENGINEERING PERCENTAGES	**$81,646,000**
SUBTOTAL	**$181,693,000**
TOTAL (ROUNDED)	**$182,000,000**

Notes:

1. Estimate does not include costs related to environmental work, permitting, rights-of-way, or inflation.
2. Unit and lump sum prices were developed using RSMeans Cost Data, the latest CTDOT Bid Item List (January 2024), CTDOT AASHTOWare Project Estimator, industry sources, and engineering judgement where applicable.
3. Percentages for the Lump Sum Items and Engineering Percentages are per the latest CTDOT Preliminary Cost Estimating Guidelines (June 2023) for a project in the Programming phase of development.

Stamford Transportation Center Master Plan

State Project No. 301-0512

Summary Order-of-Magnitude Opinion of Probable Construction Cost (High)

February 2024

Item Description	Total
Station Place (Including Civic Plaza)	$8,982,000
North State Street	$177,000
South State Street	$803,000
Adaptive Traffic Control Signals (Upgrade Existing)	$4,800,000
Minor Items (30% of Station Area Roads)	$4,429,000
SUBTOTAL STATION AREA ROADS	**$19,191,000**
STC Building	$54,549,000
Bus and Shuttle Terminal	$4,945,000
Wayfinding	$3,950,000
Minor Items (30% of STC Building/Other Work)	$19,034,000
SUBTOTAL STC BUILDING/OTHER WORK	**$82,478,000**
SUBTOTAL	**$101,669,000**
Clearing and Grubbing (0.5% of Station Area Roads Subtotal)	$96,000
Maintenance and Protection of Traffic (5% of Station Area Roads Subtotal)	$960,000
Mobilization and Project Closeout (10%)	$10,167,000
Construction Surveying (0.2%)	$204,000
SUBTOTAL LUMP SUM ITEMS	**$11,427,000**
SUBTOTAL	**$113,096,000**
Incidentals (30%)	$33,929,000
Contingencies (30%)	$33,929,000
Railroad Force Account (30% on Station Place and STC Building Work)	$21,919,000
Utilities (10% of Station Area Roads Subtotal)	$1,920,000
Design/Engineering (8%)	$9,048,000
SUBTOTAL ENGINEERING PERCENTAGES	**$100,745,000**
SUBTOTAL	**$213,841,000**
TOTAL (ROUNDED)	**$214,000,000**

Notes:

1. Estimate does not include costs related to environmental work, permitting, rights-of-way, or inflation.
2. Unit and lump sum prices were developed using RSMeans Cost Data, the latest CTDOT Bid Item List (January 2024), CTDOT AASHTOWare Project Estimator, industry sources, and engineering judgement where applicable.
3. Percentages for the Lump Sum Items and Engineering Percentages are per the latest CTDOT Preliminary Cost Estimating Guidelines (June 2023) for a project in the Programming phase of development.

Stamford Transportation Center Master Plan
State Project No. 301-0512

Order-of-Magnitude Opinion of Probable Construction Cost - Station Area Roads

February 2024

1.0 - Station Place (Including Civic Plaza)		Unit	Quantity	Unit Cost	Total
1.1	Earth Excavation	CY	3,550	$50.00	$177,500
1.2	Cut Bituminous Concrete Pavement	LF	550	$3.50	$1,925
1.3	Formation of Subgrade	SY	7,100	$6.00	$42,600
1.4	Subbase	CY	2,375	$60.00	$142,500
1.5	HMA S1	TON	2,450	$175.00	$428,750
1.6	HMA S0.5	TON	1,225	$155.00	$189,875
1.7	Concrete for Steps and Copings	CY	210	$1,700.00	$357,000
1.8	Drainage Stuctures	EA	45	$6,000.00	$270,000
1.9	RC Pipe for Drainage	LF	1,600	$150.00	$240,000
1.10	Granite Stone Curbing	LF	4,510	$75.00	$338,250
1.11	Bituminous Concrete Driveway (Commercial)	SY	525	$75.00	$39,375
1.12	Furnishing, Planting and Mulching Trees, Shrubs, Vines and Ground Cover Plants	LS	1	$250,000.00	$250,000
1.13	Sodding	SY	475	$15.00	$7,125
1.14	Sign Face - Sheet Aluminum	SF	320	$65.00	$20,800
1.15	Concrete Sidewalk/Pavers	SF	71,000	$33.00	$2,343,000
1.16	Concrete Sidewalk Ramps	SF	800	$35.00	$28,000
1.17	Bicycle Shelter	EA	1	$80,000.00	$80,000
1.18	Bicycle Stand	EA	10	$2,500.00	$25,000
1.19	South Side Shuttle Pick-Up/Drop-Off Tunnel (Structural)	LS	1	$4,000,000.00	$4,000,000
	SUBTOTAL 1.0 - STATION PLACE (INCLUDING CIVIC PLAZA)				**$8,981,700**
2.0 - North State Street		**Unit**	**Quantity**	**Unit Cost**	**Total**
2.1	Earth Excavation	CY	200	$50.00	$10,000
2.2	Cut Bituminous Concrete Pavement	LF	1,100	$3.50	$3,850
2.3	Formation of Subgrade	SY	375	$6.00	$2,250
2.4	Subbase	CY	150	$60.00	$9,000
2.5	HMA S1	TON	150	$175.00	$26,250
2.6	HMA S0.5	TON	75	$155.00	$11,625
2.7	Drainage Structures	EA	5	$6,000.00	$30,000
2.8	RC Pipe for Drainage	LF	30	$150.00	$4,500
2.9	Granite Stone Curbing	LF	1,050	$75.00	$78,750
	SUBTOTAL 2.0 - NORTH STATE STREET				**$176,225**
3.0 - South State State Street		**Unit**	**Quantity**	**Unit Cost**	**Total**
3.1	Earth Excavation	CY	175	$50.00	$8,750
3.2	Cut Bituminous Concrete Pavement	LF	1,350	$3.50	$4,725
3.3	Formation of Subgrade	SY	300	$6.00	$1,800
3.4	Subbase	CY	100	$60.00	$6,000
3.5	HMA S1	TON	650	$175.00	$113,750
3.6	HMA S0.5	TON	125	$155.00	$19,375
3.7	Milling	SY	3,400	$4.50	$15,300
3.8	Granite Stone Curbing	LF	1,275	$75.00	$95,625
3.9	Furnishing, Planting and Mulching Trees, Shrubs, Vines and Ground Cover Plants	LS	1	$125,000.00	$125,000
3.10	Sodding	SY	475	$15.00	$7,125
3.11	Concrete Sidewalk/Pavers	SF	11,250	$33.00	$371,250
3.12	Concrete Sidewalk Ramps	SF	400	$35.00	$14,000
3.13	Bicycle Stand	EA	8	$2,500.00	$20,000
	SUBTOTAL 3.0 - SOUTH STATE STREET				**$802,700**
4.0 - Adaptive Traffic Control Signals (Upgrade Existing)		**Unit**	**Quantity**	**Unit Cost**	**Total**
4.1	Station Place at Washington Boulevard	EA	1	$600,000.00	$600,000
4.2	Station Place at Atlantic Street	EA	1	$600,000.00	$600,000
4.3	North State Street at Washington Boulevard	EA	1	$600,000.00	$600,000
4.4	North State Street at Driveway	EA	1	$600,000.00	$600,000
4.5	North State Street at Atlantic Street	EA	1	$600,000.00	$600,000
4.6	South State Street at Washgton Boulevard	EA	1	$600,000.00	$600,000
4.7	South State Street at Guernsey Avenue	EA	1	$600,000.00	$600,000
4.8	South State Street at Atlantic Street	EA	1	$600,000.00	$600,000
	SUBTOTAL 3.0 - ADAPTIVE TRAFFIC CONTROL SIGNALS				**$4,800,000**
5.0 - Relocation of Eversource Facilities		**Unit**	**Quantity**	**Unit Cost**	**Total**
5.1	Relocation of Eversource Overhead Transmission Line/Poles	EA	4	$3,000,000.00	$12,000,000
	SUBTOTAL 3.0 - RELOCATION OF EVERSOURCE FACILITIES				**$12,000,000**
	TOTAL STATION AREA ROADS				**$26,760,625**

Notes:

1. Estimate does not include costs related to environmental work, permitting, rights-of-way, or inflation.

2. Unit and lump sum prices were developed using RSMeans Cost Data, the latest CTDOT English Bid Item List (January 2024), CTDOT AASHTOWare Project Estimator, industry sources, and engineering judgement where applicable.

Stamford Transportation Center Master Plan
State Project No. 301-0512

Order-of-Magnitude Opinion of Probable Construction Cost - STC Building

February 2024

1.0 - Demolition		Unit	Quantity	Unit Cost	Total
1.1	Gateway Interiors	SF	9,300	$30.00	$279,000
1.2	Gateway Façade	EA	1	$50,000.00	$50,000
1.3	Existing Tunnel Demolition	SF	2,300	$100.00	$230,000
1.4	Station Demolition at Tunnel Level	SF	11,300	$50.00	$565,000
1.5	Station Demolition at Platform Level	SF	11,000	$50.00	$550,000
1.6	Station Demolition at Concourse Level	SF	19,500	$50.00	$975,000
1.7	Station Demolition at Second Level	SF	3,425	$50.00	$171,250
1.8	Station Demolition at Roof	SF	18,200	$60.00	$1,092,000
1.10	West Escalator Enclosure Roof	SF	2,500	$60.00	$150,000
1.11	East Escalator Enclosure Roof	SF	2,150	$60.00	$129,000
1.12	East Pedestrian Bridge	SF	6,000	$90.00	$540,000
	SUBTOTAL 1.0 - DEMOLITION				**$4,731,250**
2.0 - Renovations to Existing		**Unit**	**Quantity**	**Unit Cost**	**Total**
2.1	Gateway Terminal Interior Upgrade	SF	9,300	$200.00	$1,860,000
2.2	New Gateway Façade	EA	1	$100,000.00	$100,000
2.3	Station Renovations at Tunnel Level	SF	11,300	$200.00	$2,260,000
2.4	Station Renovations at Platform Level	SF	11,000	$350.00	$3,850,000
2.5	Station Renovations at Concourse Level	SF	19,500	$450.00	$8,775,000
2.6	Station Renovations at Second Level	SF	3,425	$350.00	$1,198,750
2.7	West Escalator Enclosure Roof	SF	2,500	$200.00	$500,000
2.8	East Escalator Enclosure Roof	SF	2,150	$200.00	$430,000
2.9	East Pedestrian Bridge	SF	6,000	$300.00	$1,800,000
	SUBTOTAL 2.0 - RENOVATIONS TO EXISTING				**$20,773,750**
3.0 - New Construction		**Unit**	**Quantity**	**Unit Cost**	**Total**
3.1	Concourse Bridge	SF	8,050	$725.00	$5,836,250
3.2	South Addition at Concourse Level	SF	2,350	$700.00	$1,645,000
3.3	South Addition at Mezzanine Level	SF	2,350	$700.00	$1,645,000
3.4	Lobby Expansion at Platform Level	SF	1,225	$500.00	$612,500
3.5	New Tunnel Wing	SF	1,800	$1,000.00	$1,800,000
3.6	Tunnel Widening	SF	3,700	$1,000.00	$3,700,000
3.7	New Elevator Lobby and Retail at Tunnel Level	SF	2,100	$500.00	$1,050,000
3.8	Gateway Terminal Expansions	SF	1,600	$600.00	$960,000
3.9	Elevator Enclosure at Platform Level	SF	250	$400.00	$100,000
3.10	Barrel Roof	SF	22,700	$350.00	$7,945,000
	SUBTOTAL 3.0 - NEW CONSTRUCTION				**$25,293,750**
4.0 - Special Construction		**Unit**	**Quantity**	**Unit Cost**	**Total**
4.1	Elevators (4 Stop) - Replace Existing	EA	4	$400,000.00	$1,600,000
4.2	Elevators (3 Stop) - New	EA	4	$300,000.00	$1,200,000
4.3	Kiosks - Ticketing	EA	1	$125,000.00	$125,000
4.4	Kiosks - Retail	EA	5	$100,000.00	$500,000
4.5	Seating - Tables	LS	1	$150,000.00	$150,000
4.6	Seating - Benches	LS	1	$125,000.00	$125,000
4.7	Miscellaneous Furniture, Fixtures, and Equipment (FF&E)	EA	1	$50,000.00	$50,000
	SUBTOTAL 4.0 - SPECIAL CONSTRUCTION				**$3,750,000**
	TOTAL STC BUILDING				**$54,548,750**

Notes:

1. Estimate does not include costs related to environmental work, permitting, rights-of-way, or inflation.

2. Unit and lump sum prices were developed using RSMeans Cost Data, the latest CTDOT English Bid Item List (January 2024), CTDOT AASHTOWare Project Estimator, industry sources, and engineering judgement where applicable.

Stamford Transportation Center Master Plan

State Project No. 301-0512

Order-of-Magnitude Opinion of Probable Construction Cost - Bus and Shuttle Terminal

February 2024

1.0 - Bus and Shuttle Terminal		Unit	Quantity	Unit Cost	Total
1.1	Demolition	SF	59,500	$5.00	$297,500
1.2	Renovations (Including Ceilings, Lighting, Railings, etc.)	SF	59,500	$75.00	$4,462,500
1.3	Shelters	SF	3,700	$50.00	$185,000
	TOTAL BUS AND SHUTTLE TERMINAL				**$4,945,000**

Notes:

1. Estimate does not include costs related to environmental work, permitting, rights-of-way, or inflation.

2. Unit and lump sum prices were developed using RSMeans Cost Data, the latest CTDOT English Bid Item List (January 2024), CTDOT AASHTOWare Project Estimator, and engineering judgement where applicable.

Stamford Transportation Center Master Plan
State Project No. 301-0512

Order-of-Magnitude Opinion of Probable Construction Cost - Wayfinding

February 2024

1.0 - Wayfinding		Unit	Quantity	Unit Cost	Total
1.1	Architectural Sigange (Building Signs)	LS	1	$200,000.00	$200,000
1.2	Wayfinding - Interior Static	LS	1	$1,250,000.00	$1,250,000
1.3	Wayfinding - Electronic (Including Large Message Boards)	LS	1	$1,000,000.00	$1,000,000
1.4	Wayfinding - Exterior Static	LS	1	$1,500,000.00	$1,500,000
	TOTAL WAYFINDING				**$3,950,000**

Notes:

1. Estimate does not include costs related to environmental work, permitting, rights-of-way, or inflation.

2. Unit and lump sum prices were developed using RSMeans Cost Data, the latest CTDOT English Bid Item List (January 2024), CTDOT AASHTOWare Project Estimator, industry sources, and engineering judgement where applicable.

