8. LOCALLY PREFERRED ALTERNATIVES

As detailed in Chapter 7, a range of concept alternatives were developed and evaluated in detail to identify the Locally Preferred Alternative (LPA). Alternatives were developed and organized into three categories: through truck diversion alternatives, corridor alternatives, and central intersection (the intersection of Route 440/Routes 1&9T/Communipaw Avenue) alternatives.

The evaluation process identified a single preferred alternative under the corridor and central intersection categories (Figure 8.1). Four potential preferred alternatives were identified for the through truck diversion category. The through truck diversion preferred alternatives will require additional conceptual design and evaluation subsequent to the conclusion of this study.

Figure 8.1: Primary Investigation Area

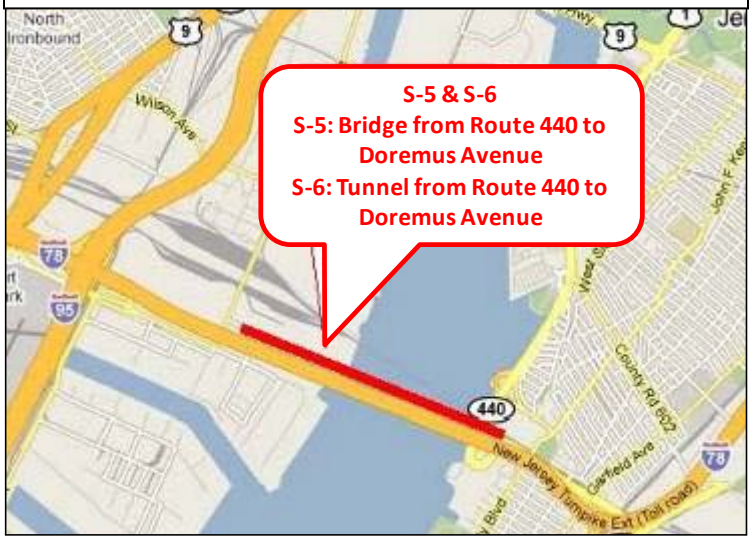
8.1 Recommendation of Heavy Through Truck Diversion Preferred Alternatives

Of the twenty four heavy through truck diversion alternatives identified (section 6), four were determined to provide sufficient benefit and support of the project purpose and need to warrant advancement into detailed evaluation and design (section 7).

8.1.1 Alternatives S-5 and S-6

Alternatives S-5 and S-6 (Figure 8.2) are identical in purpose but differ in the form of their construction. Both alternatives provide a direct connection from Route 440 in the City of Bayonne to Doremus Avenue in the City of Newark. Of the four alternatives evaluated (section 7), Alternative S-5 received the highest score (448 of a possible 1,000 points) and is ranked as the most beneficial alternative with respect to meeting the purpose and need and the objectives of the Master Plan. While providing benefit, Alternative S-6 received the lowest score (273 of a possible 1,000 points) and is ranked fourth out of the four alternatives. The difference in the level of benefit provided results from the difference in configuration between the two alternatives.

Figure 8.2: Through Truck Diversion Alternatives S-5 and S-6



Alternative S-5 constructs a new bridge over Newark Bay north of and parallel to the New Jersey Turnpike Extension Casciano Bridge. The bridge does not connect with the NJ Turnpike, but creates a new roadway connection that links the port activities in Jersey City and Bayonne (Global Marine Terminal and MOTBY) with the Newark/Elizabeth seaport complex.

Alternative S-6 creates the identical connection as Alternative S-5, but constructs a tunnel beneath Newark Bay instead of a bridge. While the vehicle transportation benefits are the same between the two alternatives, Alternative S-6 is limited in its ability to incorporate bike paths, sidewalks, and dedicated BRT lanes.

8.1.2 Alternatives W-4 and W-5

Figure 8.3: Through Truck Diversion Alternatives W-4 and W-5

Alternatives W-4 and W-5 build upon infrastructure improvements already being advanced through design and construction by other agencies (replacement of the Wittpenn Bridge, the Charlotte Circle elimination and the replacement of the St. Paul's Avenue Viaduct) in enhancing truck mobility between points north and points west of Jersey City. Of the four alternatives evaluated (section 7), Alternative W-4 received the second highest score (438 of a possible 1,000 points) and is ranked as the second most beneficial alternative with respect to meeting the purpose and need and the objectives of the Master Plan. Alternative W-5 received the third highest score (428 of a possible 1,000 points) and is ranked third out of the four alternatives. While these two alternatives connect the same trip origin and destination pair, the difference in the level of benefit provided results from difference variations in the alignment of the alternatives and the effect on heavy truck and general traffic travel patterns.

Alternative W-4 constructs a new bridge parallel to the NJTPK mainline connecting Doremus Avenue from its northern terminus near NJTPK Interchange 15-E to Route 508/Harrison Avenue/Newark Turnpike. This bridge does not directly connect with the NJ Turnpike, but provides a new crossing of the Passaic River for trucks and general traffic. The northern end of the new bridge connects to Harrison Avenue east of the connections to NJ Turnpike Interchange 15-W. Route 508/Harrison Avenue/Newark Turnpike provides a connection between the northern end of the bridge to NJ Route 7 and the western end of the new Wittpenn Bridge. Minor improvements are made to the Route 508/Harrison Avenue/Newark Turnpike corridor to improve the efficiency of traffic flow, but no additional travel lanes are constructed.

Alternative W-5 utilizes existing infrastructure to create an enhanced connection between the western end of the new Wittpenn Bridge and Routes 1&9T in the Town of Kearny. Improvements along this travel path are already under investigation by the NJDOT as part of

the Portway program, and are currently included as one of the Liberty Corridor Phase I Improvements projects. The improvements being advanced under these programs consist of elimination of geometric design deficiencies and do not add new travel lanes or create roadway connections that do not exist in some for today. Alternative W-5 provides additional travel lanes along Fish House Road and Pennsylvania Avenue, increasing capacity and providing an improved routing to attract heavy trucks away from the Route 440/Routes 1&9T corridor.

While providing a number of benefits in support of the project purpose and need, Alternatives W-4 and W-5 (ranked 2 and 3 respectively) create negative impacts EJ communities. (See Table 7.5) In advancing these alternatives for further study, special attention should be paid to the impacts of Alts W-4 and W-5 on EJ communities.

8.2 Recommendation of Corridor Preferred Alternative

The recommended optimal practical alternative for the corridor is a boulevard and complete street that traverses approximately 3.4 miles through the length of Jersey City's Western Waterfront from its northern intersection with NJ Route 7 to the border with the City of Bayonne. The boulevard and complete street includes many elements that have been recognized to enhance safety, including a design speed and speed limit of 30 mph, on-street parking, raised curbs, sidewalks, and vegetated buffer strips. The boulevard and complete street will be along the existing roadway alignment, with widening to occur in many sections. Additionally the recommended corridor improvements extend an additional 0.5 miles southward to Richard A. Rutkowski Park in the City of Bayonne (Figure 8.1).

The geometric configuration of the corridor as well as the character of the built environment through which it runs is heterogeneous along its length. The existing character of the built environment varies greatly, and there is much variation in the vision and plans for the built environment along different sections of the corridor. Currently, a speed limit of 25 mph is posted on the roadway section south of the NJ Turnpike Hudson County Extension due to the horizontal curvature of the roadway. The posted speed limit increases to 40 mph as the roadway straightens north of the railroad bridge over Route 440. Under the LPA the posted speed limit is reduced to 30 mph, as is the posted speed limit for the remainder of the corridor to the north.

Additionally, various constraints, both physical and environmental, exist and are unique to specific portions of the corridor. Accordingly, the configuration of the Locally Preferred Alternative varies along the length of the corridor and consists of seven distinct sections.

8.2.1 Purpose and Functional Relationship of Boulevard Improvement Components

Beyond improving the efficiency of traffic operations along the corridor, the LPA of the boulevard and complete street addresses the range of goals and objectives set forth in the circulation elements of the Jersey City Master Plan. The LPA addresses the project Purpose and Need Statement by providing the following:

a. Transportation Linkages for All Modes

Key to the support of a non-automobile dependent environment is providing linkages between all modes of transportation. The LPA accommodates and connects all transportation modes

and trip types throughout the corridor including through vehicles, locally destined vehicles, light rail and BRT service, pedestrian and bicycles.

b. Public and Mass Transit Service Expansion

Transit friendly design reduces dependence on automobiles for both regional and local travel, reducing congestion and supporting livability. The LPA incorporates extension of the HBLR system to the west side of Route 440 serving a planned Transit center into the heart of the Western Waterfront. Dedicated lanes are provided for BRT vehicles along the corridor, providing a high capacity connection to the Journal Square Transportation Center. The HBLR and BRT stations are easily accessible by bicyclists and pedestrians, supporting a high level of utilization of these transportation options.

c. Traffic Calming

While there are various definitions of traffic calming, they all focus on improving safety and quality of life by slowing the speed of traffic and changing driver behavior. The Institute of Transportation Engineers defines traffic calming as involving "changes in street alignment, installation of barriers, and other physical measures to reduce traffic speeds and/or cut-through volumes, in the interest of street safety, livability, and other public purposes".

The application of traffic calming includes physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users. The New Jersey and Pennsylvania Departments of Transportation collaborated on the publication of the *Smart Transportation Guidebook – Planning and Designing Highways and Streets that support Sustainable and Livable Communities, March 2008*. Under the guidance provided in this publication, the LPA is defined as a Town Center/Urban Core Community Arterial. Roadways in this category also operate as a local or regional Main Street. The guidebook establishes design values supportive of traffic calming including recommendation of lane widths between 10 and 12 feet, and design speeds of 30 to 35 miles per hour. The LPA provides a calm traffic environment along the boulevard and complete street by incorporating narrow travel lanes (11 feet) and a posted speed limit of 30 miles per hour along the entire corridor. The combination of narrow lanes and reduced speed limit adequately accommodates local travel and circulation needs, while encouraging lower travel speeds in support of a friendlier pedestrian environment.

d. Medians and Channelization

Medians enhance safety by segregating opposing traffic flows, control vehicle access along the

roadway and provide space for landscaping, signage, lighting and pedestrian refuge areas. The LPA provides both at-grade and elevated medians along most of the length of the corridor.

e. Park System Linkages

Livable communities require extensive open space and public parks and recreational space and efficient, convenient access for bicycles and pedestrians. A comprehensive network of bike paths and bike lanes along and across the corridor links together numerous existing and planned municipal and county parks in Jersey City and the City of Bayonne (Figure 8.4). Provision of bicycle and pedestrian connections between these existing and planned public parks (some of which are under construction) and the existing and future neighborhoods supports creation of livable communities in the Western Waterfront.

- Stephen Gregg park (Bayonne)
- Richard A. Rutkowski Park (Bayonne)
- The Hackensack River Walkway (existing)
- Bayfront Parks (planned)
- Gateway Circle Park (planned)
- Lincoln Park (existing)
- Marion Greenway (planned)
- Wittpenn Bridge and link to East Coast Greenway (under construction)

Figure 8.4: Bicycle Path and Pedestrian Network Connections

f. Gateways

The Route 440/Routes 1&9T Boulevard and Complete Street includes four gateway areas

- Western Corridor Gateway – 1&9T/Lincoln Highway West of Route 440
- Southern Corridor Gateway – Route 440 South of Society Hill Drive
- Northern Corridor Gateway – Route 440 North of Sip Avenue
- Central Circle Gateway – Intersection of Route 440/Routes 1&9T with Communipaw Avenue.