APPENDIX H

Research of Comparable State-of-the-Art Projects

Stamford Transportation Center 2020 Master Plan

Research of Comparable State-of-the-Art Projects

Connecticut Department of Transportation
State Project No. 301-0512

JUNE 2021

PREPARED FOR

Connecticut Department of Transportation - Office of Rail
2800 Berlin Turnpike
Newington, CT 06111

PREPARED BY

Vanasse Hangen Brustlin, Inc.
Wethersfield, Connecticut 06109

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Table of Contents

List of Figures

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1.0 Introduction

As part of the Stamford Transportation Center (STC) 2020 Master Plan, the Connecticut Department of Transportation (CTDOT) commissioned a research and information gathering exercise of comparable state-of-the-art multimodal transportation center projects constructed throughout the United States. The selected projects were reviewed to determine how they:

- created an overall brand identity for the facility and transportation services;
- established visual and physical connectivity between various modes of transportation;
- provided clarity of access and movement;
- enhanced the overall customer experience by way of public realm and placemaking, traveler amenities, and wayfinding; and,
- organized the transportation components including parking, pick-up and drop-off, Transportation Network Company (TNC) services, taxis, buses and shuttles, bicycles, pedestrians, supporting facilities and waiting areas in relationship to each other, and established brand identity and wayfinding systems.

An assessment of how the comparable multimodal transportation projects accomplished these listed elements was performed to identify trends and considerations with the goal of potentially incorporating the more successful aspects of each to inform the STC 2020 Master Plan.

1.1 Preliminary List of Comparable Projects

In order to develop a preliminary list of potentially comparable projects, facilities were selected for review based on the following:

- **Multimodal:** featuring a mix of connecting transportation modes operated by a range of carriers
- **Constructed and Operational:** fully built in order to provide lessons learned post-construction
- **Geographic Diversity:** located across the country to note if there are unique characteristics that are driven by state guidance and/or local preferences and regulations

In addition, a mix of project types ranging from new construction to rehabilitation to a combination of both (e.g., one project involved the construction of a new train station within a rehabilitated warehouse) were considered. Facilities currently under construction were not

considered as it would not be feasible to assess the success of planned improvements prior to the completion of construction.

Ideally, comparable projects would also have total daily passenger volumes similar to those at the STC, which serves 28,300 customers each weekday. However, total daily passenger volume data was not readily available for all potentially comparable projects. In coordination with the CTDOT, a preliminary list of ten comparable projects were identified for further consideration:

- Baltimore Penn Station (MD)
- Bradley International Airport (CT)
- Anaheim Regional Transportation Intermodal Center (ARTIC) (CA)
- Raleigh Union Station (NC)
- MiamiCentral (FL)
- Milwaukee Intermodal Station (WI)
- Denver Union Station (CO)
- Secaucus Junction (NJ)
- Moynihan Train Hall at Penn Station (NY)
- Springfield Union Station (MA)

1.2 Recommended Comparable Projects

Based on the considerations identified in Section 1.1 above, five projects were selected for further review as noted below and shown in Figure 1:

- Bradley International Airport (CT)
- Anaheim Regional Transportation Intermodal Center (CA)
- Raleigh Union Station (NC)
- Denver Union Station (CO)
- Moynihan Train Hall at Penn Station (NY)

Figure 1. Comparable Project Locations

2.0 Comparable Projects/Facilities

This section provides a brief description of each project/facility selected for further review, followed by notable physical and design elements such as:

- brand identity;
- customer experience including public realm and placemaking, amenities including the co-location or proximity to retail or commercial development, and wayfinding and signage;
- access and movement;
- passenger technology;
- intermodal connectivity; and,
- organized transportation components.

2.1 Bradley International Airport

Bradley International Airport (BDL) is operated by the Connecticut Airport Authority (CAA), which was established in 2011 to develop, improve, and operate BDL and the state's five general aviation airports. This facility is Connecticut's busiest commercial airport, with approximately 6.75 million passengers in 2019.[1] It is the second busiest airport in New England after Boston Logan International Airport. The airport has three runways from which

[1] Bradley International Airport 2019 Passenger Numbers

a total of nine airlines provide service. Of these, seven are domestic airlines and two, Air Canada and Aer Lingus, provide international service.[2]

Credit: Bradley International Airport Executive Summary document provided by bradleyairport.com

Terminal A was constructed in 1986 and expanded in 2001. Terminal B, which opened in 1952, was closed to passenger use in 2010, and later demolished. A proposal to replace Terminal B was announced in 2012. In 2020, construction began on the initial phase of work, a new Ground Transportation Center. This $210 million facility, scheduled for completion in 2022, will contain an on-site car rental center, roughly 800 additional airport parking spaces, and a bus terminal which will enhance air-to-ground transit access. The facility will be connected to Terminal A via a pedestrian overpass.

The airport is conveniently located geographically between Boston and New York and is presented as a more efficient and affordable alternative to larger, more congested airports such as Boston-Logan, JFK, or LaGuardia.

Over the past ten years, the CAA has heavily invested in both customer amenities and physical improvements to the airport. The airport has consistently been named among the best airports in the United States by Conde Nast Traveler's Reader's Choice Awards due to its convenient on-site parking, plentiful charging stations, free Wi-Fi, numerous restaurant options, relaxed atmosphere, and an overall increase in passenger travel over the years.[3] In February 2021, USA Today named Bradley as one of the Best Small Airports in the country.[4]

Brand Identity

BDL launched its "Love the Journey" re-branding campaign in 2016 and has since established a robust brand identity. The customer-focused branding of the airport is oriented around the comfort of the terminal and convenience of the travel experience through it.

The brand identity is well represented in the vicinity of the airport and surrounding highways.

[2] https://bradleyairport.com/journey/airlines/

[3] The Best Airports in the U.S.: 2020 Readers' Choice Awards | Condé Nast Traveler (cntraveler.com)

[4] Bradley International Airport Recognized in USA Today 10Best Readers' Choice Awards | Bradley International Airport (bradleyairport.com)

Elements of BDL's branding are also integrated into the physical airport facility. The "Love the Journey" slogan is posted on overhead signage within the passenger concourse of Terminal A. Within the visitor information center, the plane logo is featured on vertical signage which is visible in day time hours. The logo is illuminated at night which helps travelers locate the center. The retractable line dividers at airline check-in areas also prominently feature BDL branding. Beyond the terminal at either end of Schoephoester Road, there are large branded concrete and stone pedestal "gateway" signs with surrounding landscaping.

Credit: All Bradley International Airport images by Bradley International Airport, bradleyairport.com

Customer Experience

Public Realm and Placemaking

The airport is oriented around convenience in terms of ease of getting to the airport and parking at a reasonable price. Overall, the airport is modern and accessible with wide concourses and tall ceiling heights. The main concourse of the terminal is filled with storefronts, kiosks, and restaurants that, in some ways, mirrors a main street. This resemblance to a main street provides travelers with a sense of familiarity.

Bradley International Airport also works with Connecticut's Office of Arts, local artists, and students to bring public art to the terminal. In partnership with Connecticut high schools, the airport currently features nine unique Adirondack chairs that are positioned throughout the airport. These chairs were designed by high school students with Connecticut-specific themes and geographies.[5]

[5] https://bradleyairport.com/chair-art/

Amenities

There is an extensive dining and retail presence throughout the airport. Terminal A features a number of nationally-known concessionaires as well as a micro-brewery and saloon. Many of the airport shops sell a variety of locally-themed merchandise. There is also a duty-free shop for international travelers.

Credit: Escape Lounges; escapelounges.com

Escape Lounges, a UK-based company, operates premium lounges in a total of ten airports across the United States. Escape Lounges employs a common-use concept offering lounge access to any passenger regardless of airline. The Escape Lounge at BDL is a 2,100 square foot passenger lounge located near Gate 1 in Terminal A.[6] The standard walk-up fee for lounge use is $45 with a pre-booking fee or $40 if reserved 24 hours in advance.[7] American Express Platinum Card® members receive complimentary access for themselves and up to two guests.[8] The lounge features contemporary furnishings, complimentary food and drinks, private restrooms, free high-speed Wi-Fi, and flight information monitors.

Additional passenger amenities are centered on a personalized customer experience that includes musical entertainment in the terminal, an in-terminal relief area for travelling pets and service dogs, a nursing room, and a therapy dog program to provide any needed stress relief. All of the restrooms in the airport have been renovated.

In 2019, in addition to the information center, the airport introduced its Roaming Ambassadors Program to assist passengers in the terminal. Since its inception, the program has helped 65 percent more passengers compared to just the information center alone.

[6] Currently, this facility is closed due to COVID-19 protocols until further notice

[7] Airport Lounge at Bradley International Airport | Escape Lounges US

[8] Airport Lounge at Bradley International Airport | Escape Lounges US

The Sheraton Hartford Hotel at Bradley Airport is located within the airport, directly connected to the departures level of Terminal A. The hotel driveway is adjacent to the United Airlines departure drop-off.[9] The Sheraton offers a complimentary shuttle (reservations required) for hotel guests. In addition to the Sheraton, there are several major hotels within two miles of the airport that provide shuttle service to and from the terminal.

While Bradley International Airport offers convenient parking that is proximate to the terminal, there is also a frequent parker loyalty program for on-airport parking customers. The program allows individuals to earn points every time you park, automated cashier-less lanes, and a points redemption option for free parking. Additionally, there are several private parking lots such as Roncari Express, the Parking Spot, and LAZ FLY which offer valet/shuttle service to the airport.

Wayfinding and Signage

Wayfinding throughout the airport is provided with easy to read signage throughout the facility indicating directionality for gate information, restrooms, ticketing, baggage claim, and ground transportation. Exterior to the terminal, there are also clearly marked roadway signs to major highways.

[9] https://www.marriott.com/hotels/fact-sheet/travel/bdlsi-sheraton-hartford-hotel-at-bradley-airport/

Two new elevators were installed in 2018 with the goal of improving the circulation of passengers by connecting the arrivals and departures levels.[10] The elevator bank panels are illuminated and act as a wayfinding landmark within the terminal.[11] In 2018, a passenger information center was also created on the baggage claim level and is a centralized area for passengers to make inquiries.

Access and Movement

A structured parking garaged, located just across the street from Terminal A, provides easy access to the terminal building via street level crosswalks to the arrivals level, and a pedestrian overpass from the upper levels of the garage to the departures level. The terminal building has a single central check-in area with two concourses with gate access. Parking and ground transportation are conveniently located on-site. Terminal and parking maps are all well-defined.

[10] CAA Bradley International Airport • Fennick McCredie Architecture (fmarchitecture.com)

[11] CAA Bradley International Airport • Fennick McCredie Architecture (fmarchitecture.com)

Passenger Technology

Bradley International Airport has invested in a number of technological improvements to make the airport experience more convenient and connected.[12] These include:

- upgraded Wi-Fi in the terminal with added bandwidth, capacity, and a more reliable connection;
- implementation of Common Use Terminal Equipment which allows multiple airlines to share a ticket counter or gate providing more flexibility and shorter waiting times;
- installation of high-definition flat panels to better display arrival and departure gate information, with plans to enhance the existing outdoor signage and to introduce digital signage in the future;
- available flight information on both the airport's website and Twitter; and,
- double the number of charging stations in the terminal, many of which combine with seating and/or tables.

Intermodal Connectivity

At present, there is a relative lack of public transit options available at the airport itself (hourly bus service on one route), leaving Uber, Lyft, or taxi as the seemingly only options. Intermodal connections to various services on-site or proximate to the airport include:

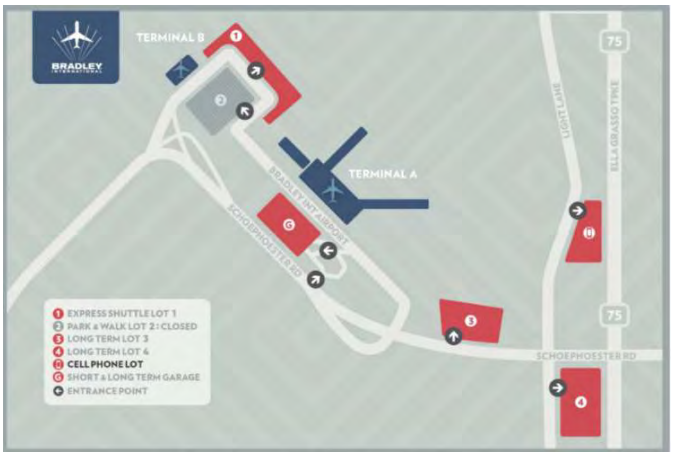
- CT*transit*'s 30 Bradley Flyer route, providing hourly bus service between the airport and downtown Hartford;[13]
- taxi and limousine service (approximately 17 car services serve BDL);[14]
- eight national rental car companies (accessible by complimentary shuttle from the airport);
- authorized TNC providers at BDL, including Uber and Lyft; and,
- Windsor Locks Station, the closest train station to the airport, approximately three miles away providing connections to Hartford, New Haven and Springfield, MA by CT*rail* and Amtrak, with continuing Amtrak service to Vermont. CT*transit* also provides bus service (e.g., Route 905) to the station and there are taxi, Uber, and Lyft connections as well.

[12] Journey Series: 5 Ways Bradley Airport is Using Tech to Improve Your Travel | Bradley International Airport

[13] 30-Bradley Flyer | CTtransit - Connecticut DOT-owned bus service

[14] https://bradleyairport.com/directions-parking/rental-taxi-limo/

Organized Transportation Components



With only one terminal building, A, the airport is reasonably easy to navigate as it has a more compact footprint as compared to many of the larger airports in the region. Terminal concourses are easy to negotiate, and flight gates are clearly marked.

There are a number of parking options at Bradley including three active surface parking lots and one garage as shown in the map on the right. Lot 2 is currently closed as a result of the construction associated with the ground transportation center. The parking garage across from Terminal A offers the closest parking to all airlines. Garage rates are currently discounted to $10 per day or $60 per week, assumed to be due to the COVID-19 pandemic, which are significantly less than parking at JFK or Boston-Logan. In 2019, airport parking rates were roughly $30 per day. In addition, there is a free cell phone waiting lot that eliminates the need to circle the airport repeatedly before picking up an arriving party. Electric vehicle charging stations are also available in the cell phone waiting lot, which is located less than three minutes from Terminal A.

Pick-up and drop-off routes, as well as TNC locations, are clearly marked and defined. Uber and Lyft are the only authorized TNCs at Bradley. Typically, Uber and Lyft drivers stage in the free cell phone lot while awaiting their trip request. Once a trip request is accepted, the pickup location at the terminal is the outer curb of the arrivals area.[15] Passengers flying out of Bradley are dropped off at their respective departure airline.[16]

Taxi service is available between the hours of 7 AM and 1 AM from a taxi stand that is located near Door 2 of Terminal A. Cabs charge a flat fare from the airport to specific destinations (e.g., Hartford $45, West Hartford $42).[17] To access the taxi stand, passengers take an escalator down to the baggage claim area and walk to the left of the escalator to Door 2. Passengers exit the terminal through Door 2 and walk to the left until they reach the taxi stand.

At present, all rental car facilities are located off of airport property and require a shuttle ride from the airport to the particular off-airport car rental facility location. Courtesy car rental shuttles are available from the inner curb of the arrivals area. The new ground transportation center, which is currently under construction, will eliminate the need for passengers to board shuttles to access their rental cars when it becomes operational (anticipated to be in 2022).

[15] Bradley-International-Airport | Airports | Drive | Uber

[16] Connecticut airport information for drivers - Lyft Help

[17] November2011_Taxicab_Fares.pdf (websitetestlink.com)

Connections from the airport to the Windsor Locks Train Station are available by taxi, limousine service or TNC. Cab fare to the station from the airport is approximately $16. Currently, an easily accessible public transit option to the train station does not exist.