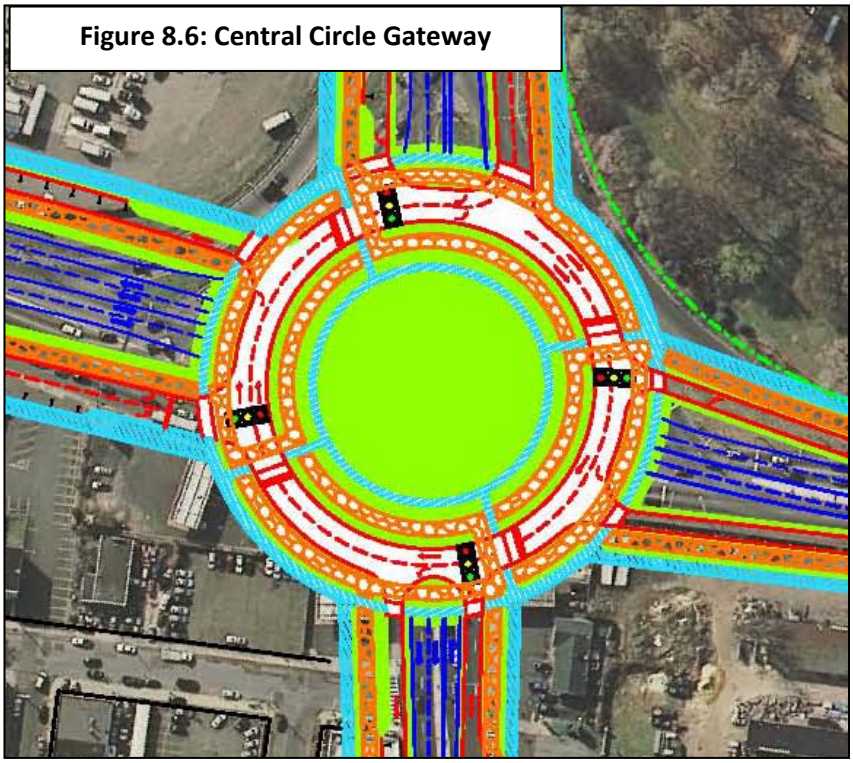
Figure 8.5: Corridor Gateway Locations

Corridor Gateways (Figure 8.5) provide a green transition delineating the "Gateways" to the Western Waterfront. Gateways establish a sense of place and announce "arrival" to vehicles and bicyclists entering the Western Waterfront. A Corridor Gateway is defined as a 'portal' or a 'transition zone' or a 'marker' that signifies one is leaving one area with a unique character/identity and entering another. Route 440 and Routes 1&9T contain the primary roadway entry points to the Western Waterfront. Integrating a series of attractive and grand "Green Corridor Gateways" at these locations creates a sense of place by expressing a unified image of the Western Waterfront community to residents and visitors, fostering a sense of civic pride, and supporting the marketing of new residential development within the Western Waterfront by helping it to overcome its current image as a bleak industrial and highway commercial area of the city. Green Corridor Gateways enhance aesthetics and livability by converting what

would otherwise typically be designed as vacant traffic islands, medians and buffer areas into green spaces incorporating extensive landscaping including shade trees, flowering trees, shrubs, and groundcover.

Green corridor gateways are provided at the northern and southern ends of the boulevard and complete street, as well as along the western approach of Routes 1&9T to Route 440. Corridor cross section concepts were developed for each of the Corridor Gateway locations incorporating the range of transportation and landscaping components to be integrated into the corridor design. The components and configuration of the Green Gateways were established in conformance with the Urban Design Guidelines (UDG) (Chapter 10).

Figure 8.6: Central Circle Gateway



The Central Circle Gateway (Figure 8.6) encompasses the intersection of Route 440/Routes 1&9T with Communipaw Avenue and is a cornerstone in the establishment of a sense of place that defines the Western Waterfront. While there are similarities in the landscape plantings and materials, there is an inherent difference between "Corridor" gateways and the "Central Circle" gateway. The corridor gateways provide a green transition delineating the "Gateways" to the Western Waterfront. The Central Circle Gateway is a cornerstone in the establishment of a sense of place that defines the Western Waterfront.

g. Noise Mitigation

Reduced noise levels are critical to the creation of livable communities. The LPA integrates design features that serve to mitigate traffic noise and create a quiet, calm outer edge along the boulevard and complete street. Provision of though travel lanes in the central section from Danforth Avenue to Communipaw Avenue provide spatial separation between majority of the

traffic volumes including heavy through trucks using the corridor and the sidewalks along the outer edges. Traffic noise is further buffered by the dense landscaping within the medians, the height of the raised planters and the row of vehicles utilizing the on-street parking.

h. Air Quality

The Western Waterfront is an area in non-attainment of the National Ambient Air Quality Standards (NAAQS) for ozone, but in attainment for other pollutants of concern. While currently in attainment, in many locations the existing concentrations of these pollutants approach the NAAQS maximum concentrations for attainment. Protecting and improving air quality is critical to livability within the Western Waterfront. The LPA will result in decreased dependence on single occupant vehicles, mobility improvements, reduced congestion and vehicle delay, and reduction in total vehicle miles traveled (VMT) in the study area. The reduction in idling vehicles (result of reduced congestion) and the diversion of travelers from private automobile to less polluting modes of travel (transit, bicycle, walking) results in air quality improvements in the study area over future conditions without the boulevard and complete street.

i. Neighborhood Access and Mobility

The LPA incorporates a network of interconnected streets and additional roadway crossings of the Route 440/Routes 1&9T corridor. This network of streets offers alternative pathways for travel within the neighborhoods along the corridor and reduces traffic volume on the center section by providing shorter distances between neighborhood trip origins and destinations. The smaller block size created by the local street network encourages walking and bicycle use for local neighborhood circulation, reducing the need for boulevard use for local circulation.

Encouraging non-automobile travel to, from and within the Western Waterfront reduces roadway congestion and supports a higher density of development in the Western Waterfront. The Bayside Plan envisions dense development within the Western Waterfront with multi-story buildings constructed abutting the boulevard and complete street and along the perimeter of the Gateway Circle (Figures 8.7 and 8.8).

The concept design for each of the unique sections of the boulevard and complete street are detailed below. Plans depicting the concept design elements of the boulevard and complete street LPA are provided in Appendix 8.1. The roadway profile and elevation of the driving surface along the corridor is presented in Appendix 8.2.

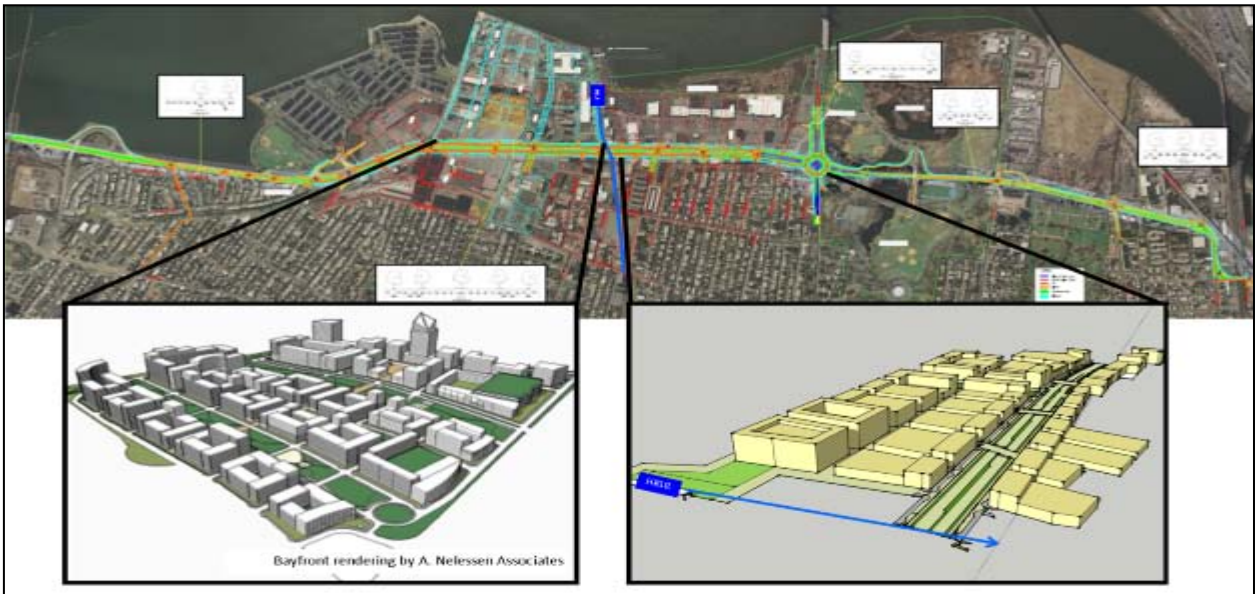


Figure 8.7: Western Waterfront Future Transit Oriented Development Sites

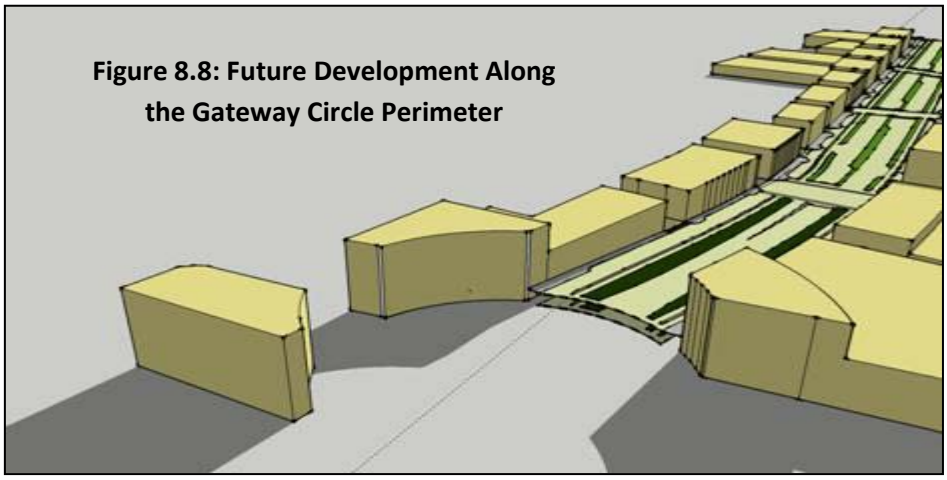


Figure 8.8: Future Development Along the Gateway Circle Perimeter

8.2.2 Section A – Waterfront Walkway and Bayonne Connection

Section A – Waterfront Walkway and Bayonne Connection (Figure 8.9) is the southernmost portion of the corridor, running from the northern edge of Richard A. Rutkowski Park in the City of Bayonne to the intersection of Mina Drive in Jersey City. The future roadway cross section and configuration within this section remains as it exists today, with two travel lanes in each direction separated by a grass median.

Figure 8.9: LPA Section A – Waterfront Walkway and Bayonne Connection

Improvements along this section consist of new walkway and bike path[1] along the waterfront on the southbound side of the street. The waterfront walkway and bike path include a total of 22-feet of paved area width. Varying paving materials are utilized to delineate ten feet for bicyclists, ten feet for pedestrians and a two-foot wide buffer separating the bicycle and pedestrian use areas. The pedestrian area adjacent to the waters edge includes benches and other amenities installed to create an attractive public space for access and enjoyment of the waterfront.

[1] This study differentiates between bike lanes and bike paths. A "bicycle lane" is a lane on the edge of a roadway reserved and marked for the exclusive use of bicycles. A "bicycle path" is a pathway that is paved and separated from streets and sidewalks, designed for exclusive use by bicycles.