Summary

Bradley International Airport was highlighted as it is a state-owned facility and contains features of an airport experience that could potentially translate to the STC. The airport is modern, clean, and spacious while providing an efficient customer experience. On-site garage parking is currently inexpensive ($10/day assumed to be due to the COVID-19 pandemic), especially compared to larger airports. The airport offers an overall convenience and ease of use that is becoming more attractive to customers. Drawbacks to the facility include limited international flight options, lack of public transit options, and off-site rental car locations which necessitate a shuttle ride. However, the new ground transportation center will replace the current off-airport rental car facilities and will eliminate the need for passengers to board shuttles to access their rental cars.

2.2 Anaheim Regional Transportation Intermodal Center

The Anaheim Regional Transportation Intermodal Center, branded as ARTIC, opened in 2014. The approximately 67,000 square foot transit facility is situated between two professional sports venues, the Honda Center and Angel Stadium of Anaheim, and adjacent to the Santa Ana River Trail. The facility is known for its modern architecture, characterized by a 120-foot steel-framed arched roof which creates a parabolic design. The modern facility strives to achieve an airport-style experience.

Credit: Southern California Regional Rail Authority (Metrolink), metrolinktrains.com

ARTIC has two side rail platforms serving two tracks, 13 bus bays with shelters, and two surface parking lots (Lots A and B) with complimentary parking.

Credit: Southern California Regional Rail Authority (Metrolink), metrolinktrains.com

The facility has achieved a LEED Platinum certification. Solar panels located in parking lot B generate 20 percent of the energy required to operate the facility.[18] This transportation hub

[18] Awards and Nominations - 2014 - The Anaheim Regional Transportation Intermodal Center (ARTIC) - ASCE OC - American Society of Civil Engineers - Orange County Branch

provides Amtrak intercity passenger and Metrolink commuter rail service as well as intercity and local bus service. In 2019, total daily ridership was estimated to be between 4,200 and 5,500 passengers.[19]

Brand Identity

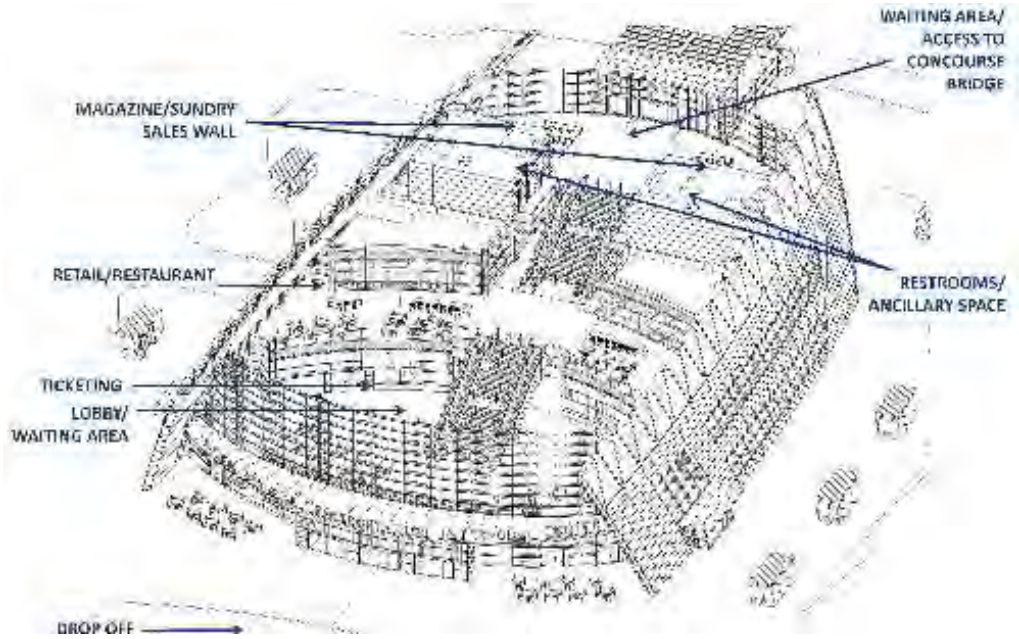
This transportation hub is branded as ARTIC and features a strong overall brand identity with a facility-specific logo. ARTIC was constructed as an anchor for a larger master planning effort called ocV!BE, which is intended to be a transit-oriented district (TOD). The TOD project is envisioned as a $3 billion, 95-acre mixed-use live entertainment development consisting of 1,500 residential units; public open space; 200,000 square feet of retail space, office and hotel uses; 8,700 parking spaces; and a concert venue.

Credit: Anaheim Capitol Program Update document provided by anaheim.net

[19] https://abc7.com/5317898/

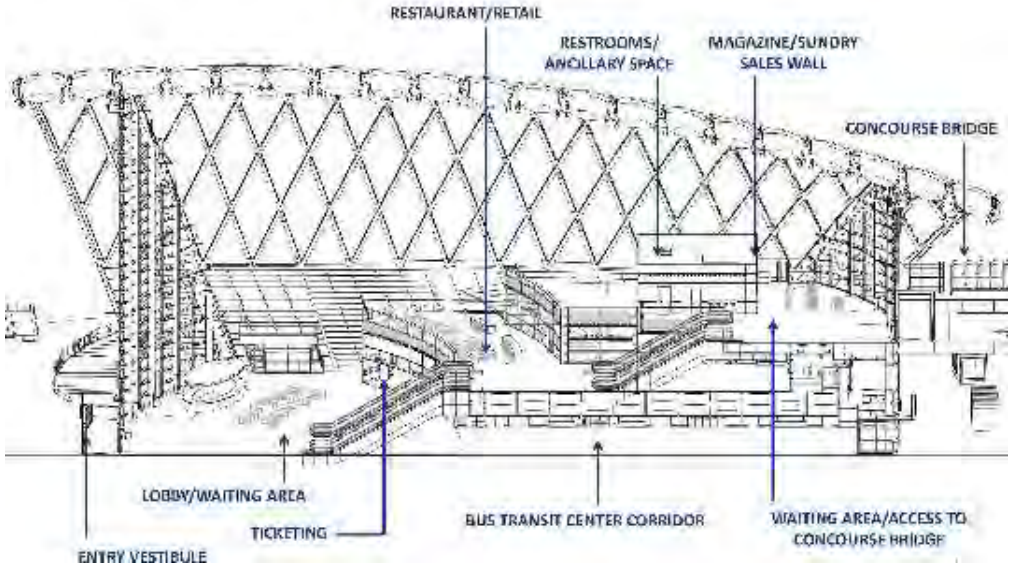
Customer Experience

ARTIC building axonometric perspective:



Credit: Anaheim Capitol Program Update document provided by anaheim.net

ARTIC building section:



Credit: Anaheim Capitol Program Update document provided by anaheim.net

Public Realm and Placemaking

Credit: VHB

ARTIC's structural shell allows for an open, column-free main hall and an abundance of natural light.[20] Glass curtain walls at the entrance and rear of the building also create complimentary daylighting opportunities. Ultimately, this open design helps to achieve the feeling of a grand civic space.

Credit: ZhengZhou, CC BY-SA 3.0 <https://creativecommons.org/licenses/by-sa/3.0>, via Wikimedia Commons

Credit: VHB

At night, ARTIC is illuminated by LED lights which are mounted on the frame of the building. A holographic public art installation by Mikyoung Kim, called *SKYSPACE*, is integrated into the grand staircase of the main hall.[21] A landscaped outdoor plaza, with limited seating, is located at the entrance of the facility which segments the passenger and taxi drop-off lanes. Collectively, the outdoor plaza, the unique structure of the ARTIC shell, which many consider to be art in and of itself, and structural lighting help to instill a sense of place.

[20] https://www.hok.com/projects/view/anaheim-regional-transportation-intermodal-center/

[21] SKYSPACE Installation at ARTIC | Mikyoung Kim Design - Landscape Architecture, Urban Planning, Site Art (myk-d.com)

Amenities

ARTIC is less than 10 years old and is a spacious facility that contains modern amenities. Since opening, a few of the dining establishments have closed. While there is extensive space for dining and retail, that type of passenger experience has not yet been realized. There are plans, however, to expand the dining and retail presence as the ocV!BE development is anticipated to open in 2024 and passenger flow increases.

Wayfinding and Signage

Credit: VHB

Credit: Southern California Regional Rail Authority (Metrolink), metrolinktrains.com

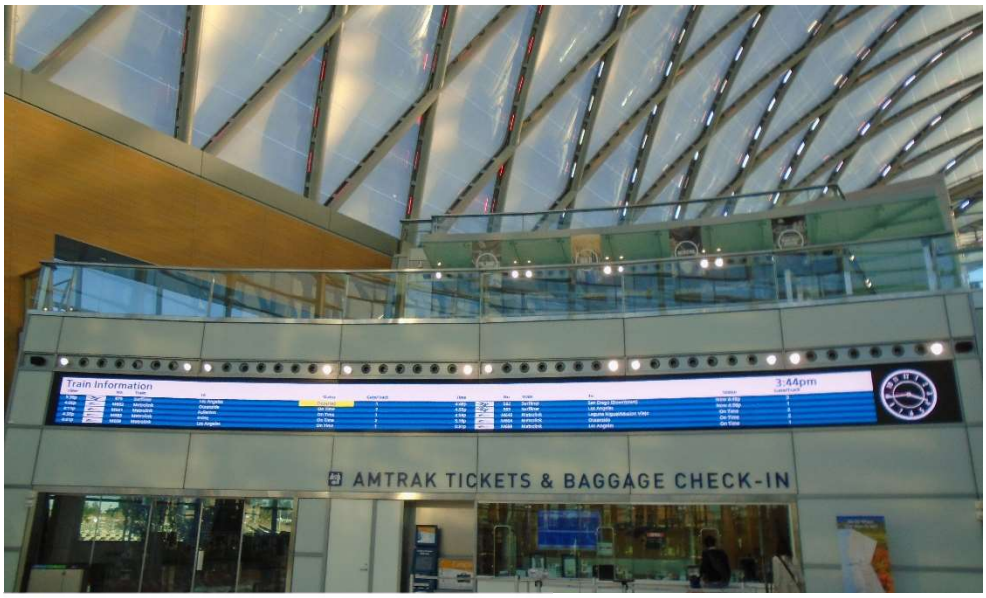
This expansive station has well-featured and large lettered signage above the ticket windows, and directional signage posted throughout the interior of the facility. Bus bay signage within the terminal is posted above exterior doorways that are clearly marked with bus bay numbers. Signage for taxi, drop-off, and parking areas are posted throughout the exterior of the facility with physical signage on platforms noting the direction of the station building as well as elevator locations.

Access and Movement

ARTIC provides intuitive access with well-marked signage to tracks, bus bays and other elements of the transit hub. The bus bays, which are located along the exterior of the facility, are easily accessed from the terminal itself or by walking outside to the specific bay. However, since the facility opened, rail commuters have been resistant to parking in the main commuter lot and walking through the station due to its distance from the platforms. A secondary lot, Lot B, is approximately 100 feet from the rail platforms. As such, given its convenience, Lot B has been well-utilized by rail commuters who actively avoid the station and its amenities completely.[22]

Passenger Technology

Digital schedule boards for trains are installed above the respective Amtrak and Metrolink ticket windows within the station. Similarly, digital schedule boards are provided above the intercity bus ticket windows. The digital display system at ARTIC is integrated across all carriers. The schedule boards are an appropriate size for a facility of this scale. Digital signs are also located on the rail platforms indicating train number, destination, and train status (i.e., boarding, departing, etc.). Passenger technology includes free Wi-Fi and outlets for the charging of electronic devices. Electric vehicle charging stations are also located in the parking lots at this facility with six chargers in Lot B and additional chargers in Lot A. The fee to use the electric vehicle charging stations is $1.50 per hour.[23]



Credit: VHB

[22] https://voiceofoc.org/2015/10/anaheims-artic-wasteland/

[23] https://www.plugshare.com/location/59541

Intermodal Connectivity

Credit: Anaheim Capitol Program Update document provided by anaheim.net

ARTIC is a true multimodal facility providing connections to various services:

- Amtrak *Pacific Surfliner* to San Diego and San Luis Obispo;
- Metrolink commuter rail service to Oceanside and Los Angeles;
- Orange County Transportation Authority (OCTA) bus network;
- intercity bus carriers Greyhound, Megabus, and FlixBus;
- international bus service provided by Tres Estrellas de Oro to Tijuana and Guadalajara Mexico; and,
- Anaheim Transportation Network's Anaheim Resort Transportation (ART) shuttle service between local hotels and points of interest in and around the City of Anaheim and Orange County.

Organized Transportation Components

Credit: VHB

There are a series of eight drop-off/pick-up lanes at the entrance of the facility. Although not officially designated, this area also serves as the pick-up/drop-off point for TNCs. Bus bays, 13 in total, are located along the exterior of the facility. There are two designated taxi-only lanes that are segmented by curbing and landscaping from the passenger drop-off/pick-up lanes at the main entrance of the facility. There are no on-site car rental vendors at ARTIC. The Santa Ana River Trail provides a bicycle path adjacent to the station.

As noted above, the ART shuttle provides service between local hotels and activity centers in and around the City of Anaheim and Orange County. ART's ARTIC Sports Complex Line runs every 40 minutes and provides service to the Anaheim Convention Center, the Disneyland Main Transportation Center, five area hotels, the Platinum Triangle mixed-use development, and the Garden Walk retail and entertainment district.[24] The ART shuttle stops at two locations at ARTIC, bus bays 11 and 12. Tickets are available for purchase at the ART information desk located on the first floor of ARTIC. Riders can also purchase tickets via the RideART mobile app, online from the ART website, or on board ART shuttles (one-way cash fares with exact change).[25] The ability of ART's ARTIC Sports Complex Line to reach so many distinct destinations on a consolidated shuttle route is a unique differentiator of ARTIC. From a passenger perspective, there are no competing shuttles serving nearby destinations thereby avoiding confusion as to which shuttle to board.

Collectively, ARTIC's parking areas, outdoor circulation areas, and the transit facility building itself create a sizeable footprint to navigate. Transitioning from the main commuter parking lot, Lot A, to the rail platform requires a long walk through the main terminal hall, up to the mezzanine level, and then across a pedestrian overpass before descending two flights of stairs down to the rail platforms. Conversely, Lot B is well-utilized by rail commuters as it is

[24] PowerPoint Presentation (rideart.org)

[25] Fares & Passes - Anaheim Resort Transportation (rideart.org)

much closer to the rail platforms (approximately 100 feet away) and more convenient for rail commuters to use because of the shorter walking distance.

The bus bays, along the exterior of the building, are also far away from the rail platforms resulting in inefficient connections. Passengers connecting from rail to bus require similar movements up and down the vertical circulation elements mentioned above, followed by a long walk through the terminal or outside along the side of the building to access the bus boarding areas.

Summary

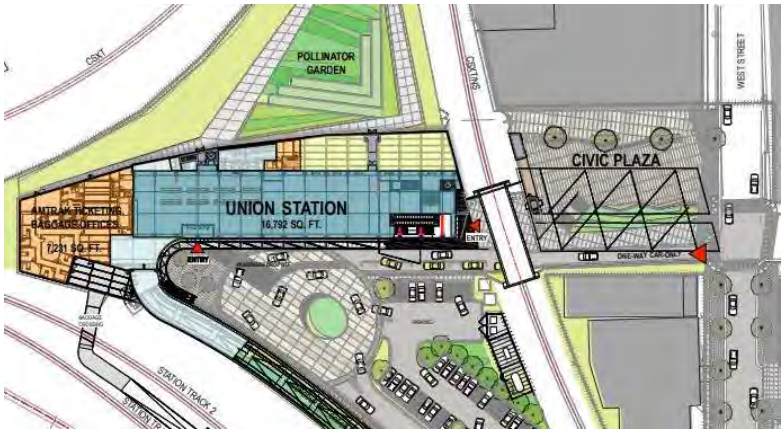
Credit: VHB

ARTIC achieves an airport-style experience with modern amenities as noted above. The facility is considered by many to be an iconic and beautiful piece of architecture. However, others consider ARTIC to be an eyesore that has been poorly sited. The expansive station design has been criticized due to the distance between the main commuter parking lot, station building, and transit elements.[26] Originally, ARTIC was estimated to see approximately 10,000 daily riders. This ridership appears to have been overstated as pre-pandemic daily ridership across all modes has been between 4,200 and 5,500 passengers.

[26] https://voiceofoc.org/2015/10/anaheims-artic-wasteland/

2.3 Raleigh Union Station

Credit: http://www.raleighnc.gov



Credit; North Carolina Station Program document by Paul C. Worley NCDOT Rail Division Director

Opened in 2018, Raleigh Union Station is housed in a repurposed warehouse within the Boylan Wye. The 26,000 square foot facility anchors the city's Warehouse District, an area that is currently being revitalized. The facility serves two rail tracks (Amtrak) with an ADA-compliant, 920-foot center island platform for level boarding and is the first high-level platform in the state of North Carolina.[27] Raleigh Union Station provides intercity rail service and two connections to local buses are available near the facility. Track infrastructure space has been preserved for the construction of a second platform if commuter and high-speed rail services are realized. Raleigh Union Station is owned by the City of Raleigh. The state-supported passenger rail service between Charlotte and Raleigh is operated by Amtrak.[28] Construction of an adjacent regional bus terminal, by the Research Triangle Regional Public Transportation Authority (GoTriangle), is planned for completion in 2025.[29] The street-level bus terminal will be part of a larger mixed-use development of up to 40 stories, comprised of market-rate and affordable housing, office, and retail space to be built by a private developer.

The station incorporates a green roof with native plantings on the passenger concourse leading to the tracks as well as a pollinator garden adjacent to the station building.

[27] Raleigh Union Station Fact Sheet (peace.edu)

[28] https://www.peace.edu/wp-content/uploads/RUSFactSheet.pdf

[29] https://dtraleigh.com/tag/raleigh-union-station-bus-facility/

Other sustainable elements include energy efficient radiant heating, inserts in the glass panels of the façade to protect against heat gain, and permeable pavement to minimize stormwater runoff.

Brand Identity

The station does not have a station-specific logo, but there is a heavy focus on "Raleigh" destination branding as evidenced by the large signs on the building façade. In addition to transit uses, the facility also houses a number of commercial businesses and is used for special gatherings and events, solidifying its tie to the community or "Raleigh" brand.

Credit: By NCDOTcommunications – RAIL 2018.05.02 Union Station Tour_jl-39, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=68883407

The station is also geographically tied to the city as it is within a resurgent neighborhood district which functions as a gateway to downtown Raleigh.

Credit: ©2021 Art Howard Photography, provided by Surface678

Customer Experience

Public Realm and Placemaking

Credit: ©2021 Art Howard Photography, provided by Surface678

Raleigh Union Station offers plenty of natural light, high ceilings that provide a sense of spaciousness, and great views of the Raleigh skyline. The modern aesthetic of the station blends in well with neighboring structures in the area.

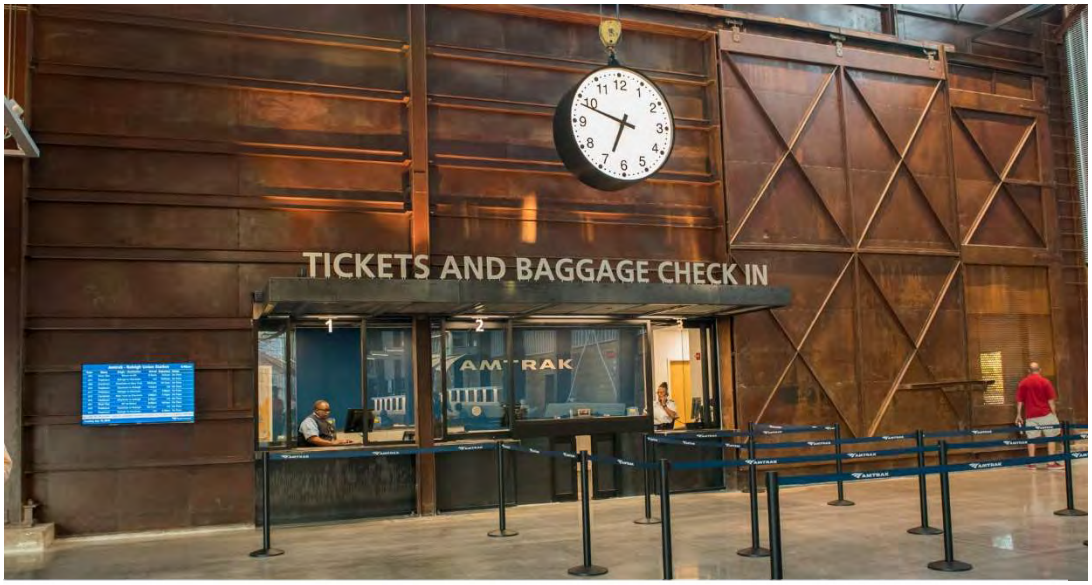
Public art is prevalent throughout Raleigh Union Station. There is artistic neon signage that features "Raleigh" within the station building, as well as exterior art installations by Hank Willis Thomas and Mary Carter Taub.[30]

Credit: ©2021 Art Howard Photography, provided by Surface678

A large public plaza, designed by Surface 678, helps to provide an urban gathering area and space for special events. The plaza canopy provides functional shade and incorporates the railroad history of the Warehouse District as well as the City's industrial past. Raleigh Union Station's community use terrace and mezzanine, as well as the civic plaza which will be integrated into the future TOD/ Raleigh Union Station (RUS) Bus project to help facilitate placemaking.

[30] Raleigh | Downtown Raleigh Public Art

Amenities



Credit: By NCDOTcommunications – RAIL 2018.07.10 RaleighUnionStation_(265 of 282), CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=70797434

Amenities include an easy to navigate great hall, Amtrak ticket window, and ample indoor seating. Vending machines are located in the station. Currently, there are no restaurants operating in the station but there is sufficient space to accommodate dining establishments within the building footprint. Restrooms are located on the main level of the station.

Credit: www.raleighnc.gov

The center-island rail platform is covered thereby providing some shelter to passengers from the elements.

Aside from commuter traffic through the facility, Raleigh Union Station houses commercial tenants including a wine and paint bar, a commercial architecture firm, and a design and construction company. Rents vary from approximately $17,800 to $27,850 per year, or approximately $23 per square foot.[31] Similarly, the station contains three event spaces – the Grand Hall, Outdoor Plaza, and Upper Mezzanine Terrace. These spaces are available to rent for special events such as weddings, receptions, and corporate events.[32] Collectively, these special events and commercial uses bring non-transit foot traffic to a station where people may not have otherwise ventured. In this sense, Raleigh Union Station goes beyond a transit facility and also functions as a community space.

Bicycle racks are present on-site and available on a first-come, first-served basis. There is also a Citrix Cycle bicycle dock with space for ten bikes (nine standard and one electric).[33] Citrix Cycle is a fee based bike share program with memberships ranging from $20 per month to $95 for an annual membership. Metered parking is available at the station for a fee of $1 per hour with a 2-hour maximum.[34] There are several parking garages within walking distance of the station. The closest parking is across the street from the station on 223 S. West Street, in a mixed-use development named The Dillon, with rates of $2 per hour or $18 per day.

Wayfinding and Signage

Large lettered signage highlights major components of the facility including signage for tickets and baggage check above the Amtrak ticket window and to trains. Overall, this helps to facilitate efficient navigation through the station.

Directional signage for trains, ticket areas and restrooms are also posted throughout the interior of the building.

Access and Movement

In its current configuration, the facility provides intuitive access with well-marked signage to the tracks and other elements of the station. The circular passenger drop-off/pick-up near the entrance provides direct access to the main passenger hall. The passenger concourse effectively channels passengers down to track level. However, passengers have a considerable walk from the station to the rail platforms. The walk from the existing station to the planned RUS Bus transfer facility across the street will offer even less efficient connections as passengers navigate between two distinct facilities.

[31] Two firms grab space at Raleigh's Union Station - Triangle Business Journal (bizjournals.com)

[32] A Fleeting Calm - Raleigh Magazine

[33] Citrix Cycle

[34] Raleigh Union Station | Raleighnc.gov

Passenger Technology

Passenger technology is limited at this facility. There are electrical charging outlets for passengers but Wi-Fi is not available.[35] Next to the ticket window, there is a monitor display showing schedules, which is undersized for a facility of this size and scale.

Credit: By NCDOTcommunications – RAIL 2018.07.10 RaleighUnionStation_(265 of 282), CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=70797434

Intermodal Connectivity

Currently, Raleigh Union Station is predominantly rail-focused with limited bus connections as follows:

- Amtrak daily service to Charlotte (four round trips per day); New York (twice per day) and Florida (once per day); and,
- two GoRaleigh bus routes serve the station including the R-Line downtown circulator, Route 8 (after 7 PM), and Route 13.[36]

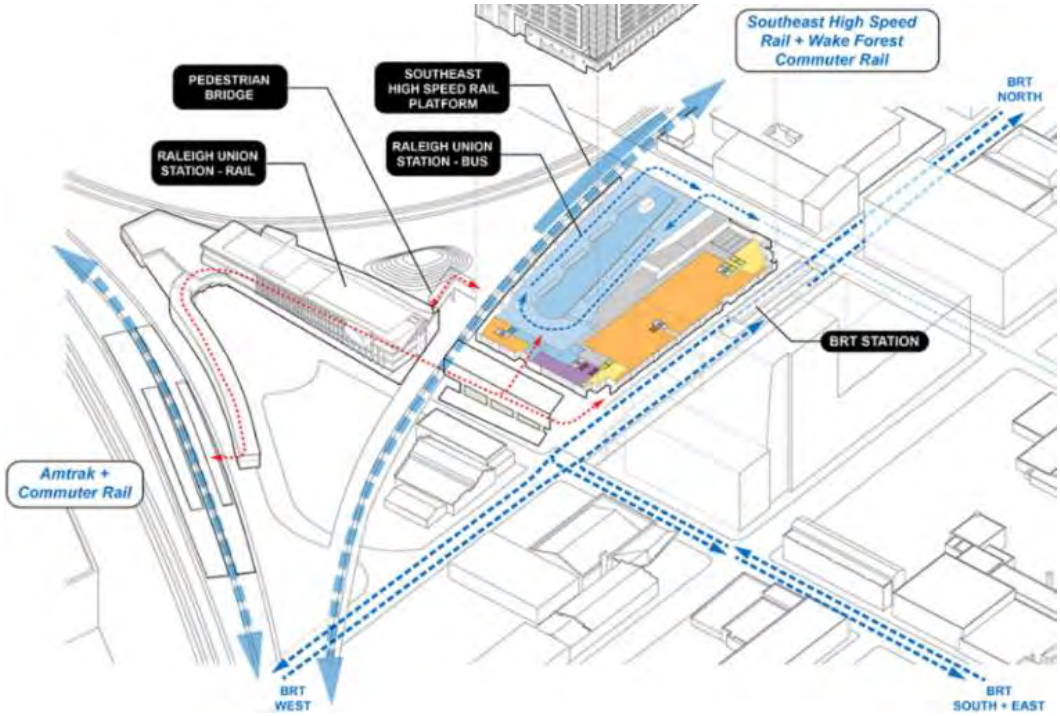
Intermodal connectivity is anticipated to improve in the future once GoTriangle's Raleigh Union Station (RUS) Bus transfer facility and mixed-use development is constructed across the street from the station.

Organized Transportation Components

In its current state, the rail station provides pragmatic access with well-marked signage to the rail platforms. The enclosed, curved passenger concourse provides access from the station that effectively funnels passengers to the track level and is reminiscent of a jetway. The passenger concourse extends below grade to the rail platform and passengers are able to ascend to the platform level by stairs and elevators. As such, a direct station-to-track connection is provided and passengers are protected from inclement weather. The station was designed to accommodate the future expansion of commuter and high-speed rail. The transportation elements work well in the station from a rail perspective. However, since the

[35] Raleigh, NC - Union Station (RGH) | Amtrak

[36] https://raleighnc.gov/SupportPages/bus-service-raleigh-union-station



Credit: RUS Bus, rusbusnc.com

RUS Bus site is proposed across the street, the rail-to-bus connection will not be as efficient as if the facilities were co-located under one roof.

The facility features a convenient circular passenger drop-off area at the station entrance which is accessible from West Street. Additional one-way access is available from West Martin Street. There are no car rental facilities present on-site and no designated TNC passenger pick up areas. Bicycle racks are present on-site and available on a first-come first-served basis.

Summary

The design of Raleigh Union Station has a modern feel that integrates and features materials from the former warehouse that previously occupied the site. The station serves not only as an Amtrak station but also as a community space with a contemporary interior, natural light, and industrial architecture. The station will likely transition to more of a multimodal transportation hub when the planned commuter and high-speed rail services and proposed bus hub are implemented. While long-term parking is located across the street from the station, only short-term parking, with a two-hour maximum, is available at the station proper.

2.4 Denver Union Station

Denver's historic train depot, first built in 1881, functions as a regional multimodal transit hub. The facility was closed in 2012 for two years, redeveloped, and reopened in 2014. Denver Union Station provides intercity and commuter rail service, local and intercity bus service, as well as light rail service.[37] The project is the centerpiece of a new transit-oriented, mixed-use development. It included rehabilitation of the Union Station headhouse (with retail and dining space as well as a hotel), construction of a 22-gate underground bus facility (16 designed for regional and express buses, four for the free downtown circulator, and two for commercial/future carriers), an eight track at-grade commuter rail station and construction of a new tensile structure canopy over the train platforms. The canopy has an opening that frames the historic station building. The different transportation elements are connected aboveground by major public spaces.

Credit: By Kcorless - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=94722887

Credit: By Amy Aletheia Cahill, CC BY-SA 2.0 https://creativecommons.org/licenses/by-sa/2.0, via Wikimedia

The Great Hall of the facility functions as a lobby for the Crawford Hotel and central station for the multimodal transit hub integrating light rail, commuter rail, Amtrak, local and intercity buses, bicycles and pedestrians. The redevelopment project was awarded the 2015 Urban Land Institute Global Award for Excellence and Downtown Colorado, Inc.'s 2015 Governor's Awards for Downtown Excellence as Best Adaptive Reuse or Rehabilitation.[38] The station is also LEED Gold certified.

[37] Denver, CO – Union Station (DEN) – Great American Stations

[38] Denver Union Station | ULI Case Studies

Brand Identity

Credit: By Alex Patton - Derivative work of File:Denver union station.jpg, Public Domain, https://commons.wikimedia.org/w/index.php?curid=25973836

An overall brand identity for Denver Union Station was established as part of its redevelopment. The branding is influenced by the historic building, the people who use the space, and the city itself.[39] Redevelopment of the historic building includes several public spaces, including Wynkoop Plaza, 17th Street Promenade/Gardens, the Wewatta Pavilion, and the Light Rail Plaza.