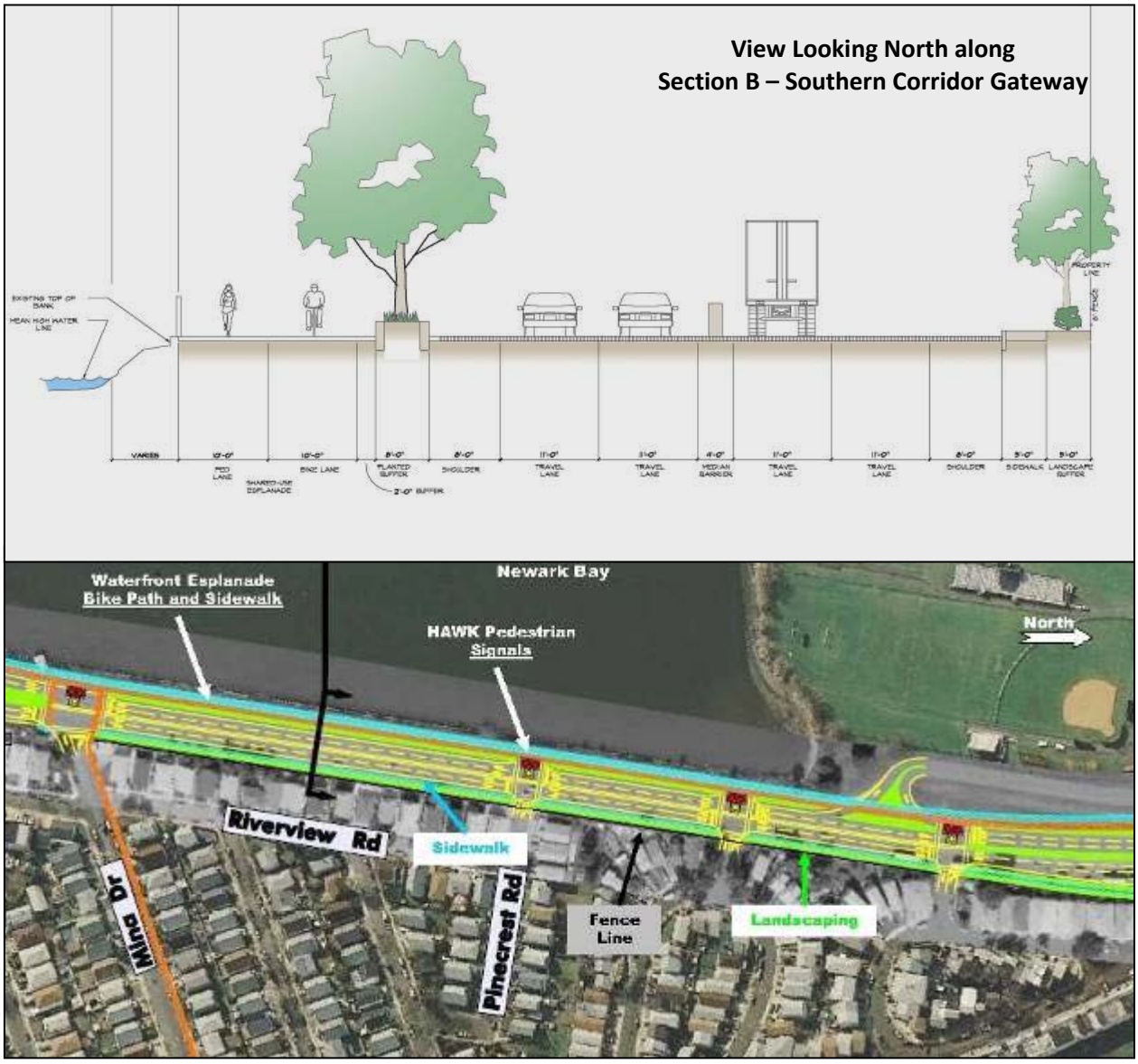
8.2.3 Section B – Southern Gateway - Country Village Frontage

Section B (Figure 8.10) marks the beginning of the transition from the existing roadway configuration to the boulevard. This section includes Route 440 from a point immediately south of the intersection with Mina Drive to a point midway between the intersections with Suburbia Court and Society Hill Drive. The existing roadway in this section sits within a 102-foot wide right-of-way.

Significant constraints exist along both sides of the roadway limiting the width available to construct improvements. Newark Bay abuts right-of-way along the western side, while an established residential community of one and two family detached homes, called Country Village, abuts the eastern side. These constraints present unique challenges to integrating design features to protect and enhance livability within the existing residential community, while efficiently accommodating traffic flows and providing bicycle and pedestrian connections to the waterfront.

The Southern Corridor Gateway encompasses Section B. The landscape strips along both sides of the roadway form the Green Corridor Gateway and define the southern entrance to the Western Waterfront. An eight-foot wide raised planter separates the southbound roadway from a 22-foot wide shared use waterfront esplanade. This waterfront amenity will serve to enhance the attractiveness of the corridor, and afford space where area residents and visitors may access and enjoy the Newark Bay waterfront. The raised planter is constructed to a height of 20-inches and planted with trees with a dense canopy and dense mix of shrubs, providing a safety buffer and a visual screen of the roadway from the waterfront esplanade.

Figure 8.10: LPA Section B – Southern Corridor Gateway - Country Village Frontage



In this section, the LPA maintains two 11-foot wide travel lanes and an 8-foot wide shoulder in both the northbound and southbound directions. The existing grass center median is reduced to a width of four feet and the grass replaced with a decorative median barrier (Figure 8.11).

Incorporation of the barrier is intended to enhance safety by providing protection from vehicles inadvertently crossing over the median The median barrier is rectangular in cross-section and incorporates decorative facing to provide a more appealing visual aesthetic.

Figure 8.11: Sample of Decorative Median

Along the southbound side, the waterfront walkway and bike path from Section A continues with a total of 22 feet of paved width. Varying paving materials are utilized to delineate 10 feet for bicyclist and two feet as a buffer space. The remaining 10 feet are designed for pedestrian use, with benches and other amenities to create an attractive public space for access and enjoyment of the waterfront.

A two-foot wide buffer separates the 10-foot wide bike path from a six-foot wide raised, continuous planter. The walls of the planter are constructed to a height of 20 inches, and planted with a dense mix of shrubs as well as trees with a dense canopy. The dense landscaping provides a visual and audio screening of the roadway for people utilizing the waterfront walkway, and in conjunction with the landscaping along the eastern edge of the corridor, creates a unique and visually appealing Green Gateway to the Western Waterfront.

Constructing the landscape strip in an elevated planter supports public safety in two significant ways. First, the height of the planter and the dense landscaping deter mid-block crossings of the roadway by pedestrians and bicyclists. Second, the 20-inch high walls of the planter prevent vehicular collisions with pedestrians, bicyclists, and trees.

Along the northbound side, six-inch high non-mountable curbing separates the roadway shoulder from a five-foot wide sidewalk. Adjacent to the sidewalk is a five-foot-wide landscape strip planted with trees with a dense canopy and a dense mix of shrubs. This landscape strip forms the eastern edge of the Green Gateway to the Western Waterfront.

An eight foot high board on board fence is installed along the property line of the adjacent residential properties. Installation of the fence serves to buffer the adjacent neighborhood from noise generated by vehicles traveling along the corridor.

The four (4) existing unsignalized intersections within this section are to be maintained as right-in-right-out intersections for vehicles along the northbound side, with southbound and westbound left turns prohibited by the decorative median barrier. Safe pedestrian and bicycle crossing facilities to the waterfront walkway and bike path are provided at the intersections of Route 440 with:

- Mina Drive
- Pinecrest Road
- Suburbia Court
- Suburbia Terrace

Crosswalks and openings in the median barrier are provided for pedestrians and bicyclists at all four locations. In addition, a bike route crossing is provided at Mina Drive in anticipation of a future bike lane connection on local streets to John F. Kennedy Boulevard. Special traffic signals (Figure 8.12), known as HAWKs (**H**igh-intensity **A**ctivated cross**W**al**K**), are installed at these intersections to provide safe crossing of the corridor for pedestrians and bicyclists. HAWKs use traditional traffic and pedestrian signal heads but in a different configuration. This system includes signage that instructs motorists to "stop on red" and a "pedestrian crossing" overhead sign. There is also a signage that informs pedestrians on how to cross the street safely.

Figure 8.12: HAWK Pedestrian Signal
Source: SRTS Guide

When not activated, the signal is blanked out. The HAWK signal is activated by a pedestrian push button. The overhead signal begins flashing yellow and then solid yellow, advising drivers to prepare to stop. The signal then displays a solid red and shows the pedestrian a "Walk" indication. Finally, an alternating flashing red signal indicates that motorists may proceed when

safe, after coming to a full stop. The pedestrian is shown a flashing "Don't Walk" with a countdown indicating the time left to cross. The HAWKs are to be installed at each of the four existing intersections along this section, providing safe accommodation of bicycle and pedestrian crossings. The raised medians with reduce midblock crossings, and further enhance safety along the corridor.

8.2.4 Section C – Central Boulevard

Section C (Figures 8.13 and 8.14) comprises the corridor from Society Hill Drive to just south of Communipaw Avenue. The majority of the future residential, commercial and institutional development in the Western Waterfront is planned to occur along this section of the corridor. Accordingly, this section of the corridor will experience not only the highest level of transportation demand, but also the greatest variety in the types of demands including through traffic (including heavy trucks traveling through the Western Waterfront), local neighborhood access and circulation, bus rapid transit service, access to public transit facilities, bicycle and pedestrian circulation and on-street parking in support of retail and commercial development. These demands are accommodated in a manner that is sustainable, encourages economic development and supports livability and quality of life.

The Central Boulevard may be described as an assembly of all of the desired components necessary to create a "complete street" consistent with the NJDOT's recently adopted Complete Streets Policy. This policy is intended as framework within which to:

- Design complete streets and intersections that serve pedestrians, persons with disabilities, bicyclists, transit vehicles and trucks as well as motorists.
- Create interconnected street networks with frequently spaced intersections and networks of pedestrian paths and bicycle trails.
- Provide sufficient-multimodal capacity.

Figure 8.13: LPA Section C – Central Boulevard

Figure 8.14: LPA Section C – 4th Ave to Carbon Place

The boulevard is centered along the existing 112-foot NJDOT right of way, with the northbound and southbound sides as mirror images of each other. The boulevard is 232-foot wide (Figures 8.15 and 8.16) and incorporates the following components:

An 18-foot wide center median divides the northbound and southbound travel lanes. The median is comprised of a continuous 20-inch high raised planter that is planted with trees with a dense canopy and a dense mix of shrubs to deter mid-block bicycle and pedestrian crossings of the corridor. The dense plantings along the length of the Central Boulevard contributes to an aesthetically pleasing environment, and contributes to the buffering of existing and future land uses and public spaces from the noise generated by through traffic.

Signalized cross street intersections are provided every 500 to 1,000 feet. At these intersections, the median is narrowed to eight feet allow for the integration of dedicated left turn lanes, and safe havens for pedestrian crossings are provided in the median. All existing jughandles along the central section of the corridor are eliminated.

The LPA incorporates closely spaces signalized intersections as a means of increasing the number and attractiveness of safe crossing locations for bicycles and pedestrians. The NJDOT traffic signal spacing policy set forth in the New Jersey State Highway Access management Code N.J.A.C. 16:47-3.4 establishes a minimum distance between traffic signals along state roadways of 2,640 feet (1/2 mile). Provisions are in place for granting a waiver of this minimum spacing criterion if it can be demonstrated that through travel along the main roadway would not be adversely affected by the installation of additional traffic signals.

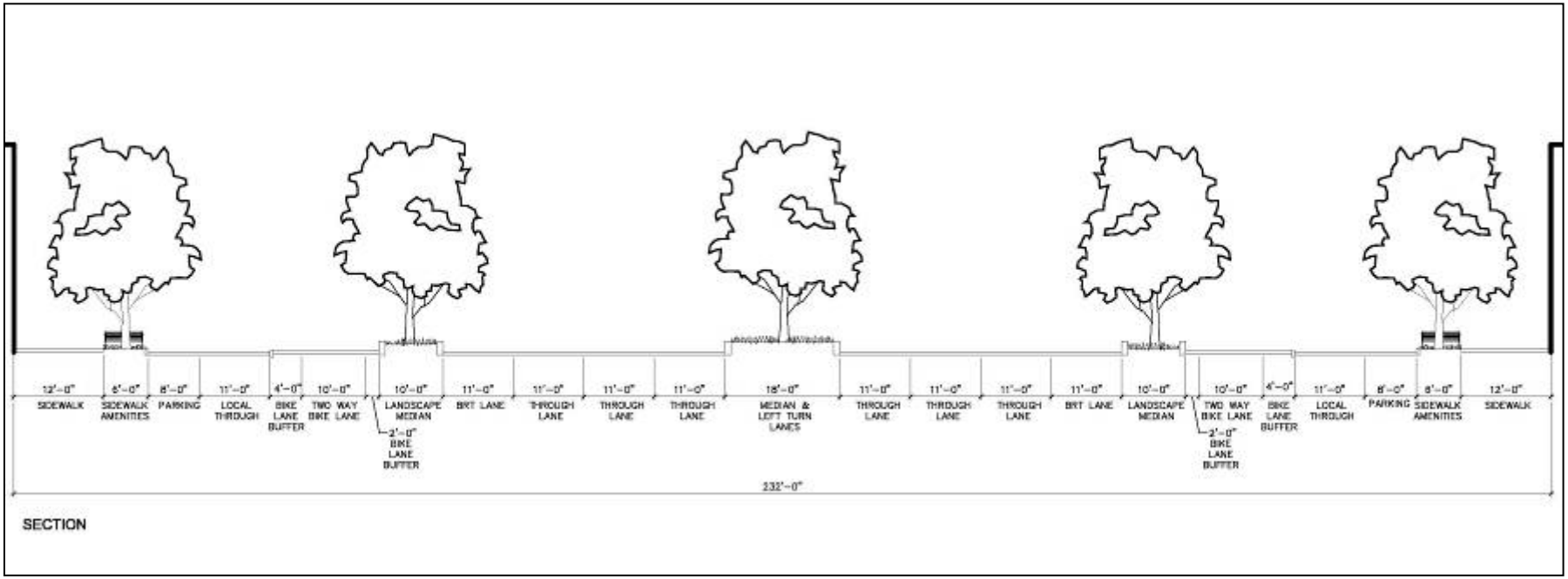
Placement of additional traffic signals along the corridor is a key feature of the LPA in that the additional signalized intersections create safe crossing locations for pedestrians and bicyclists, and facilitate metering of traffic flow along the north/south roadway to control travel speeds. Analysis of the traffic operations of the boulevard and complete street (Chapter 9) demonstrate that efficient operations are maintained along the entire corridor subsequent to construction of the LPA.

As stated in the NJDOT Roadway Design Manual, “median widths of 20 feet to 25 feet or more are desirable at intersections with a single left-turn lane, but widths of 15 feet to 18 feet are acceptable.” A median width of 18 feet is considered the absolute minimum along the boulevard due to the need to provide safe havens large enough to safely accommodate the significant pedestrian activity that is anticipated in the future. .

As stated above, dedicated left turn lanes are integrated into the median at the signalized intersections, providing access to the existing and future local adjacent land uses. The NJDOT Roadway Design Manual states that within a median "left-turn lanes with median curbing should be 11 feet wide and desirably 14 feet wide. The lane width is measured from the curb face to the edge of through lane. Left-turn lanes without median curbing should be at least 11 feet wide and preferably 12 feet wide." While minimum 11 foot turn lanes are desirable, in urban settings the use of 10 foot turn lanes is common. The ten-foot width is adequate to physically accommodate the vehicle movement while encouraging slower travel speeds and a calm traffic environment.

Figure 8.15: LPA Section C – Central Boulevard (Typical Section)

Figure 8.16: LPA Section C – Central Boulevard Cross Section



On each side of the center median, the boulevard includes a total of four (4) 11-foot wide travel lanes. Starting at the center median, the first three travel lanes serve general traffic traveling through the area, including trucks. The fourth lane is dedicated exclusively for Bus Rapid Transit (BRT) vehicle travel and stops for passenger pickup and discharge. Segregation of through traffic and BRT to the center of the boulevard provides a spatial separation of the through traffic from outer edges of the boulevard, thereby creating a calm environment for the bike paths, sidewalks and building frontages.

BRT lanes are provided along both sides of the through travel lanes. BRT stations are located within the outer medians at the following locations:

- Northbound and Southbound at Kellogg Street
- Northbound and Southbound at Stegman Boulevard
- Northbound at Ege Avenue
- Southbound at Williams Avenue

An additional BRT station is provided at the southern end of the central section along the westbound side of Society Hill Drive. The BRT vehicles travel south along corridor to Danforth Avenue. This is the southern limit of the anticipated redevelopment areas, and is a logical termination point for the BRT service. Returning of southbound BRT vehicles to the northbound direction is accomplished by turning right onto Society Hill Drive, stopping to service the southernmost BRT station. Upon exiting the station, the BRT vehicle turns right onto Danforth Avenue and turns right again into the northbound BRT lane.

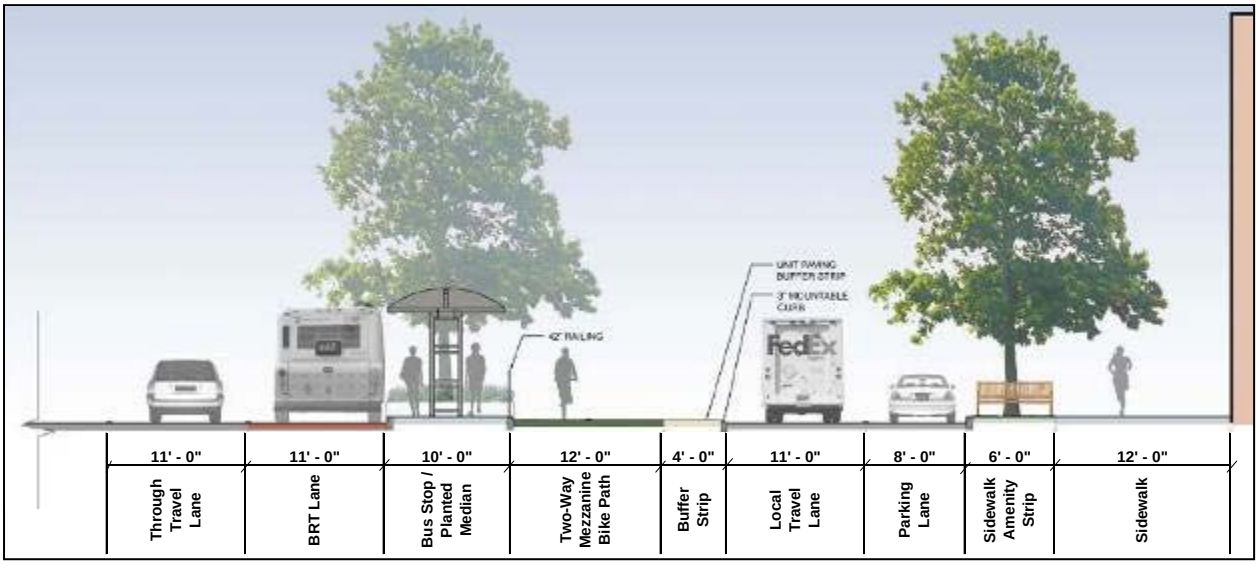
As set forth in the NJDOT Roadway Design Manual: "Lane widths have a great influence on driving safety and comfort. On freeways and land service highways, the predominant lane width is 12 feet. Although lane widths of 12 feet are desirable, there are circumstances on land service highways that necessitate the use of lanes less than 12 feet. In urban areas, the use of 11 foot wide lanes is acceptable. Ten foot wide lanes have been provided in the past at certain locations where right-of-way and existing development became stringent controls and where truck volumes were limited."

The center median, six through-travel lanes, and two BRT travel and stop lanes occupy 106 feet of the 112-foot wide existing right-of-way. The remaining elements are constructed outside of the BRT lanes, and incorporate additional landscaping, bike paths, sidewalks, on-street parking and local travel lanes.

Within the calm edge (Figure 8.17) on each side of the boulevard, the element that is closest to the through and BRT travel lanes is a 10-foot wide, 20-inch high, raised planter outer median that contains a dense mix of plantings to deter mid-block bicycle and pedestrian crossing of the through and BRT lanes, enhance boulevard aesthetics, and contribute to mitigation of road noise. BRT stations with shelters, ticket vending machines and associated amenities are placed at 1,000 to 1,400 foot intervals within the outer medians alongside the BRT lanes.

The center and outer medians also provide space for the placement of bridge piers to support a grade-separated crossing of Route 440 to the north of Culver Avenue by a planned extension of the Hudson-Bergen Light Rail (HBLR). Support piers for the elevated structure are placed within the landscaped areas of the center and outer medians, and outside the edge of the 232' wide boulevard area (see section 8.4 for detailed discussion of HBLR requirements).

Figure 8.17: LPA Section C – Central Boulevard Calm Traffic Edge



Adjacent to the outer raised planters and BRT stations are two directional bike paths. A four foot high decorative iron pedestrian fence separates the BRT station area from the bike path. The bike path consists of a 10-foot wide two-directional riding surface, separated from the raised planter by a 2-foot wide safety and drainage buffer space. Along the outer edge of the bike path is a 4-foot wide paved buffer separating the bike lane from the 11 foot wide one way local travel lane. As set forth in the NJDOT Roadway Design Manual, while a 12-foot travel lane is considered optimal, 11-foot wide lanes are considered acceptable, particularly in an urban environment. The Institute of Transportation Engineers defines traffic calming as "the combination of mainly physical measures that reduce the negative effects of motor vehicle use,

alter driver behavior, and improve conditions for non-motorized street users". Recent studies have shown that narrow streets slow traffic and reduce vehicular crashes, increasing neighborhood safety. Some studies have shown speed reductions of as much as three miles per hour per every foot of lane narrowing. This narrow lane width adequately accommodates local travel and circulation needs, while encouraging lower travel speeds in support of a friendlier pedestrian environment.

The bike path and buffer is atop a mezzanine that is elevated 3-inches above the road surface of the adjacent local travel lane. The difference in elevation is sufficient to create a clear distinction between the vehicle lane and the bike path and buffer, and low enough to permit emergency vehicles to easily mount the mezzanine if there is need to bypass a stopped vehicle in the local travel lane.

The local travel lane provides access to and egress from local destinations and is integral to neighborhood circulation. Driveways, and vehicular access to and egress from adjacent land, are prohibited along the local travel lane. Along the outer edge of the local travel lane is an eight foot wide on-street parking lane. The outermost edge of the boulevard contains an 18-foot wide pedestrian realm that is comprised of a 6-foot wide amenity strip along the parking lane and a 12-foot wide clear area for use by pedestrians and shopkeepers. The amenity strip includes trees in tree pits, benches, bike racks, waste receptacles, sidewalk lighting, place-marker signs, and public art.

The sidewalks and curbs are extended at the intersections to minimize pedestrian crossing distances and to daylight the intersection with safe sight lines by preventing vehicles from parking close to the intersection. Curb turning radius impacts local lane and local street access, but not through lane access. Separation of the through lanes from the local lanes provides a larger area within the intersection for vehicles to execute turns without being restricted by smaller radius corners. Actual turning radii on the extended curbs of 25-feet calms traffic and enables ADA curb ramps to be aligned correctly, and is sufficient to accommodate large truck turning movements. The effective turning radii are larger than the actual turning radii when the bicycle lanes on the side streets are taken into account.

Unsignalized “T” intersections of the local cross streets with the local lanes of the boulevard are provided at intervals between the signalized intersections (Figure 8.18). These intersections provide access to the adjacent neighborhoods and support local circulation. Direct access to the through travel lanes at these unsignalized intersections is not provided. Bicycle access from the side streets across the local lane to the mezzanine bike paths is provided. As driveway

access from local lanes is prohibited, these unsignalized intersections provide access to and egress from property and structures that abut the boulevard.

The Central Section incorporates a total of 10 signalized intersections, with bicycle and pedestrian crossing facilities provided at each. Table 8.1 summarizes the pedestrian crossing distances between sidewalks and refuge areas at the intersections. Seven of the ten traffic signals run in semi-actuated mode on a 120-second cycle with three phases. As this section is expected to have significant pedestrian activity, minimum green times were set to afford adequate pedestrian crossing times between median areas. While some pedestrians may not get across the entire corridor without stopping in a median, adequate time is afforded to allow pedestrians to cross active roadway sections.