The brand reflects a simplified graphic of the building with clean fonts. Branded Union Station merchandise is also available at the facility. The Crawford Hotel's logo utilizes the Denver Union Station color palette, a similar typography, and also features the Denver Union Station wordmark.

UNION STATION
EST. 1881

UNION STATION
EST. 1881 | DENVER

THE CRAWFORD HOTEL
DENVER UNION STATION

Customer Experience

Credit: By Isaac Kim 2 - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=37409608

Public Realm and Placemaking

The redeveloped station has won numerous awards and stands as an attractive centerpiece to a revitalized downtown core. The rebuilt commuter rail platforms feature a white steel arched roof providing shelter to customers adajacent to the station building. Inside the station, grand chandeliers hang from open ceilings,

[39] https://www.thinkaor.com/work/denver-union-station-branding-website

giving the appearance of a grand European station. Every detail of the restoration pays homage to a pioneer spirit while embracing a modern sensibility. Much of the train hall is used as a lobby for the hotel; however, it also serves as an attractive retail and food/beverage option for passengers.

Credit: Regional Transportation District, RTD Denver

In addition to the indoor space, Wynkoop Plaza is a notable outdoor public space, featuring approximately 30,000 square feet of tables, greenery, and seating areas. Multiple event areas are located within the plaza and can be rented out. The fountain feature is considered to be the highlight of the plaza and attracts thousands of people across all age groups every year. Wewatta Pavilion and Chestnut Pavilion, both situated above the bus concourse, have an abundance of seating and landscaping, and are integrated with skylights.

Credit: Regional Transportation District, RTD Denver

A kinetic sculpture that sequences like a pendulum was installed in 2015. The unique piece, called *Lola*, was created by artist Christian Moeller.

Annual holiday lighting, farmers markets, outdoor performances, and other events attract not only waiting passengers, but tourists, office workers, and other onlookers.

Beyond revitalizing a historic station, Denver Union Station has a public plaza with extensive landscaping and art. The intent of this space is to create a vital place for the community beyond the facilities used for transportation connections.

Amenities

Credit: By Paul Sableman - Denver Union Station, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=71319478

Denver's Union Station has attracted a number of dining and retail venues as part of its redevelopment efforts. In total, 12 restaurants, including a food marketplace, and four retail stores, including a bookstore and local boutique shops, are located within the station and provide activities to serve as a destination as well as an intermodal transportation center. As part of its redevelopment, Union Station includes ticketing kiosks for local and intercity travel, free Wi-Fi station-wide, 24-hour security, and exceptional lighting and signage. Also within Union Station is the 112-room Crawford Hotel, which has been nominated for Travel and Leisure's World's Best Awards 2021.[40]

Wayfinding and Signage

Credit: By Rw rynerson at en.wikipedia, CC BY 3.0, https://commons.wikimedia.org/w/index.php?curid=13364338

Union Station features wayfinding signage which clearly marks directions for passengers traveling to all modes. In many respects, the wayfinding signage in Denver Union Station mimics airport wayfinding signage, distinguishing between gates and modes using color coordination.

Overhead signage affixed to pavilion entrances also indicate mode by color and totem signage provides directionality for passengers.

While signage is clear, the transit component of Union Station spans multiple blocks, necessitating long walks between the main entrance of the station, where the retail is located, and the bus and light rail access points.

[40] https://unionstationindenver.com/shop/

Credit: Regional Transportation District, RTD Denver

Access and Movement

Union Station includes station and approach guideways, passenger platforms, passenger seating, grade-separated passenger circulation, and a distinctive train hall canopy with pedestrian connections to the historic station building and bus concourse.

Credit: Regional Transportation District, RTD Denver

The bus concourse features seven skylights for natural daylighting which creates a bright and open effect for the customer. Due to the linear nature of the facility, the bus concourse serves as an underground passageway for customers looking to get to and from the light rail and bus areas to the central station and commuter rail. There are multiple entrances to the bus concourse from the street level, and elevators provide ADA accessibility to all points underground. The most convenient entrances to the underground bus concourse are Chestnut Pavilion and Wewatta Pavilion.

Passenger Technology

Credit: By Isaac Kim - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=32998429

When Union Station was redeveloped, a number of technological advancements were incorporated both in the station and in the public outdoor space. Heated bus ramps and steps to and from the bus concourse melt snow to avoid excessive shoveling, plowing, and salting. The outdoor plaza includes nine teardrop-shaped bench planters that incorporate softstcape, shade plantings, and seating. The planters and benches are also underlit with advanced iLight LED luminaires to add light and drama to

the new public realm at night.[41] Generally speaking, the station is built for passenger comfort while retaining a historic feel. Seating is plentiful, there are numerous charging areas, and free Wi-Fi is available throughout.

While the station lacks an iconic train schedule board, there are digital schedule boards for Regional Transportation District (RTD) service at pavilion escalator locations.

Intermodal Connectivity

Credit: By Jeffrey Beall - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=

Credit: By Kenneth C. Zirkel - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=574605

Union Station offers connections to multiple modes of transportation which serve the greater Denver area and beyond:

- three commuter rail lines to the Denver airport and surrounding suburbs with one additional line set to open in the future;
- seven light rail routes serving the immediate Denver metropolitan area;
- local and regional RTD bus lines providing a connection to 16 routes across the RTD service area;
- intercity bus service via Bustang, Burlington Trailways, Black Hills Stage Lines, and Greyhound to destinations within Colorado, throughout the Great Plains and beyond;
- Amtrak *California Zephyr* long distance train connecting Denver with Emeryville, CA (San Francisco Bay Area), Chicago, and intermediate points;
- Amtrak's seasonal *Winter Park Express* ski train to popular resort destinations in the Rockies; and,
- Free Metroride bus service providing access to popular downtown attractions.

[41] https://www.ilight-tech.com/denver-union-station/

Organized Transportation Components

Despite spanning four blocks, Union Station connects commuter rail, bus, and light rail while providing an attractive indoor and outdoor public space. In addition, it features a hotel and multiple retail and food/beverage options. Underground concourses provide seamless passenger flow and movement, including its 1,000-foot long bus concourse, with ADA-accessible entrances located throughout. For passengers traveling to and from Union Station via bus, commuter rail and light rail connections are on either side of the concourse. However, for those looking to transfer between commuter rail and light rail, an approximately 1,000-foot walk through the entire concourse is necessary.

Credit: Regional Transportation District, RTD Denver

There are a total of five designated TNC pick-up locations as shown on the following map. Four pickup areas are centered around the station and one pick-up location is at the light rail facility:[42]

- North Wynkoop
- Central Wynkoop
- South Wynkoop
- Wewatta Street
- Light Rail Pickup: Chestnut Place & 17th Street

[42] Union Station | Lyft | Colorado

A taxi staging area, for pick-up and drop-off, is located directly across from the Crawford Hotel on Wynkoop Street. There are no rental car facilities within the station. However, there are a number of rental and Zipcar facilities surrounding the station.

Denver's Union Station does not offer a dedicated parking facility on-site. Valet parking is available at the station with rates ranging between $17 and $27 for up to eight hours depending on validation. Stays over eight hours or overnight cost $47 per night. On-street parking is available on Wynkoop Street and surrounding roadways. A number of off-street parking facilities are located proximate to the station on nearby streets including Chestnut Place, Wynkoop Street, as well as 18th and 19th Streets.[43] Given its location in an urban core and the availability of on-and off-street parking in the vicinity of the station, the lack of dedicated parking facilities at Denver Union Station is not considered to be a detriment.

Summary

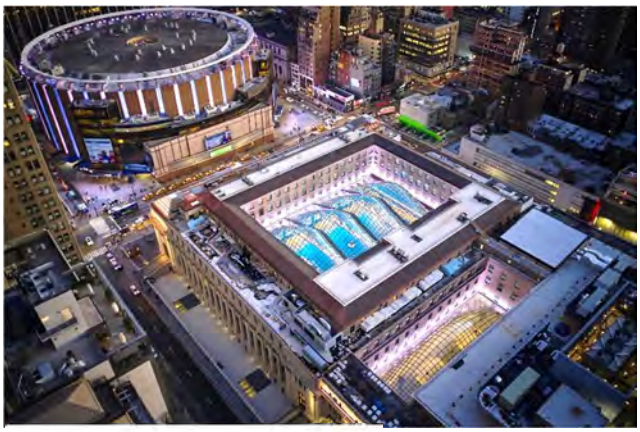
Credit: By Randall A Gordon - Imported from 500px (archived version) by the Archive Team. (detail page), CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=77527029

The redevelopment of Denver Union Station serves as an example of a way to revitalize a downtown public space while simultaneously providing an attractive multimodal station to attract transit riders. Unique in nature by incorporating an award-winning hotel within it, Union Station provides Amtrak, commuter rail, light rail, and bus access within four city-blocks. In addition, numerous retail and food/beverage options attract non-traveling individuals to provide not just a multimodal transit station but a destination for tourists and residents alike. The award-winning redevelopment highlighted the station's grand open ceiling, allowing for plenty of daylighting and the beautiful architecture to shine. The station features strong public realm improvements from terminal space to pavilions and linear landscaped plazas. The facility has an effective interface when transferring between the bus concourse and light rail station, but transfers between bus or light rail and commuter rail is less efficient due to the distance and location of the rail platforms. Overall, the station serves as a pragmatic downtown terminal with the capacity to handle rush-hour commuters, hotel guests, and tourists simultaneously, all while standing out as a highlight of the City of Denver.

[43] Downtown Denver Valet & Public Parking | Union Station (unionstationindenver.com)

Credit: By Brian W. Schaller - Own work, FAL, https://commons.wikimedia.org/w/index.php?curid=55746055

2.5 Moynihan Train Hall at Penn Station



Credit: Lucas Blair Simpson @ SOM

New York Penn Station is the busiest rail hub in North America, with passengers taking more than 650,000 trips daily (pre-pandemic) on intercity passenger, commuter rail, and local rail lines.[44] Connections are available to intercity and local bus service.

The original station, opened in 1910, was demolished in the 1960s and its underground concourses were reconfigured into the existing station. In 2006, New York State purchased the Farley Post Office building, located west of Penn Station between W. 31st and 33rd Streets and 8th and 9th Avenues. In 2017, construction began on this site for the Moynihan Train Hall. The train hall opened to the public on January 1, 2021, and expanded the concourse space by 50 percent.[45]

Credit: All Moynihan Train Hall photos by VHB unless otherwise noted

Moynihan Train Hall is the first step in a comprehensive redevelopment initiative, known as the Empire Station Complex, that will enable the expansion of Penn Station into the blocks south of the existing station and Moynihan Train Hall, from W. 31st and W. 30th Streets between 7th and 9th Avenues. The Empire Station Complex project would also introduce eight new commercial buildings on the surrounding blocks from W. 34th St. to W. 30th St.[46]

Long Island Rail Road (LIRR) and Amtrak trains are served by 17 tracks, accessible from the train hall as well as the West End Concourse, which was constructed in 2017. The main hall features marble flooring and receives an abundance of natural light as a result of the restoration of the Farley Building's 92-foot high skylight atrium and steel trusses. The

[44] https://www.greatamericanstations.com/stations/new-york-penn-station-ny-nyp/
[45] https://esd.ny.gov/moynihan-train-hall
[46] Empire Station Complex | Empire State Development (ny.gov)

skylight ceiling was originally used by postal workers who needed natural light to see the mail that they were sorting.[47]

Brand Identity

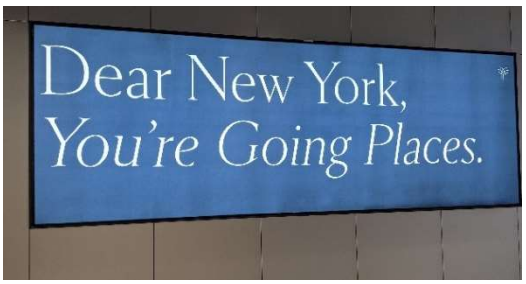
The long-awaited Moynihan Train Hall has a strong brand identity, especially with the facility opening during the COVID-19 pandemic. The marketing is predominantly focused on the context of the space, history of the former Farley Post Office, and welcoming visitors to New York City. Branding is incorporated within the physical infrastructure of the building and also on interior and exterior signage. Overall, the branding creates a warm, sophisticated, and uplifting sense of space. The brand identity also focuses on the juxtaposition of this new and sleek gateway with Penn Station, which was seen as unorganized, confusing, and crowded.

The primary logo is an abstract eagle, inspired by the connection of people around the station and a nod to the legacy of the Farley Post Office building which now houses the train hall. It also pays homage to the eagle sculptures that were removed from the original Penn Station. There is also use of a secondary logo – the "MTH" monogram, which is featured in select areas of the station, including on entrance doors. A postmark-like seal with bronze letters is inlaid at the bottom of the train hall's main staircase. The brand identity was put into place in a well-balanced manner serving to both educate visitors and commuters, and also familiarize the public with a brand that will be a centerpiece of the city for generations to come.[48]

Customer Experience

Public Realm and Placemaking

Moynihan Train Hall is a visionary renovation to the Farley Building which was the sister building to the historic Pennsylvania Station. The train hall functions as both a public building and a civic space. The space evokes the feeling of a grand European train hall but is state-of-the-art at the same time.



[47] https://www.6sqft.com/midtowns-new-moynihan-train-hall-will-open-january-1/

[48] http://gdusa.com/news/fresh/moynihan-train-hall-branded-as-gateway

Empire State Development, in partnership with the Public Art Fund, commissioned three large-scale art installations within the train hall which reflect broadly on the past, present and future.[49] Photographic panels in the passenger waiting area depict images of the original Pennsylvania Station. An architectural beehive-like structure featuring futuristic skyscrapers is suspended above the mid-block entrance to the train hall at 31st Street.

A hand-painted stained glass installation, titled *Go*, echoes the train hall's skylights and is a modern take on a European fresco. Collectively, the artwork commissions cost $6.7 million.[50]

At Moynihan Train Hall, the efforts to integrate public art within the public spaces strongly fits the characteristics of placemaking which can extend to include streets, interior and exterior art, signage, and destinations. The architecture of the facility makes a strong reference ot the former historic Pennsylvania Station, and includes details that connect both to history and current aesthetics at the same time.

Amenities

Approximately 120,000 square feet of retail space and three high-end restaurants will be housed within the train hall in the future. A Starbucks is currently in operation at the facility and a food hall is anticipated to open later in 2021.

In addition to the restaurant and retail space, Facebook has committed to leasing all of the

[49] https://www.publicartfund.org/exhibitions/view/mth/

[50] https://www.publicartfund.org/exhibitions/view/mth/

commercial office space (approximately 730,000 square feet) in the Farley Building.[51]

The main hall is organized around amenities and passenger services including a 320-seat waiting room with wood banquettes. Power and USB outlets are located throughout the waiting room.

The Metropolitan Lounge is Amtrak's new ADA-accessible first-class lounge space which provides passengers a premium experience including priority boarding, food and beverage options, dedicated customer service and private restrooms.