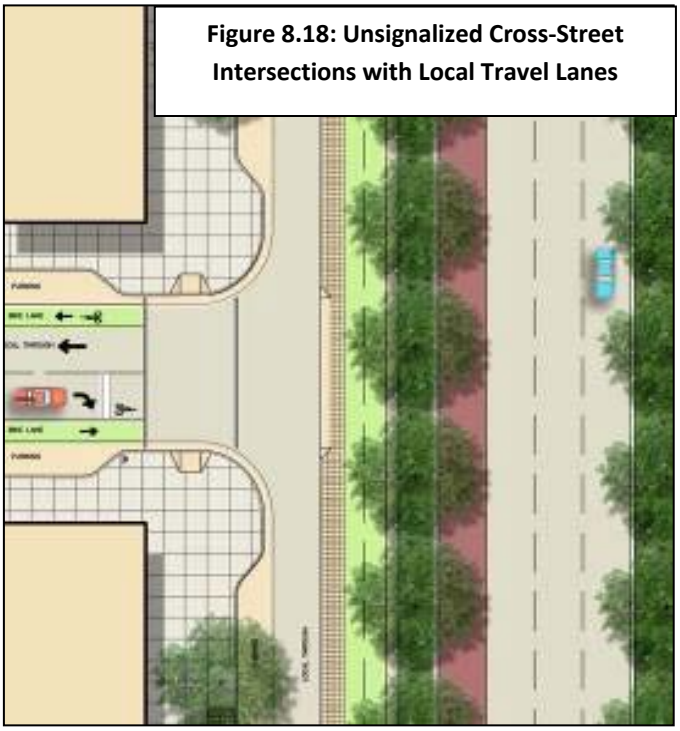


Figure 8.18: Unsignalized Cross-Street Intersections with Local Travel Lanes

Table 8.1: Pedestrian Crossing Distances

Curb to Curb Crossing	Pedestrian Crossing Distance
Full Boulevard – Sidewalk to Sidewalk	180 feet
Sidewalk to Near Side Median	11 feet
Sidewalk to BRT Station	27 feet
Sidewalk to Center Median Pedestrian Refuge	81 feet
Typical Cross Street	32 feet

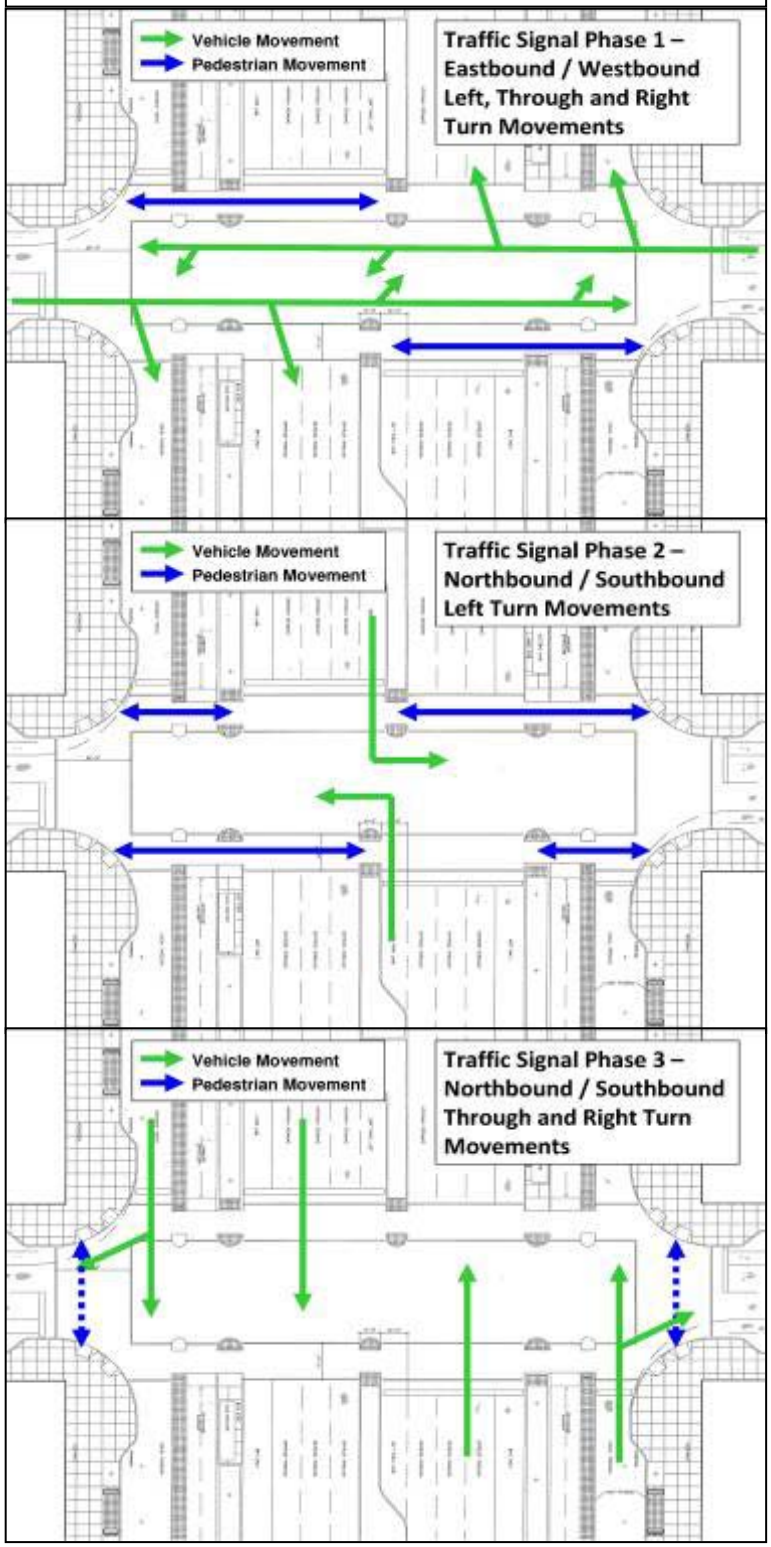
Phase 1 permits vehicular eastbound and westbound left, through and right turn movements and eastbound and westbound bicycle movements across one-half of the through travel lanes. Pedestrians are provided with a save pedestrian staging area within the center median of the

roadway. A 160 square foot area with depressed curbs for handicapped accessibility is provided within the center median on both the north and south sides of each signalized intersection. Separate bicycle signals are integrated with the main signal controller, thereby permitting east-west bicycle crossings of the boulevard with the direction of traffic. Pedestrians are permitted to cross east/west segments that do not conflict with right turning vehicles (Figure 8.19).

Phase 2 permits vehicular northbound and southbound left turn movements from the through lanes, and eastbound and westbound bicycle movements across the local travel lanes and the one-half of the through travel lanes not accommodated under Phase 1. Pedestrians are permitted to cross east/west segments that do not conflict with left turning vehicles.

Phase 3 permits vehicular north-south through movements from the through lanes, vehicular through and right turn movements from the local lanes, northbound and southbound bicycle through movements, and pedestrian crossings of the cross street.

Figure 8.19: Bicycle and Pedestrian Crossing Phases at Signalized Intersections



If a traffic control signal is to function properly, the signal must be visible, attract attention, and convey a clear message. Design of a traffic signal involves a number of factors such as size and quantity of the signal heads, mounting choices, and physical arrangement of the signal components at the intersection. The Manual on Uniform Traffic Control Devices (MUTCD) requires that there be a minimum of two signal faces for each through approach to an intersection, with a single signal face used for the control of an exclusive turn lane in addition to the two through approach signal faces. Based upon vehicle and human restrictions, the MUTCD defines a "cone of vision" in which the traffic signal faces should be located. The MUTCD requires that at least one and preferably two signal faces be located within this "cone of vision", with signal faces required to be a minimum of 40 feet and a maximum of 150 feet from the stop line of the approach to the intersection.

Due to the width of the traveled roadway portions of the boulevard and complete street, the traffic signals utilize a combination of pole-mount and mast-arm mounted traffic signals. Detailed placement of the traffic signal equipment will be developed during the preliminary engineering phase of project advancement.

Segregation of through traffic from local traffic within the central section supports a calm environment along the edge of the boulevard by confining the vast bulk of vehicular traffic to the through lanes[2]. Right turns are prohibited from the through lanes, except at through lane to local lane crossover locations. Vehicular crossovers from through lanes to local lanes at select lower volume intersection increase local access and reduce traffic volume on the local lanes with minimal interference to signal coordination along the corridor. It is important to note that vehicular crossovers from local lanes to through lanes are avoided because they encourage the use of local lanes to be used as through lanes, induce traffic, and create congestion on the local lanes, which undermines local access and neighborhood circulation. Access from the local lanes to the through lanes in either direction is provided through use of the local street grid and the through cross streets. Crossovers from through lanes to local lanes cross the BRT lane and the outer median and are provided at the following locations:

[2] Through traffic consists of vehicles, both automobiles and trucks that do not have a trip origin or a trip destination within the Western Waterfront, but are merely “passing through” the area.

- **Southbound at 4th Avenue.** The southbound 4th Avenue through to local lane crossover provides alternate access to local destinations on the west side of Route 440 at the southern end of the central section for southbound vehicles that are in the through lanes. Provision of alternate access provides an efficient alternate route option and reduces vehicular volumes on the southbound local lanes.

- **Northbound at 4th Avenue.** The Northbound 4th Avenue through to local lane crossover provides alternate access from the northbound through lanes to local destinations on the east side of Route 440 to the north of 4th Avenue and reduces the volume of traffic traveling along the northbound local lanes.

- **Northbound at Williams Avenue.** The northbound Williams Avenue through to local lane crossover provides access from the northbound through lanes to the elevated Gateway Circle (see description below). This access is primarily intended for use by vehicles turning westward at 1&9T, but may also be used as an alternate route by vehicles travelling in any direction. This cross-over from the through lanes to the local lane reduces the volume of northbound traffic on the local lane between 4th Avenue and Williams Avenue, by allowing vehicles to travel the majority of the central section in the through lanes, thereby limiting the necessary use of the local lane to only a short distance (between Williams Avenue and Communipaw Avenue).

- **Southbound at Williams Avenue**. The singular location at which a crossover from a local lane to the through lanes is necessitated is Southbound at Williams Avenue. This exception is necessary to provide left turning vehicles from westbound Communipaw Avenue with an entrance to the southbound through lanes on Route 440. Southbound through lane access provides mobility to local destinations at the southern end of the central boulevard, to external destinations south of the boulevard, and access to

neighborhoods on the east side of the Western Waterfront via the center median left turn lanes.

- **Southbound at Ege Avenue**. The southbound Ege Avenue through to local lane crossover provides access to local destinations on the west side of Route 440 for southbound vehicles that enter the boulevard's center through lanes from the northern end.

The boulevard and complete street incorporates an eight foot wide on-street parking lane adjacent to the local travel lane. There are numerous benefits to the provision of on-street parking, particularly in light of the anticipated development of significant first-floor retail uses along the boulevard. On-street parking is critical to the boulevard for the following reasons:

Critical Infrastructure - On-street parking is vital infrastructure for local businesses and residents. It is envisioned that ground-floor retail with frontages on the urban boulevard will be a requirement of the mixed-use redevelopment that will occur over the next 40 years, and the on-street parking will serve the clients of the ground-floor retail establishments.

Safety - On-street parking on low-speed streets (less than 35 mph) has been shown to reduce the severity of vehicular crashes. On-street parking calms traffic by narrowing the perceived width of a roadway, causing drivers to reduce speeds and drive more cautiously. Slower travel speeds allow drivers, pedestrians and bicyclists greater reaction time and reduce the severity of crashes.

Vibrant Streets - On-street parking serves as a buffer between moving vehicles and the sidewalk. A lane of on-street parking creates a pedestrian realm that is safer and more comfortable. Not only are sidewalks a space for pedestrians, sidewalks also make up a significant portion of public space in Jersey City. A sidewalk that is buffered by a lane of on-

street parking is more attractive to those on foot, as well as to those who are relaxing at a sidewalk café or sitting on a bench located in a dedicated area of the sidewalk.

Noise Mitigation - On-street parking contributes to mitigation of the impacts of the noise of vehicular traffic to pedestrians on the sidewalk and those who live and work adjacent to the corridor. As an urban boulevard, Route 440/Routes 1&9T will continue to be a critical roadway in the local street network and will carry a high number of vehicles, including private automobiles, trucks, and buses. The eight-foot wide parking lane on both sides of the boulevard, along with the proposed medians and bicycle paths, creates distance between through traffic and the buildings that abut corridor, thereby reducing noise impacts to the residents and businesses who occupy those buildings. The physical mass of the parked vehicles aids in the noise mitigation by interfering with the sound waves.

8.2.5 LPA Section D – Gateway Circle

Section D includes perhaps the most unique feature along the corridor. This section generally covers the intersection of Route 440, Routes 1&9T, and Communipaw Avenue. This intersection experiences higher traffic volumes than any other intersection along the corridor. Existing congestion and vehicle queuing emanating from this intersection spills back along the approaching roadways, adversely affecting traffic operations throughout the surrounding area. Accordingly, provision of efficient traffic operations at this location is critical to the ability to the provision of efficient traffic operations along the entire corridor.

The LPA for this section includes an at-grade signalized intersection to accommodate all through and right turn movements, and an elevated traffic circle above the intersection to accommodate all left turn movements. The center of the traffic circle is filled in to provide approximately 1.6 acres of new public space. The surface of the traffic circle and the public space in the center is approximately twenty five and one-half feet above the surface of the at-grade roadway beneath the circle. This elevation difference is required to provide adequate vertical clearance for trucks to pass beneath the circle vehicles (minimum of 16-feet, 6 inches), five feet placement of traffic signal heads at the at-grade intersection beneath the circle, and approximately four feet for structural elements supporting the public space.

Instead of a traditional traffic circle with counterclockwise traffic flow, traffic in the circle flows in a clockwise direction (Figure 8.20). As a result, left turning vehicles only need to travel one-quarter of the way around the circle, eliminating a majority of the potential traffic conflicts that would otherwise exist with a counterclockwise flow pattern, and reducing the traffic volumes and total vehicle miles of travel within the circle.

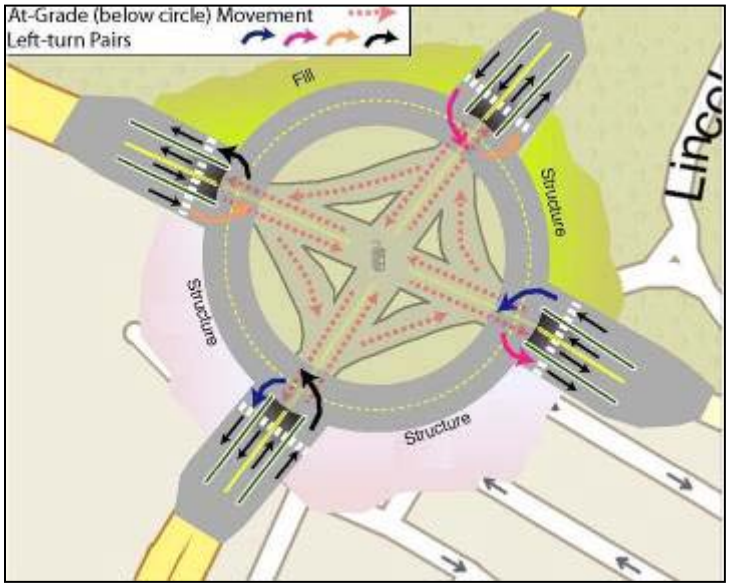


Figure 8.20: LPA Section D – Gateway Circle (schematic)

On each vehicular approach to the circle, through and right turning vehicles travel at grade and pass beneath the elevated circle to continue straight or to make a right turn. The northbound, southbound and eastbound approaches incorporate two through lanes and a single right turn lane at this intersection. The westbound approach includes one through lane and one right turn lane. Through movements are controlled by a traffic signal operating on a 120-second cycle with two phases. Phase 1 accommodates the northbound and southbound approaches, while Phase 2 accommodates the eastbound and westbound approaches. The traffic signal phasing and prohibition of right-turns-on-red at the at-grade intersection allows the right turning vehicles to execute their turn and merge back into the through lanes in a free-flow condition.

Left turns from all approaches are accommodated on the elevated circle above the at-grade intersection. Along each approach, a ramp diverges from the through and right turn lanes and rises to meet the circle at an intersection controlled by a traffic signal. Egress from the circle is provided on ramps that descend from the circle and merge back into the through roadways. As opposed to traditional highway-style ramps, these ramps form local streets containing travel

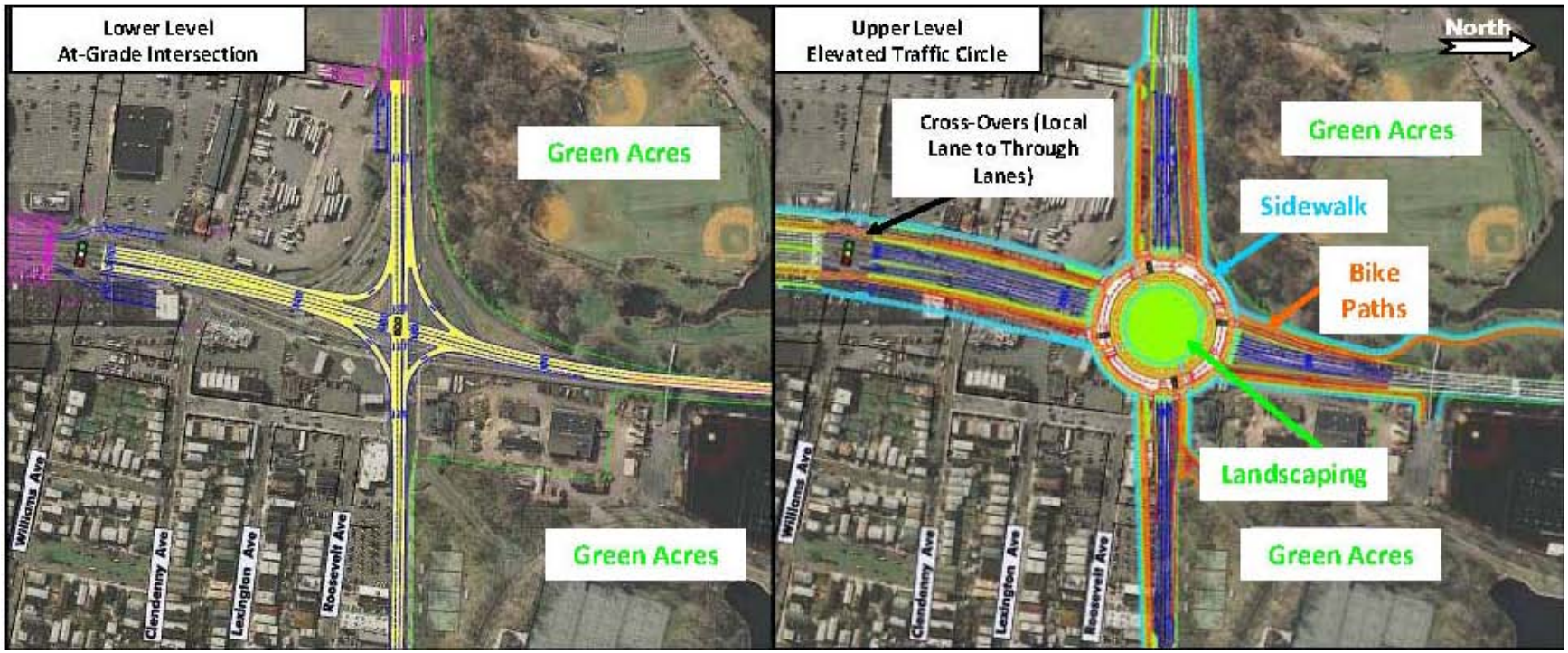
lanes, bike paths, wide sidewalks and landscaping (Figure 8.21). The ramps accessing the circle from the surface roadways extend approximately 500 feet from the circle with grades of approximately five percent. The ramps connecting the circle to the Central Boulevard section also include on-street parking, and serve as continuations of the local travel lanes. On-street parking is provided along the ramps connecting the eastbound side of Lincoln Highway and Communipaw Avenue as well.

Facades of new buildings abut the ramp sidewalks and the circle itself on three sides. This allows the buildings around the circle to integrate directly with the wide sidewalks around the circle, creating the effect of an attractive and vibrant local street. The land on the northwest side of the circle is sculpted from the sidewalk edge to meet Lincoln Park.

The circle itself is 360-feet in diameter with two 15-foot wide travel lanes. The center of the circle is 300 feet in diameter and provides over 1.6 acres for a significant new public park with landscaping, lighting, walkways, seating and public art to create an attractive amenity and gathering place.

Bicycle and pedestrian access to the middle of the circle is provided from all surrounding quadrants, thereby integrating this new public space into the surrounding neighborhoods. Each of the eight ramps accessing the circle includes a wide sidewalk along its outer edge. The sidewalks are connected by a wide sidewalk around the circumference of the circle. Pedestrian crossings of the circle travel lanes are provided at the intersections of the ramps entering the circle, with safe crossing of the circle and access to the new public space provided by the traffic signals. Bike lanes are incorporated into each ramp as well, with safe, signal controlled connections for crossings to the center of the circle for access to the public park.

Figure 8.21: Gateway Circle – At Grade Intersection and Elevated Circle



The traffic signals controlling the intersections of the ramps with the circle operate on two phases. During phase 1, vehicle on the approach ramps enter the circle. Bicycle and pedestrian crossings of the circle are provided on the circle approaches to each signal, providing safe bicycle and pedestrian crossings to and from the public space within the circle during this phase. Separate bicycle and pedestrian signal heads are integrated into the traffic signal to control these crossing movements. Bike and pedestrians will also be able to cross the ramps exiting the circle during this phase.