Two nursing lounges are located in the train hall and public restroom facilities are located throughout. Ticket kiosks, airport style ticketing/customer service stations for LIRR and Amtrak, and baggage assistance are also available. Amtrak's baggage claim area includes an airport-style conveyor.

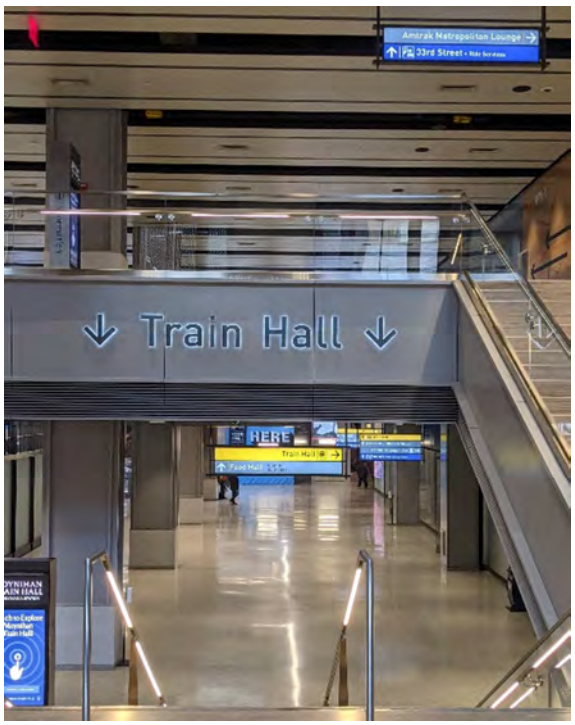
[51] https://gothamist.com/news/facebook-will-lease-730000-square-feet-farley-post-office-building

Wayfinding and Signage

Moynihan Train Hall features consistent and clear wayfinding throughout the facility. Major elements of the train station, including Amtrak and LIRR ticketing and customer service, are clearly marked with electronic signage. Similairly, the waiting room for ticketed passengers contains appropriate locational signage (denoting "Ticketed Waiting Room") that is easy to view from points throughout the train hall. State-of-the-art wayfinding is provided via LED and LCD displays with variable message sign (VMS) information. Totem signage with electronic displays are provided adjacent to the escalators to clearly mark each train platfrom. Signage is marked in large fonts and visibility is good from nearly all viewing points.

While there is not a primary large-sized schedule board at Moynihan, there are numerous smaller schedule monitors in various configuratons situated throughout the station. Elevator access is availble to all platforms and electronic map directories are posted next to elevators. Overhead directional signage is provided at appropriate corridors indicating directions to major components such as ground transportation, the food hall, and lounge space. Directional street signage is also posted at exits and major corridors. In addition, overhead directional signage to Moynihan is provided in Penn Station's LIRR concourse.

Lastly, the four-faced clock, suspended over the center of the atrium, serves as a landmark focal point and meeting spot.



Access and Movement

Within the Moynihan Train Hall there is intuitive access with well-marked signage to rail platforms and other elements of the facility. In many ways, Moynihan Train Hall serves as an extension to Penn Station. However, NJ TRANSIT is not directly accessible via Moynihan nor are the NYCT subway lines (A,C,E on 8th Avenue or 1,2,3 on 7th Avenue). To access NJ TRANSIT, customers must either traverse through Moynihan's West End Concourse into Penn Station or go outside and walk east to Penn Station and use the entrance near the NJ TRANSIT concourse at 7th Avenue and 31st Street. Subway connections are also provided in Penn Station with surface connections located on 7th and 8th Avenues.

Passenger Technology

A complimentary Wi-Fi network, using next generation Wi-Fi 6 technology, is available in the facility. There is also an inductive loop system to provide hearing assistance within the station. The train hall features digital video screens in a variety of sizes with live video

capabilities that feature important updates for passengers. These LED/LCD displays are located throughout the terminal, near elevators, escalators, and luggage storage. A massive LED board in the skylight atrium shows New York City-centric visuals to create a more relaxed commuter environment.[52] Many of these displays are VMS-enabled providing real-time information.

Ticketing kiosks for Amtrak, as well as ticket vending machines for LIRR and AirTrain are present throughout.

[52] ANC Adds LED Displays In New York's Moynihan Train Hall | ANC

Intermodal Connectivity

Moynihan Train Hall offers connections to multiple modes of transportation including:[53]

- Amtrak service north to Boston, Vermont, Albany, and Montreal; west to Buffalo, Toronto, and Chicago; and south to Philadelphia, Washington, DC, and Florida;
- Long Island Rail Road service to all points east;
- connections via the lower concourse or above ground via W. 33rd Street to New York City Subway service (A,C,E line and 1,2,3 line);
- NJ TRANSIT commuter rail via Penn Station;
- dedicated taxi pick-up points available at both W. 31st Street and 8th Avenue;
- dedicated ride share (Uber/Lyft) drop-off and pick-up points situated along W. 33rd Street between 8th and 9th Avenues;
- CitiBike dock located outside of the entrance on the corner of W. 33rd Street and 8th Avenue; and,
- local NYCT bus service available on surface streets at W. 34th Street and 9th Avenue.

Organized Transportation Components

Moynihan Train Hall provides direct access to 17 of Penn Station's 21 tracks. Platforms serving the southernmost four tracks, used by NJ TRANSIT, could not be extended into Moynihan Train Hall. In combination, Moynihan Train Hall and Penn Station create a sizeable footprint to navigate. Transitioning from the rail platforms requires an ascent up an escalator or elevator into the main train hall or a walk up the West End Concourse stairs followed by a long walk through Penn Station. Passengers connecting from rail to subway or bus require movements up vertical circulation elements, and then a long walk through the terminal or outside to access the subway or closest bus stops. The old LIRR passenger facilities in Penn Station and the NJ TRANSIT waiting area are closer and provide an indoor connection to the adjoining NYCT subway stations at 7th and 8th Avenues, respectively.

As an urban core train station, access modes to Moynihan Train Hall and Penn Station skew heavily toward walking, taxi/for-hire, and transfers to other transit services. Passenger demand for off-street parking in the vicinity of the station is considered to be negligible, and parking facilities are therefore not considered a factor in the station's design and operation. Off-street parking facilities are located on W. 31st and W. 33rd Streets between 8th and 9th Avenues, respectively.

[53] Transportation - Moynihan Train Hall NYC

Summary

Moynihan Train Hall is included in this review due to Penn Station's regional importance as well as it being the busiest rail station in the country. While the lessons learned from this project may not be known at this time, this transformative project successfully utilizes state-of-the-art wayfinding, information displays, and amenities to improve the overall customer experience. The modern amenities, natural lighting, spacious layout, and architectural detail of the Moynihan Train Hall stand in stark contrast to the dark, enclosed, subterranean environment of Penn Station. Overall, Moynihan Train Hall provides an attractive alternative to Penn Station for Amtrak and LIRR customers. Geographically, the facility has the potential to become a transit anchor for Hudson Yards and the Midtown West neighborhood. Drawbacks of Moynihan are the lack of direct access to NJ TRANSIT or the NYCT A,C,E and 1,2,3 subway lines which are currently served by Penn Station. Some, however, may argue that the project represents an aesthetic investment without operational improvements given the lack of ability to add additional platforms to increase efficiency and train service. The large footprint of the facility also requires long walks if connecting to the above-mentioned services or local bus service.

Credit: U.S. Department of Transportation

3.0 Comparable Projects/Facilities Matrix

Each of the projects/facilities reviewed in this document is summarized in the accompanying matrix. The matrix provides an overview of branding, accessibility, intermodal connectivity, passenger technology, and customer experience and also notes strengths and weaknesses of each facility. The matrix is intended to summarize the common elements and the strengths and weaknesses of each project/facility.

Anaheim Regional Transportation Intermodal Center

Moynihan Train Hall – Penn Station

Bradley International Airport

Raleigh Union Station

Denver Union Station

Entity	Brand Identity	Access and Movement	Customer Experience: Public Realm	Customer Experience: Amenities, incl. Retail Commercial Development	Customer Experience: Wayfinding and Signage	Passenger Technology	Intermodal Connectivity	Organized Transportation Components	Strengths	Weaknesses
Bradley International Airport (CT)	Launched its new brand "Love the Journey" in 2016, and has since established it as a very strong brand identity New England's second-busiest airport (after Boston) Nominated in 2021 as best small airport in the country	Terminal map is available online, one central check-in area and two branches with gate access. Parking and ground transportation is on site Well defined parking and drop off maps.	Modern and accessible, with very high ceilings and spacious terminals	Free Wi-Fi Nursing Room Many retail and food options Fully accessible parking, pick up/drop off, and restrooms	Wayfinding appears to be excellent, with easy to read maps and signage	Free Wi-Fi throughout airport Electric/charging outlets	30-Bradley Flyer connects the airport to downtown Hartford Train station connecting to Vermont, Springfield, MA, Hartford, and New Haven	Compact footprint with one terminal building Pick-up and drop-off routes, as well as TNC locations clearly marked and defined Car rentals accessible through shuttle service	Easy on-site parking that is close to the terminal Measure of convenience and ease offered to attract customers Airport is clean, modern, and spacious, providing an efficient customer experience	Rental cars are not located directly on-site Limited public transit options
Anaheim Regional Transportation Intermodal Center (CA)	Branded as "ARTIC" and part of a larger complex titled ocV!BE, a planned $3 billion mixed-use 95-acre live entertainment district. Plans include a large sports arena, 6,000 person concert venue, office space, 1,500 residential units, riverfront park, 230k sq ft of retail, two hotels, and 8,700 parking spaces.	Current parking lot is on opposite end of train platform (1/4-mile walk from front of lot to train platform) Bus bays surrounding station on both sides	Features public art and tremendous natural light Colorful lights illuminate building at night Platinum LEED certified 20% energy from solar panels 120-foot glass wall, 67,000 square foot interior	Very little retail or restaurants Free Wi-Fi Plans to greatly expand retail and restaurants as ocV!BE is built in the next few years and passenger flow increases	Expansive station with well-featured and large lettered signage	Wi-Fi Electric/charging outlets	Connections to: Amtrak (Pacific Surfliner) to San Diego and San Luis Obispo Metrolink to Oceanside and Los Angeles Orange County bus network Intercity and international bus (Greyhound, Megabus, FlixBus, Tres Estrellas de Oro)	Significant distance between parking area, terminal, and rail platforms Inefficient bus to rail transfers	Some consider building to be beautiful public art	Some consider massive building to be an eyesore Expansive space necessitates long walks between parking and transit Originally estimated 10,000 daily riders; pre-COVID ridership between 4,200 and 5,500 for all modes
Raleigh Union Station (NC)	Heavy focus on "Raleigh" branding, but not much in the way of brand identity for the station itself	Long walk from station to train platform	Modern architecture fits in with warehouse district surroundings, outdoor civic plaza Green infrastructure, including green roof, energy efficient radiant heating	Abundance of indoor seating Ticket agents Attractive event space to host weddings, meetings, and galas up to 400 people; commercial space Food vending machines, space available for restaurants	Easy to navigate Clear signs	Electric/charging outlets	Amtrak south to Charlotte), Florida, and New York Two city bus routes GoTriangle plans to build a bus terminal next to station	Bike racks and storage Convenient drop off- Good access for rail Future connection to RUS Bus facility will be across the street from the rail station	Station serves not only as an Amtrak station but a gathering space with an attractive interior, natural light, and modern architecture Will serve as a future multimodal station with planned commuter rail and bus hub	Lacks intermodal connectivity Only short-term parking available at station (long-term across the street)

Entity	Brand Identity	Access and Movement	Customer Experience: Public Realm	Customer Experience: Amenities, incl. Retail Commercial Development	Customer Experience: Wayfinding and Signage	Passenger Technology	Intermodal Connectivity	Organized Transportation Components	Strengths	Weaknesses
Denver Union Station (CO)	Strong brand identity, as Union Station is an historic building that has been rehabilitated Redevelopment includes several public spaces, including Wynkoop Plaza, 17th Street Promenade/Gardens, the Wewatta Pavilion, and the Light Rail Plaza	Light rail and Amtrak platforms are at opposite ends of the bus concourse.	Spacious indoor space outdoor plazas with landscaping, fountains, seating	Ticketing kiosks Signage Lighting Free Wi-Fi 24-hour Security Various retail establishments and a hotel	Bus concourse doubles as pedestrian concourse to trains Website has several maps of station layout and bus concourse	Heated bus ramps LED public realm lighting Electric/charging outlets Free Wi-Fi	Connections to: Local light rail lines Commuter rail lines including one to the Denver Airport Local and intercity buses Downtown circulator Amtrak service to San Francisco Bay area, Chicago, and intermediate points; seasonal ski train to resorts in the Rockies	Efficient connections to bus and light rail services Transfers between commuter rail and bus/LRT services are more distant and on different levels	Brand identity - the building is historic and its redevelopment has contributed to placemaking in Downtown Denver Redevelopment has attracted more development around the station. Although below ground, bus concourse is described as bright and airy.	Inefficient connections between commuter rail or Amtrak and bus or light rail
Moynihan Train Hall/Penn Station (NY)	Strong brand identity, especially with station opening during pandemic. Much of the marketing is focused on "bringing NYC back" Identity also focuses on the contrast with NY Penn station, which is seen as crowded, dirty, and unorganized. Moynihan is new, sleek, and classy	NJ TRANSIT is not directly accessible to Moynihan, nor are the 7th Ave. subways To reach Penn Station, customers must either go outside or navigate through underground hallways	New construction with tremendous natural lighting Feeling of a grand historic European train station Historic restoration of old post office building Numerous architectural feats and public art displays	120,000 sq of shops and restaurants Goal of station is to be a retail center as well as transit station Will feature three signature restaurants and food hall, as well as high-end retail Seating, electric charging outlets Ticket kiosks, customer service stations, and baggage assistance	Train platforms are clearly marked and visible from nearly all points in the station Signage utilizes large font and is accessible from nearly all viewing points Smaller information boards located across station footprint Elevator access to all platforms State of the art wayfinding via LED and LCD displays and messaging	Free Wi-Fi LED/LCD displays Electric/Charging outlets Luggage storage	Amtrak service north to Boston, Vermont, Albany, and Montreal. West to Buffalo, Toronto, and Chicago. South to Philadelphia, Washington DC, and Florida LIRR--all points east	Facility has a large footprint Taxi drop-off and pick-up at 31st St. and 8th Ave. Dedicated TNC drop-off areas	Modern amenities, strong branding, excellent wayfinding Enhanced ADA accessibility Attractive station building with provisions for numerous retail options Provides alternative to Penn Station for Amtrak and LIRR customers	Does not offer access to NJ TRANSIT or 1,2,3 subways (served by Penn Station) Large station necessitates long walks

4.0 Conclusion

This document has been prepared to assess how comparable state-of-the-art multimodal projects created an overall brand identity, established visual and physical connectivity between various modes of transportation, provided clarity of access and movement, enhanced the overall customer experience, and organized the transportation components. It also identifies trends and considerations with the goal of potentially incorporating the more successful aspects of each to inform the STC 2020 Master Plan. The projects that are identified as having been most successful in the areas of brand identity, customer service experience (public realm and placemaking, amenities, wayfinding and signage), passenger technology, intermodal connectivity and organized transportation components are featured below.