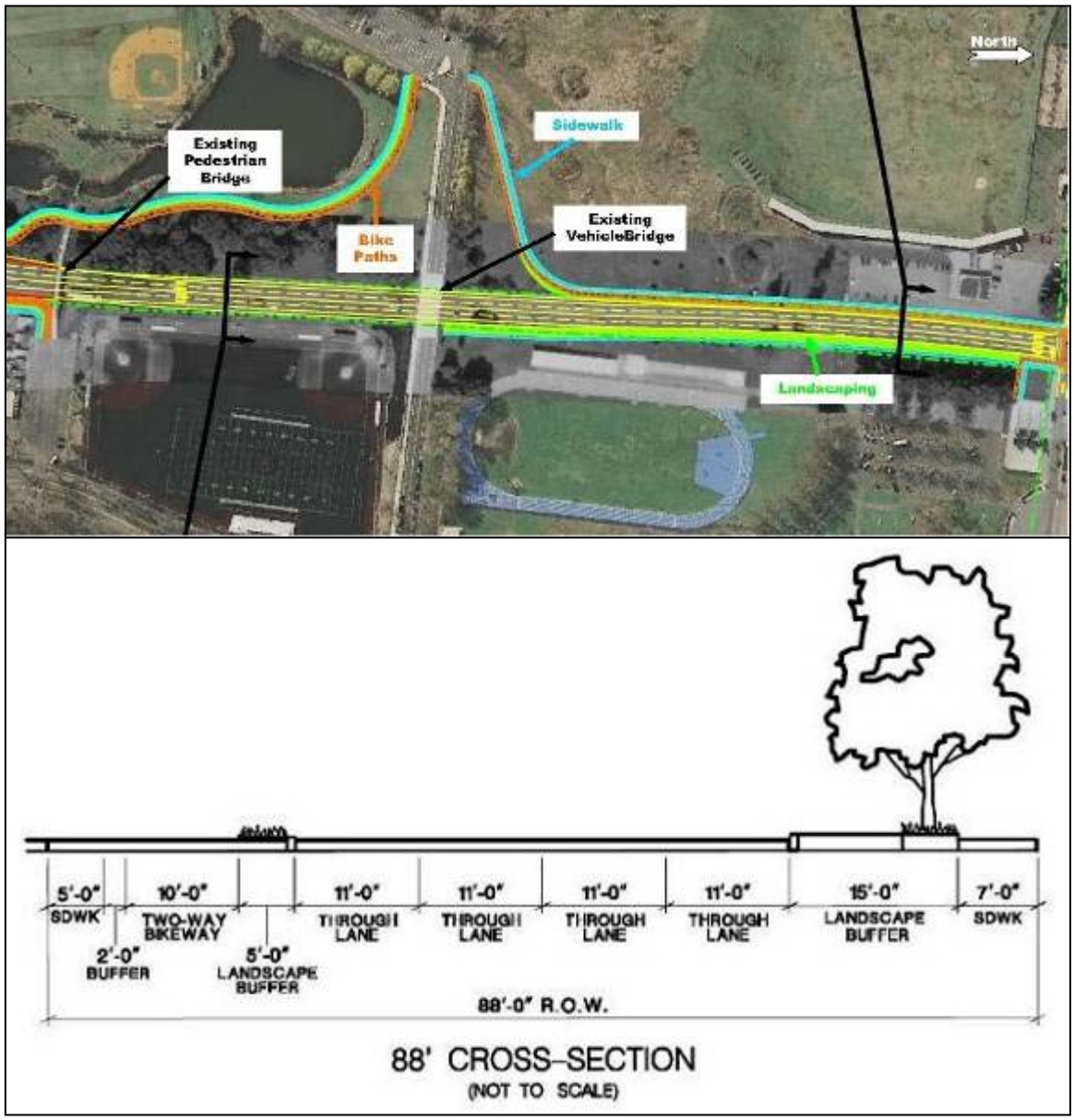
During phase 2 vehicles on the circle permits left turns exiting the circle, and bicycle and pedestrian crossing of the circle entrance ramps. By accommodating the bicycle and pedestrian crossings to and from the new public space on the upstream side of the ramp intersection during Phase 1, the need to add a third phase to the signals is avoided, and the result is an increase in vehicular capacity through the intersections and around the circle.

8.2.6 LPA Section E – Lincoln Park Gateway

The Lincoln Park Section (Figure 8.22) extends from just north of the intersection of Route 440/Routes 1&9T with Communipaw Avenue to Duncan Avenue. This is the most dimensionally constrained section along the corridor due to the existence of Lincoln Park, which abuts both the northbound and southbound sides of the right-of-way. Lincoln Park is part of the Hudson County park system. There appears to be case law that says that county parks commission lands may not be conveyed for non-recreational uses. Sidewalks, bike paths and landscaping are deemed to be supportive of and consistent with recreational uses within Lincoln Park, and therefore construction of these features within Lincoln Park is permitted.

The Lincoln Park section has a constrained width of 60 feet. It is therefore not possible to incorporate significant landscaping within the right of way and still maintain the number of lanes necessary to accommodate future roadway traffic demand. However, the western side of the street in this section is already filled with large trees within the Lincoln Park property. The addition of smaller ornamental trees and shrubs interspersed with the existing trees would enhance the aesthetic appeal of this area without interfering with the existing mature trees.

Figure 8.22: LPA Section E – Lincoln Park Frontage



The existing right of way width of 60 feet represents the extent of the space available for roadway improvements. Due to the constrained width, the section of roadway between the circle and the existing pedestrian bridge that connects the east and west sides of Lincoln Park remains in a similar configuration as it exists today, with two 11-foot wide travel lanes and an eight foot wide shoulder in each direction. While sidewalks and bike paths are incorporated along the ramps leading from the circle to Route 1&9T, the constrained width under the bridge

precludes the ability to continue these sidewalks and bike paths along both sides of the roadway within the existing 60 foot right of way.

The existing grade along this section is elevated to an elevation of 11 feet. This raising of the roadway surface ranges up to three feet from the existing roadway surface elevation and will elevate the roadway two feet above the existing base flood elevation in this area as a measure of protection against the potential for future climate change. The ramps to and from the circle meet the grade of the north/south through roadway just south of the existing pedestrian bridge crossing over Routes 1&9T. At this point, connections are provided linking the ramp bike lanes and sidewalks into the bicycle and pedestrian facilities within Lincoln Park. While not immediately adjacent to the roadway for the full length of the Lincoln Park frontage, connectivity is maintained on both sides of the street, and a comprehensive pathway for bikes and pedestrians is provided along the entire length of the corridor.

To the north of the existing vehicle bridge that connects the east and west sides of Lincoln Park, the width of the existing right-of-way increases to 88-feet. Along the northbound side, a 6-inch non-mountable curb separates the travel lanes from a 15 foot wide landscape buffer to separate the road from a seven foot wide sidewalk. The landscaped buffer is planted with a variety of low height shrubbery and trees with a dense canopy along the outer five-feet, providing a buffer between the roadway and the adjacent seven foot wide sidewalk.

A width of 22 feet is available for construction of sidewalks, bike lanes and landscaping within Lincoln Park outside of the existing Routes 1&9T right of way. Hudson County is advancing plans for construction of a golf course within Lincoln Park. The plans include a two-tiered retailing wall parallel to the Route 1&9T corridor running most of the length of the property frontage between the existing vehicle bridge and Duncan Avenue. Preliminary plans locate this retaining wall approximately 22 feet west of the property line.

Along the southbound side, a six inch non-mountable curb separates the travel lanes from a five foot wide grass strip. The 17 foot wide space adjacent to the grass strip incorporates a 10 foot wide bike path separated from a five foot wide sidewalk by a two foot wide paved buffer strip.

8.2.7 LPA Section F – Hackensack River Edge Frontage

Section F (Figure 8.23) is continuation of the complete street that accommodates all users all the time. It abuts the Hackensack River Edge Growth Area, and runs between Duncan Avenue and Sip Avenue. It accommodates through traffic, local traffic, a critical Bus Rapid Transit link between the central boulevard section and the Journal Square Transportation Center, pedestrians and bicyclists. It also provides bicycle and pedestrian linkage between the planned Marion Greenway, Lincoln Park and points south.

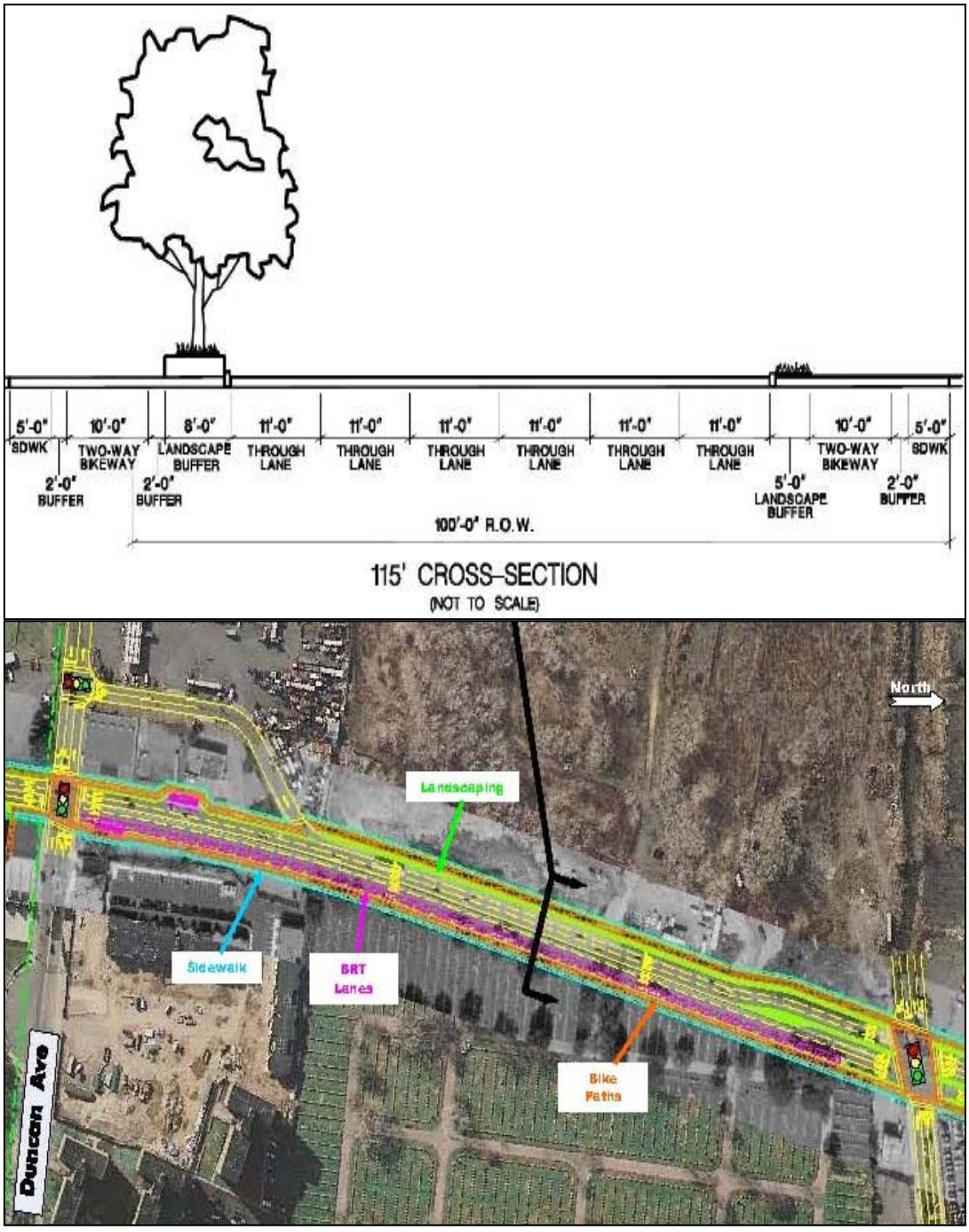
This section is constrained along the eastern edge by the Holy Name Cemetery and along the western edge by the planned PJP landfill cap and berm. Potential changes in alignment of the southern end are constrained by Lincoln Park and a retaining wall that is being constructed as part of golf course construction on the south side of Duncan Avenue. Along the western side of the corridor, potential development scenarios may include nearly 900,000 square foot high cube warehouse or approximately 327,000 square feet of big box retail space. .

The LPA that is described in the following paragraphs is designed with an expanded right-of-way to accommodate the greater roadway travel demands of the retail development scenario. The right-of-way may be expanded over the PJP landfill cap and berm by raising the elevation of the street. The warehouse development scenario requires a smaller right-of-way expansion as fewer travel lanes are needed; however, some right-of-way expansion is needed in order to accommodate a complete street with a dedicated BRT lane on the northbound side, and bike paths, sidewalks and landscaping strips on both sides of the street. The warehouse development scenario also incorporates driveway access directly from Route 1&9T, and because of the different travel demand and travel lane needs, it incorporates different intersection configurations at Duncan Avenue and Sip Avenue from what is provided by the LPA under the retail development scenario.

Access to the site under the retail development scenario is provided by the signalized intersections at Duncan Avenue and Sip Avenue. At Duncan Avenue, dedicated left turn lanes are provided on the eastbound and westbound approaches of Duncan Avenue to Routes 1&9T. Due to the physical constraint imposed by the Lincoln Park in the southeast and southwest quadrants of the intersection, dedicated left turn lane cannot be provided on the northbound and southbound approaches of Route 1&9T to Duncan Avenue. Northbound left turns are prohibited on the northbound approach to Duncan Avenue. The existing jughandle is maintained for southbound left turn and right turn movements onto Duncan Avenue.

Dedicated left turn lanes are provided on all approaches to the intersection of Routes 1&9T with Sip Avenue.