Brand Identity

All of the assessed projects/facilities possess some degree of brand identity. Even a facility such as Raleigh Union Station, which does not have a station-specific logo or strong brand identity for the station itself, incorporates "Raleigh" destination branding through signage and public art installations. Moreover, the facility houses a number of commercial businesses and is used for special events which solidifies its tie to the "Raleigh" brand. On balance, Bradley International Airport, Moynihan Train Hall, and Denver Union Station are the three facilities that have the strongest branding of the projects/facilities assessed.

The Moynihan branding is successfully incorporated on digital schedule boards and displays, on interior and exterior signage, and within the physical infrastructure of the building. The brand identity is executed in a well-balanced manner that both educates visitors and commuters, and also familiarizes the public with a brand that will be a centerpiece of the New York City's transit infrastructure for future generations.[54] The station-specific logo for Denver Union Station is not incorporated to a large extent within the physical infrastructure of the station as it is at Moynihan Train Hall. However, the rehabilitation of Denver Union Station and corresponding brand identity has successfully contributed to placemaking and anchored the in-fill redevelopment that has occurred in the surrounding neighborhood. The success of Bradley's brand identity is not based as much on physical terminal branding as it is customer-focused and centered on the ease of the airport travel experience.

Customer Experience

Public Realm and Placemaking

Public realm and placemaking elements are successfully integrated in meaningful ways through facility architecture at ARTIC and Moynihan Train Hall and the incorporation of civic space at Raleigh Union Station and Denver Union Station. The plazas and outdoor public art installations at the respective stations help to create an urban gathering space and attract both passengers and the general public. While Moynihan Train Hall and ARTIC do not offer civic plazas like at

[54] http://gdusa.com/news/fresh/moynihan-train-hall-branded-as-gateway

Denver Union Station or Raleigh Union Station, there is an impressive scale to the facilities and an openness when walking through them. ARTIC's iconic design creates an airy main hall with a large amount of natural light. The structure is highly visible from surrounding areas and the open design of the facility provides the feeling of a grand public space. At Moynihan Train Hall, the skylight trestles create an atrium-like quality providing an abundance of daylight, while numerous public art installations offer a civic feel.

Amenities

All of the projects/facilities assessed feature varying degrees of passenger amenities such as passenger seating areas, ticketing kiosks, and restrooms. While ARTIC has space to accommodate retail and restaurants, there are currently no retail presence and limited dining options. Similarly, Raleigh Union Station has space for dining concessionaires but currently there is no in-station dining presence with only vending machines present. One of Raleigh Union Station's key amenities is its rentable event space and commercial presence which brings non-transit foot traffic to a station people may not have otherwise ventured to. Denver Union Station also succeeds in attracting non-transit users as it integrates a diverse set of uses within its footprint from transit and shopping to a hotel, restaurants, and public plazas. A major amenity at Bradley International Airport is the proximity of the parking deck to the terminal while retail as well as an array of dining options and other amenities are intended to provide an efficient customer experience at the airport. Both Moynihan Train Hall and Bradley International Airport feature premium passenger lounges. Ultimately, Moynihan Train Hall will include 120,000 square feet of retail and dining including a food hall and three signature restaurants.

Wayfinding and Signage

Wayfinding is present in all of the projects/facilities that were assessed via overhead signage, large-lettered signs above ticket windows and other major facility elements. Bradley International Airport, Denver Union Station and Moynihan Train Hall also feature easy to read directional maps that are either available online or posted within the facilities. The recently-completed Moynihan Train Hall provides exceptional wayfinding. There is visible and consistent wayfinding throughout the facility via LED and LCD displays, many of which are VMS-enabled providing real-time information. Major elements of the Train Hall are marked with electronic signage, while signage and displays adjacent to track escalators clearly differentiate the tracks. While there is not a large schedule board like at ARTIC, there are multiple monitors in a number of configurations throughout the facility.

Passenger Technology

Each of the assessed projects/facilities incorporates power and charging outlets. Except for Raleigh Union Station, all of the facilities offer complimentary Wi-Fi. Similar to wayfinding, as the newest of the facilities assessed, Moynihan Train Hall incorporates the greatest amount of current passenger technology as compared to the other facilities. The Train Hall features digital video screens that feature important updates for passengers. These LED/LCD displays are located throughout the terminal, near elevators, escalators, and luggage storage. Many of these displays are VMS-enabled providing real-time information.

Intermodal Connectivity

All of the assessed projects/facilities provide some level of intermodal connectivity. However, Bradley International Airport and Raleigh Union Station offer very limited public transit connections. At ARTIC, ART's ARTIC Sports Complex Line shuttle reaches multiple destinations from a consolidated shuttle route. The presence of the shuttle at ARTIC is a differentiator for this facility as it eliminates the need for competing shuttles serving nearby destinations.

Organized Transportation Components

The five projects/facilities assessed all serve different markets with varying transit modes. As a result, they are organized differently with respect to their transportation components. Bradley International Airport has a relatively compact footprint and is focused on parking with the parking garage located approximately 150 feet from the terminal. While the underground concourse at Denver Union Station provides seamless passenger transfers between bus facilities and the light rail connection located at the west end of the concourse. However, transfers between light rail and commuter rail require an approximately 1,000-foot walk through the underground concourse and an ascent up an escalator or elevator to the rail level. Similarly at ARTIC, passengers connecting from rail to bus, and vice versa, require movements up and down vertical circulation elements followed by a long walk through the terminal or alongside the building to access bus boarding areas. Raleigh Union Station offers little intermodal connectivity but the station is well organized from a rail perspective. Both Denver Union Station and Moynihan Train Hall are situated in downtown urban environments and on-site parking was not considered in their design and operation.

APPENDIX I

Summary of Development Projects

Stamford Transportation Center Master Plan

Summary of Development Projects

Connecticut Department of Transportation
State Project No. 301-0512

NOVEMBER 2022

PREPARED FOR

Connecticut Department of Transportation - Office of Rail
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List of Figures

1.0 Introduction

As part of the Stamford Transportation Center (STC) Master Plan, the Connecticut Department of Transportation (CTDOT) commissioned a review, evaluation, and summary of local, City, and CTDOT projects recently completed, under construction, planned, or proposed around the STC site. Specifically, those projects within approximately one-quarter mile of the study area, which constitutes an approximately five-minute walk and is generally considered to be a reasonable walking distance for purposes of planning studies, were identified (see Appendix A).

The purpose of this memorandum is to convey an understanding of the identified projects and the general operational impacts, both positive and negative, that they may pose on the study area and recommendations for the STC. For each identified project, to the extent such information was available, the following information was compiled:

- Site location
- Building use
- Development program
- Site access and circulation
- Parking

If not otherwise cited, project information and images were gathered from the City of Stamford's Current Developments Map, which includes residential projects with more than 20 dwelling units as well as commercial projects.[1] Site access and circulation descriptions are based on recent aerial views. Traffic volume projections and site plan diagrams were requested from the City of Stamford for all identified projects and referenced where provided.

1.1 Recently Completed Projects

The following projects have been completed since 2010:

1. 75 Tresser
2. 111 Harbor Point
3. Atlantic Station
4. Atlantic Station West
5. Key at Yale and Towne
6. Metro Green Phase II
7. Metro Green Phase III

[1] https://www.choosestamford.com/data-center/current-developments-map

8. Charter Communications World HQ

1.2 Projects Under Construction

The following project is currently under construction as of the date of this report:

1. Stamford Station Parking Garage
2. 287-297 Washington Blvd

1.3 Planned Projects

The following projects have received the necessary approvals to proceed and are in the planning and/or design phase, but are not yet under construction as of the date of this report:

1. 553 Pacific Street
2. 583 Pacific Street
3. Metro Tower
4. RBS-Clinton Ave

1.4 Proposed Projects

The following projects have been proposed, but are not currently approved as of the date of this report:

1. 677-707 Washington Blvd

2.0 Completed Projects

This section provides a summary of those projects that have been completed since 2010. Since these projects have been completed, the summaries do not include a discussion of the future traffic projections, if provided, as such trips are already accounted for within the existing street network.

2.1 75 Tresser

Completed in May 2014 and owned by Waterton Residential, 75 Tresser is a five-story, mixed-use building containing 344 rental units and 5,120 square feet (SF) of retail. Ten percent of the units are affordable, in accordance with the City of Stamford's inclusionary zoning regulations.[2] The building has a parking garage and extensive amenities, including a pool and fitness studio.

The development is located at 75 Tresser Boulevard in downtown Stamford. The development is bounded by Tresser Boulevard to the north, Washington Boulevard to the east, and Clinton Avenue to the west. Based on recent aerial views, residential access to the building is available on all three street frontages. The retail space primarily fronts Washington Boulevard. The parking garage can be accessed via a midblock entrance on Tresser Boulevard as well as via midblock driveways on Washington Boulevard and Clinton Avenue, at the rear of the building.

Figure 1: 75 Tresser

[2] https://www.stamfordadvocate.com/local/article/Stamford-affordable-housing-program-opens-doors-7963577.php

2.2 111 Harbor Point

111 Harbor Point is part of the Harbor Point Development, a multi-phase, mixed-use project encompassing approximately 100 acres of former industrial land in the South End. The development consists of 4,000 rental units as well as hotel, retail, and office space.[3]

Formerly owned by BLT, 111 Harbor Point was acquired by GAIA Real Estate and four institutional partners in 2016.[4] Completed in 2012, the building contains 228 rental units and extensive amenities, including covered parking.

It is located at 111 Towne Street, between Pacific and Lock Streets, and advertised as "just steps from the Metro-North and Amtrak train station."[5] BLT operates a free trolley that connects Harbor Point to the STC and downtown Stamford.

Based on recent aerial views, the primary building entrance is located at the intersection of Towne Street and Lock Street. Residential access to the building is also available on the Lock Street and Towne Street frontages and along the pedestrian path at the rear of the building. Roll-down gates and curb cuts are located on Pacific Street.

Figure 2: 111 Harbor Point

[3] https://portal.ct.gov/DECD/Content/Community-Development/05_Sucess_Stories/Harbor-Point---Stamford

[4] https://www.stamfordadvocate.com/business/article/Stamford-Harbor-Point-apartment-buildings-sell-10789830.php

[5] https://www.111harborpoint.com/

2.3 Atlantic Station

Owned by RXR Realty and the Cappelli Organization, Atlantic Station is a two-phase project, the first of which was completed in February 2018. The 26-story, mixed-use building contains 325 rental units and 17,000 SF of retail. The building has 321 indoor parking spaces as well as extensive amenities, including a pool and fitness center.[6]

It is located at 355 Atlantic Street in downtown Stamford, at the southwest corner of Tresser Boulevard and Atlantic Street, and advertised as, "Minutes to Stamford Station."[7]

Based on recent aerial views, the retail space fronts Atlantic Street and Tresser Boulevard, with access on Atlantic Street. Roll-down gates and curb cuts are also located on Tresser Boulevard. The parking garage can be accessed via midblock driveways on Atlantic Street and Tresser Boulevard, at the rear of the building.

Figure 3: Atlantic Station

[6] https://patch.com/connecticut/stamford/rxr-realty-hosts-grand-opening-stamfords-atlantic-station

[7] https://as.atlanticstationstamford.com/amenities

2.4 Atlantic Station West

Owned by RXR Realty and the Cappelli Organization, Atlantic Station West is the second phase of the Atlantic Station project. Completed in the summer of 2021, the 26-story, mixed-used building contains a total of 325 rental units and 14,000 SF of retail space. The building has extensive amenities, including a pool and fitness center. This phase of the project also includes construction of a 534-space structured parking garage and renovation of the former US Post Office located at 421 Atlantic Street to accommodate approximately 34,000 SF of retail.[8]

Located at 405 Atlantic Street in downtown Stamford, the new building is accessed midblock, between the first Atlantic Station tower to the north and the renovated former US Post Office to the south. Recent aerial views show that the building is also accessible via Federal Street to the south.

Figure 4: Atlantic Station West

[8] https://www.multihousingnews.com/post/rxr-realty-scores-98m-loan-for-luxury-connecticut-project/

2.5 The Key at Yale and Towne

The Key at Yale and Towne is part of the Harbor Point Development, a multi-phase, mixed-use project encompassing approximately 100 acres of former industrial land in the South End. The development consists of 4,000 rental units as well as hotel, retail, and office space.[9]

Formerly owned by BLT, the Key at Yale and Towne was acquired by GAIA Real Estate and four institutional partners in 2016.[10] Completed in 2013, the building contains 107 rental units and extensive amenities, including a parking garage.

It is located at 110 Towne Street, between Pacific and Lock Streets, and advertised as "walking distance to the Stamford Train Station."[11] BLT operates a free trolley that connects Harbor Point to the STC and downtown Stamford.

Based on recent aerial views, the primary building entrance is located at the intersection of Towne Street and Lock Street. The parking garage can be accessed on Market Street. Roll-down gates and curb cuts are located on Pacific Street.

Figure 5: The Key at Yale and Towne

[9] https://portal.ct.gov/DECD/Content/Community-Development/05_Sucess_Stories/Harbor-Point---Stamford

[10] https://www.stamfordadvocate.com/business/article/Stamford-Harbor-Point-apartment-buildings-sell-10789830.php

[11] https://www.thekeystamford.com/

2.6 Metro Green Phase II

Owned by Jonathan Rose Companies and Malkin Properties, Metro Green is a four-phase project, the second of which was completed in 2011. Also known as Metro Green Residences, the seven-story building contains a total of 50 rental units, of which 40 are affordable and 10 are market-rate.[12] A shared parking garage, with approximately 300 spaces, services the entire Metro Green project and is accessed via Metro Green Terrace.

Located at 717 Atlantic Street, near Henry Street, the development shares the block with the STC parking garage. It is advertised as a "commuter's dream."[13] Based on recent aerial views, the building is accessible via a main entrance on Atlantic Street. Retail space is accessible at the corner of Atlantic Street and Henry Street.

Figure 6: Metro Green Phase II

[12] https://www.stamfordadvocate.com/business/article/Metro-Green-sees-brisk-demand-for-new-apartments-12321198.php

[13] https://rosecommunity.com/apartments/metro-green-residences/

2.7 Metro Green Phase III

Owned by Jonathan Rose Companies and Malkin Properties, Metro Green is a four-phase project, the third of which was completed in October 2017. Also known as Metro Green Terrace, the 11-story building contains a total of 131 rental units, of which 73 are affordable and 58 are market-rate.[14] Amenities include a private courtyard for tenant use and a public plaza. A shared parking garage, with approximately 300 spaces, services the entire Metro Green project and is accessed via Metro Green Terrace.

Located at 695 Atlantic Street, near Henry Street, the development shares the block with the STC parking garage. It is advertised as a "commuter's dream."[15] Based on recent aerial views, the building is accessible via a main entrance on Atlantic Street. The shared parking garage for the Metro Green project is also accessible via Atlantic Street.

Figure 7: Metro Green Phase III

[14] https://westfaironline.com/95071/metro-green-terrace-latest-addition-to-stamford-residential-scene/

[15] https://www.metrogreenterrace.com/

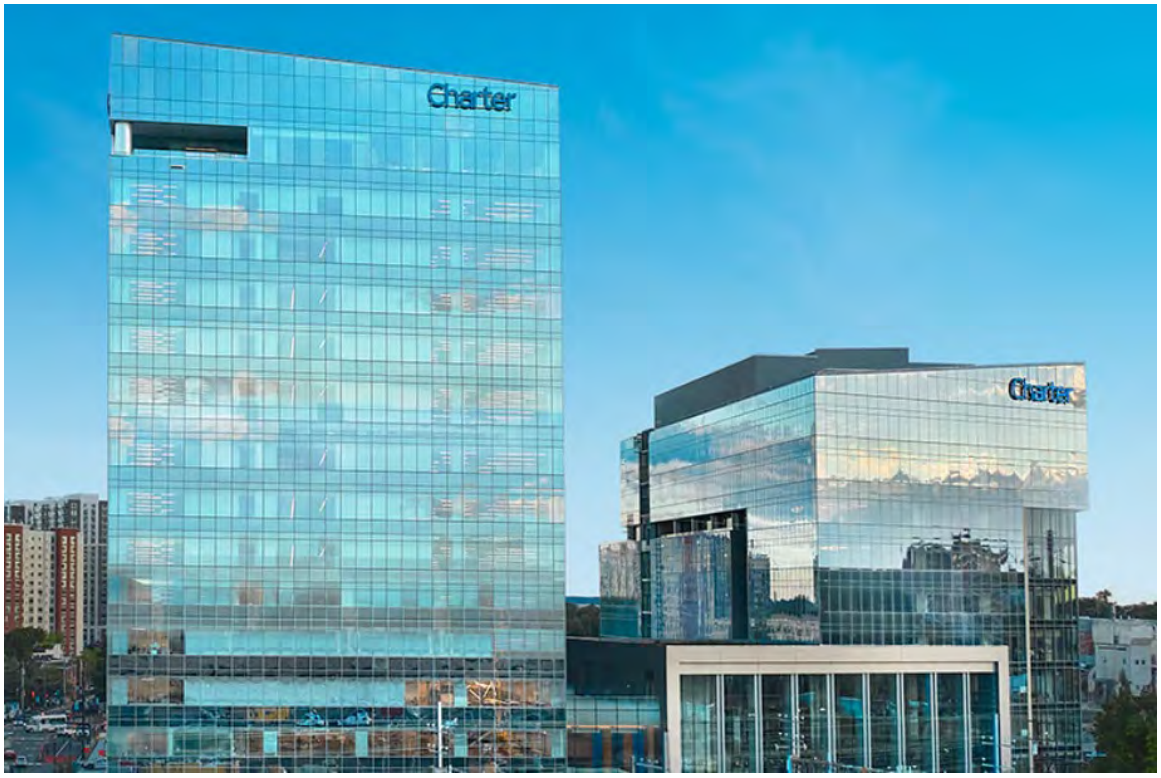
2.8 Charter Communications World HQ

In June of 2022, Charter Communications officially marked the opening of its new headquarters in downtown Stamford. Located at 406 Washington Boulevard, Charter's new headquarters was developed by BLT. The development site, also known as the Gateway parking garage site, had been occupied by a four-story, 950-space parking garage. Situated just south of Interstate 95, a first building of 14 stories and approximately 500,000 SF opened in March of 2021. A second building of nine stories as well as a three-story connecting structure opened in June of 2022, bringing Charter's headquarters campus to approximately 900,000 SF. Work continues on a 250-seat auditorium set to open late summer of 2022 and an outdoor amphitheater scheduled to open in the fall of 2022.[16] Charter's headquarters contains a total of 2,010 parking spaces.

Primary vehicular access to the site is provided by driveways on Washington Boulevard and Pulaski Street with pedestrian access provided on Washington Street. Charter's new headquarters also has a direct connection to/from the STC via a pedestrian bridge.

According to the Traffic Impact Study for the site, dated February 2019, the additional office development at the Gateway parking garage site will generate a total of 284 additional vehicle trips during the weekday morning peak hour and up to 299 additional vehicle trips during the weekday afternoon peak hour. The study concluded that the future traffic volume projections will not have a significant impact on traffic provided that recommended improvements to the local street network be implemented.

Figure 8: Charter Communications World HQ[17]



[16] https://corporate.charter.com/newsroom/charter-officially-opens-corporate-headquarters-in-stamford-ct

[17] Image source: https://corporate.charter.com/newsroom/charter-officially-opens-corporate-headquarters-in-stamford-ct

3.0 Projects Under Construction

This section provides a summary of those projects that are currently under construction.

3.1 Stamford Station Parking Garage

CTDOT, under State Project No. 301-0047, has begun construction of a new seven-level, 928-space commuter parking garage for the STC. The project site is bounded to the north by I-95, to the south by the Metro-North Railroad right-of-way, to the east by Washington Boulevard, and to the west by the Rippowam River. Prior to commencement of construction, the project site had been partially occupied by a surface parking lot for the STC.

Drivers will access the parking garage via South State Street. There will be a pedestrian ramp from Level 2 to the Track 5 platform as well as a 320-foot glass-enclosed pedestrian bridge from Level 4 over Washington Boulevard to the station headhouse. A sheltered storage zone for approximately 100 bicycles will also be provided.

A Traffic Impact Study was completed for this project in March 2019. It showed that the garage is likely to generate fewer than 100 new peak hour trips on the study area network, based on the documented assumptions for redistribution of traffic from existing parking facilities. The impact of the new trips and the redistributed trips is anticipated to reduce the level of service (LOS) at some study area intersections. The required mitigation for these impacts consists of optimizing signal timing splits for the afternoon peak hour at the intersection of South State Street and Washington Boulevard only.

CTDOT intends to close and demolish the original section of the existing parking garage located on Station Place following completion of the new garage.

Figure 9: Stamford Station Parking Garage

3.2 287-297 Washington Blvd

Hardy Properties & HDF have proposed to construct a new 22-unit, below market rate (BMR) development at 287-297 Washington Boulevard. No further information about the development program, site access and circulation, or future traffic volume projections was provided by the City of Stamford for this project.

Figure 10: 287-297 Washington Blvd

4.0 Planned Projects

This section provides a summary of those projects that have received the necessary approvals to proceed and are in the planning and/or design phase, but not yet under construction.

4.1 553 Pacific Street

The City of Stamford has approved a 32-unit residential development at 553 Pacific Street. No further information about the development program, site access and circulation, or future traffic volume projections was provided by the City of Stamford for this project.

Figure 11: 553 Pacific Street

4.2 583 Pacific Street

The City of Stamford has approved a 20,205 square foot (SF) office development at 583 Pacific Street. According to the Traffic Impact Study for this project, dated June 2018, the development site currently contains a two-story building and 20 parking spaces. The planned project will remove a portion of the existing building and add three stories of office space to the development site as well as ground-level parking. There will be a total of 32 parking spaces provided on the development site in the future with access available via a new single driveway on Pacific Street. The study concluded that the traffic generated by the development site can be adequately handled on the surrounding roadway and motorists and the study intersections are expected to continue to experience good operations with overall Level of Service (LOS) C or better during weekday morning and weekday afternoon peak hours.

Figure 12: 583 Pacific Street

4.3 Metro Tower

Malkin Holdings (via the Empire State Realty Trust) has received approval to construct a 17-story, 385,000 SF office building on Station Place in downtown Stamford, adjacent to the STC. No further information about the development program, site access and circulation, or future traffic volume projections was provided by the City of Stamford for this project.

Figure 13: Metro Tower

4.4 RBS-Clinton Ave

RBS Americas Property Corp. received approval to construct a new 456-unit residential development at Division Street and Clinton Avenue. No further information about the development program, site access and circulation, or future traffic volume projections was provided by the City of Stamford for this project.

Figure 14: RBS-Clinton Ave

5.0 Proposed Projects

This section provides a summary of those projects that have been proposed but are not currently approved.

5.1 677-707 Washington Blvd

Stamford Washington LLC has proposed to construct a new 406-unit development with and ground floor retail at 677-707 Washington Boulevard. The development site formerly contained approximately 700,000 of vacant office space.[18] No further information about the development program, site access and circulation, or future traffic volume projections was provided by the City of Stamford for this project.

Figure 15: 677-707 Washington Blvd

[18] https://www.stamfordadvocate.com/business/article/Business-experts-weigh-impact-of-Stamford-Amazon-12294066.php

6.0 Findings

This summary identified 15 development projects that are located within a quarter-mile radius (or approximately a five-minute walk) of the Stamford Transportation Center and have either been recently completed, under construction, planned, or proposed. The identified projects encompass a total of approximately 2,486 residential units and over 1.37 million SF of commercial development.

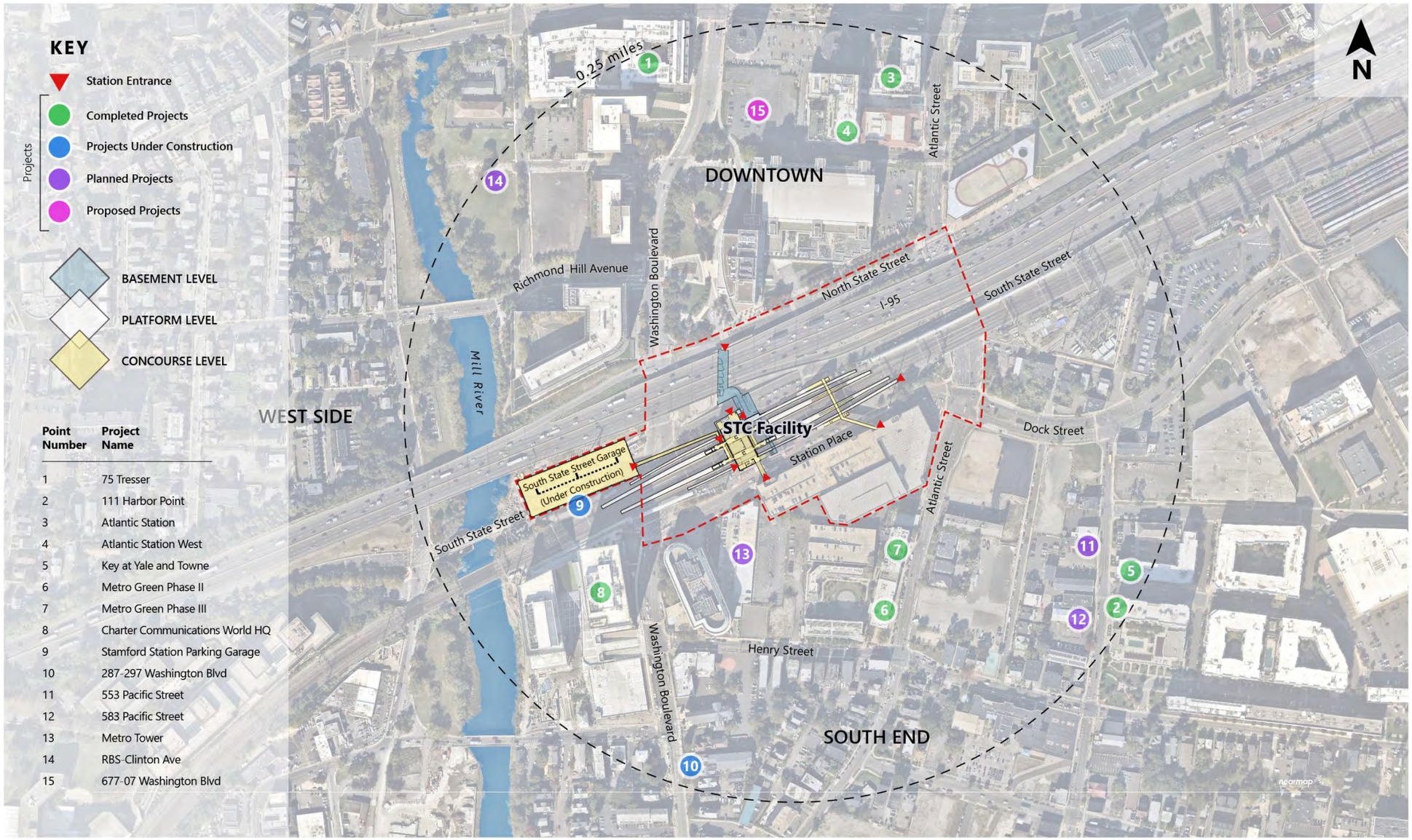
The identified projects align with recent development trends within the City of Stamford. The South End has gained more than 4,000 new rental apartments over the past 13 years, the vast majority of which are in the Harbor Point Development.[19] Downtown Stamford has also seen major new residential developments (e.g., 75 Tresser and Atlantic Station). Marketing materials for the new residential developments in the South End and Downtown Stamford highlight their proximity to the STC, which provides a quick access to jobs and services in New York City and beyond. Pedestrian infrastructure improvements would allow new residents to walk the short distance safely and conveniently between their homes and the STC. Improvements to bicycle infrastructure, bus and shuttle connections, and TNC operations would further enhance access to the STC for residents of the immediately surrounding area.

In addition to new residential developments, a major new office building has opened to the immediate west of the Stamford Transportation Center, and another is planned (the Charter Spectrum HQ and the Metro Tower, respectively). Improving connections between the STC and nearby places of employment would further enhance access for area employees and visitors.

[19] https://www.nytimes.com/2022/01/12/realestate/living-stamford-ct-south-end.html

Appendix A: Location of Development Projects Within a Quarter Mile of the Stamford Transportation Center

Location of Development Projects Within a Quarter Mile of the Stamford Transportation Center



Point Number	Project Name
1	75 Tresser
2	111 Harbor Point
3	Atlantic Station
4	Atlantic Station West
5	Key at Yale and Towne
6	Metro Green Phase II
7	Metro Green Phase III
8	Charter Communications World HQ
9	Stamford Station Parking Garage
10	287-297 Washington Blvd
11	553 Pacific Street
12	583 Pacific Street
13	Metro Tower
14	RBS-Clinton Ave
15	677-07 Washington Blvd

STAMFORD TRANSPORTATION CENTER MASTER PLAN

STC PROJECT BASE PLANS | PROJECT SITES

0 200 400 800

Appendix B: Summary of Development Projects Within a Quarter Mile of the Stamford Transportation Center

Summary of Development Projects Within a Quarter Mile of the Stamford Transportation Center

Project No.	Project Status	Project Name	Address	Residential Units	Commercial (SF)	Parking Provided
1	Completed	75 Tresser	75 Tresser Blvd.	344	5,120	Yes
2	Completed	111 Harbor Point	111 Towne Street	288	0	Yes
3	Completed	Atlantic Station	355 Atlantic Street	325	17,000	321 spaces
4	Completed	Atlantic Station West	405 Atlantic Street	325	48,000	534 spaces
5	Completed	Key at Yale and Towne	110 Towne Street	107	0	Yes
6	Completed	Metro Green Phase II	717 Atlantic Street	50	Yes	Yes
7	Completed	Metro Green Phase III	695 Atlantic Street	131	0	302 spaces
8	Completed	Charter Communications World HQ	406 Washington Blvd.	0	900,000	2,010 spaces
9	Construction	Stamford Station Parking Garage	Station Place	0	0	928 spaces
10	Construction	287-297 Washington Blvd	287-297 Washington Blvd.	22	0	-
11	Planned	553 Pacific Street	553 Pacific Street	32	-	-
12	Planned	583 Pacific Street	583 Pacific Street	0	20,205	32 spaces
13	Planned	Metro Tower	Station Place	0	385,000	-
14	Planned	RBS-Clinton Ave	Division St. & Clinton Ave.	456	-	-
15	Proposed	677-707 Washington Blvd	677-07 Washington Blvd.	406	Yes	-