Figure 8.23: LPA Section F – Hackensack River Edge Frontage



The complete street has a width of 115 feet for most of this section. At the approach to Sip Avenue, the corridor section widens to accommodate an additional northbound left turn lane. Along the northbound side, a 17-foot bike and pedestrian corridor comprised of a five foot wide sidewalk abutting the property line of the Holy Name Cemetery, a two foot buffer and a 10-foot wide two-direction bike path. This bike path is separated from the northbound travel lanes by a five foot wide grass strip and six inch non-mountable curbing.

On the northbound side, three 11-foot wide travel lanes are provided, with the rightmost lane designated for exclusive BRT vehicle travel for most of its length. A BRT station is on the north side of Duncan Avenue. The BRT lane terminates at Sip Avenue with BRT vehicles turning right to access the Journal Square Transportation Center. At the approach to Sip Avenue, general vehicle right turn movements are allowed in this outer lane as well, and the corridor widens to accommodate a landscaped center median and dedicated left turn lane. On the southbound side, three 11-foot wide travel lanes are provided. As the roadway approaches Duncan Avenue, the outermost lane becomes an exit lane to the nearside jughandle which accommodates all turns onto Duncan Avenue and access to the retail development. A southbound BRT stop is accommodated in a pull-off south of the exit lane. Adjacent to the travel lanes, an eight foot wide raised planter separates the travel lanes from a 10-foot wide two-direction bike path. The bike path separated from the raised planter strip by a two foot wide paved safety and drainage buffer, and an additional two foot wide buffer along the western side separates the bike path from a 5-foot wide sidewalk.

8.2.8 LPA Section G – Northern Gateway and Broadway Frontage

The boulevard and complete street follows an “S” shape in this section, and serves as the northern gateway entrance to the Western Waterfront, and provides a critical bicycle and pedestrian link between the Western Waterfront and the planned alignment of the East Coast Greenway. The northern terminus is NJ Route 7 / Newark Avenue. This segment is designed to accommodate the travel demand associated with a potential retail development scenario described in section 8.2.7 above.

This section poses a number of challenges, including constraints presented by the public housing complex along the eastern side of the roadway, tight horizontal curves, a Conrail railroad embankment, and the need to maintain access to Broadway west of the corridor for

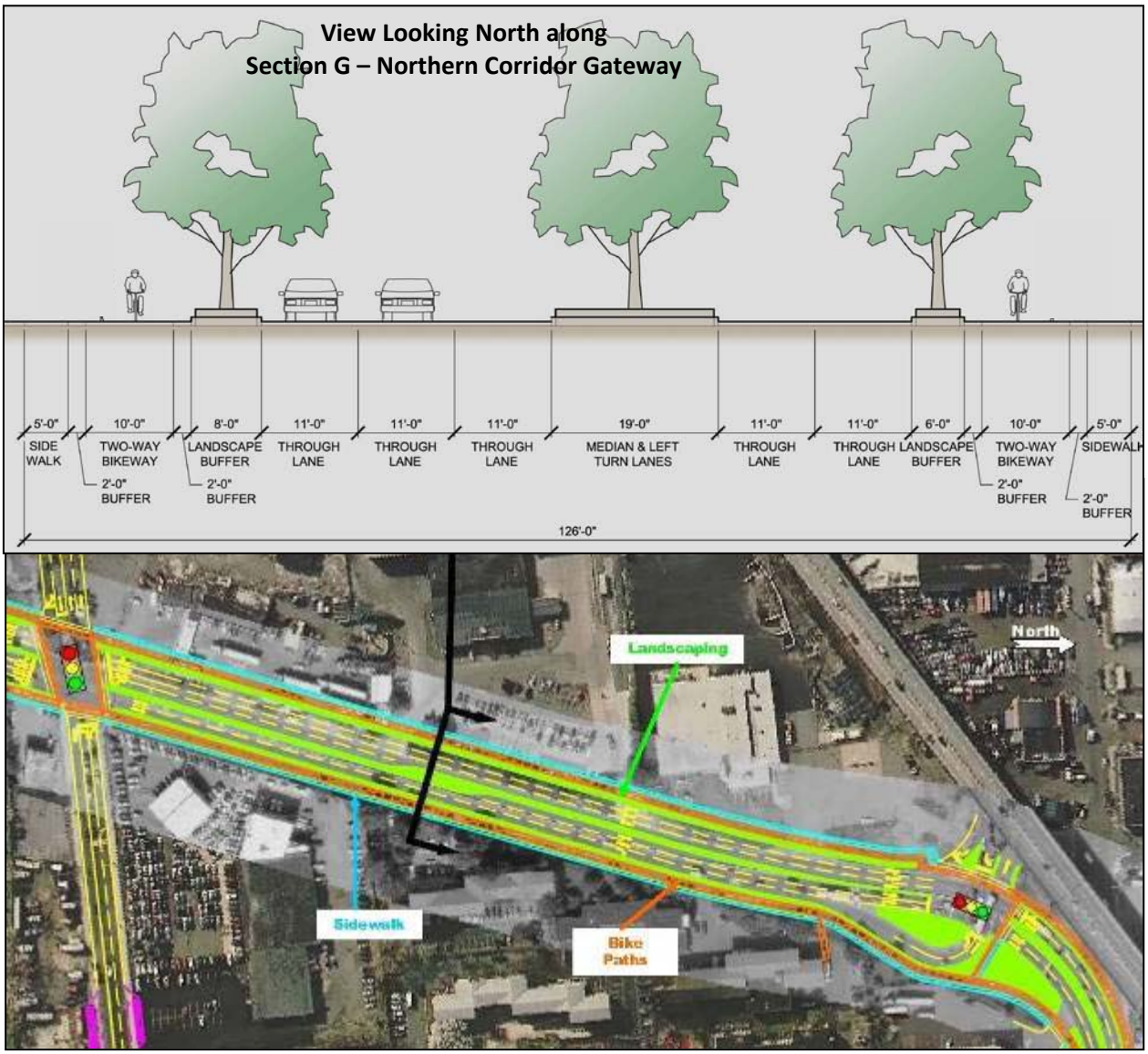
access to the Pulaski Skyway. Intersection enhancements, upgrade of the traffic signal system and integration of landscaping, bicycle and pedestrian accommodations, and additional travel lanes for segments of the street between Sip Avenue and Broadway significantly improve the operations and aesthetics of this section of the corridor.

The Northern Corridor Gateway includes two separate sections: Section E—Lincoln Park that is described in 8.2.6 above, and Section G—Northern Gateway and Broadway Frontage. The Northern Corridor Gateway section provides three landscape strips that create a green Corridor Gateway to define the northern portal to the Western Waterfront (Figure 8.24).

In the portion of this section between Sip Avenue and Broadway, the right-of-way is 126 feet with the number and configuration of the travel lanes varying along the length of the section. On the northbound side the section begins with two 11-foot wide travel lanes, widening to three 11-foot wide lanes 550 feet north of Sip Avenue. The rightmost lane becomes a dedicated exit lane to the Broadway jughandle. The northbound travel lanes are abutted by a six foot wide, 20-inch high raised planter containing a mix of shrubs and trees with a dense canopy. The elevated planter is offset from the travel lanes by a 6-inch high concrete curb. The 19 foot wide strip adjacent to the raised planter includes a two foot paved safety and drainage buffer, a 10 foot wide two directional bike path, another two foot wide paved buffer, and a five foot wide sidewalk.

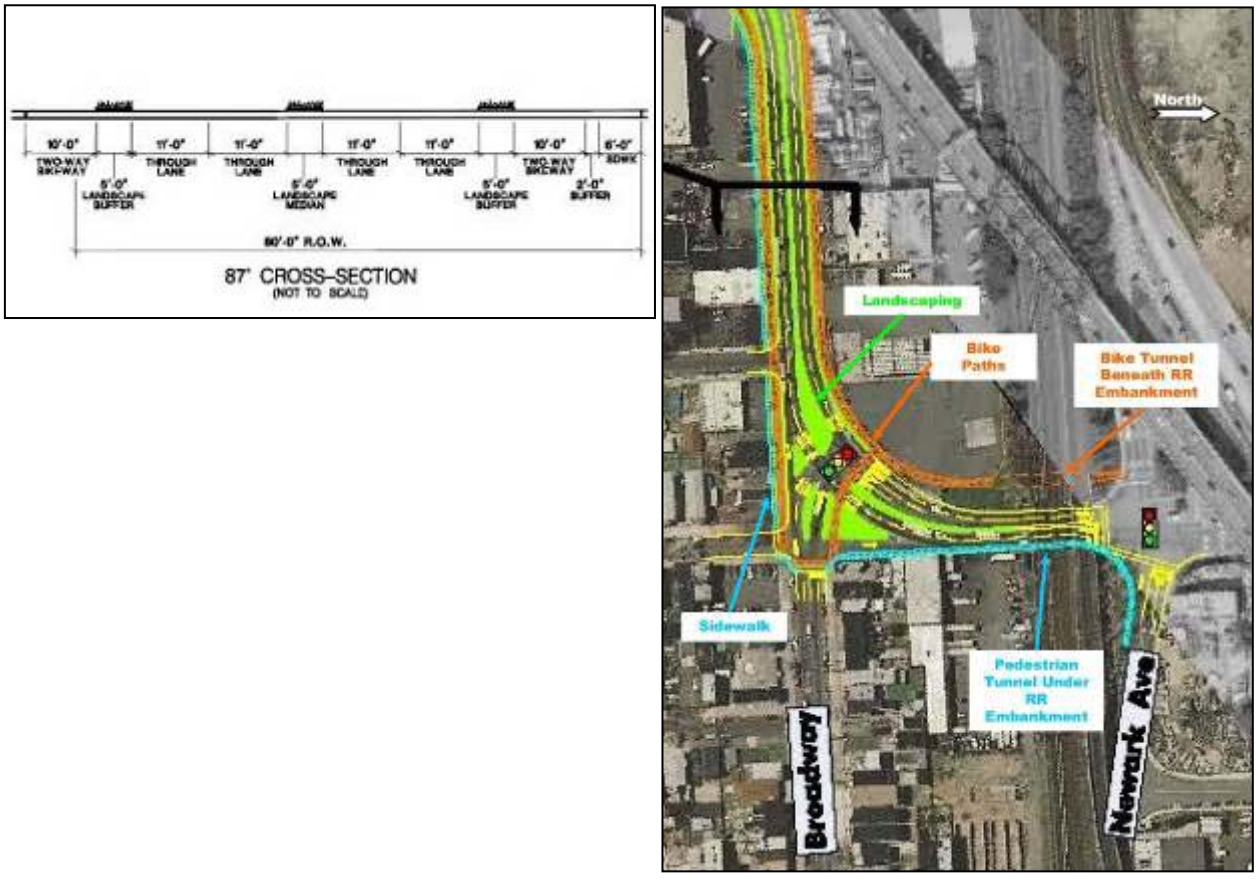
Along the southbound side, there are three 11-foot wide travel lanes along the length of the section. A dedicated left turn lane begins approximately 475 feet north of Sip Avenue. Right turns are permitted from the outermost travel lane at Sip Avenue. The southbound travel lanes are abutted by an eight foot wide twenty-inch high raised planter with a mix of shrubs and trees with a dense canopy. The raised planter is offset from the travel lanes by a 6-inch high concrete curb. The 19 foot wide strip adjacent to the raised planter will include a two foot paved safety and drainage buffer, a 10 foot wide bike path, another two foot wide paved buffer, and a five foot wide sidewalk.

Figure 8.24: LPA Section G – Northern Gateway



Along the Broadway frontage (Figure 8.25) the boulevard and complete street provides two 11-foot wide travel lanes in each direction. These lanes are separated by a 5-foot wide grass median. A five-foot wide grass strip is provided along both outer edges of the travel lanes, providing separation from a 10-foot wide bike path. Along the northbound side, the bike path is separated from a 6 foot wide sidewalk by a two-foot wide paves buffer.

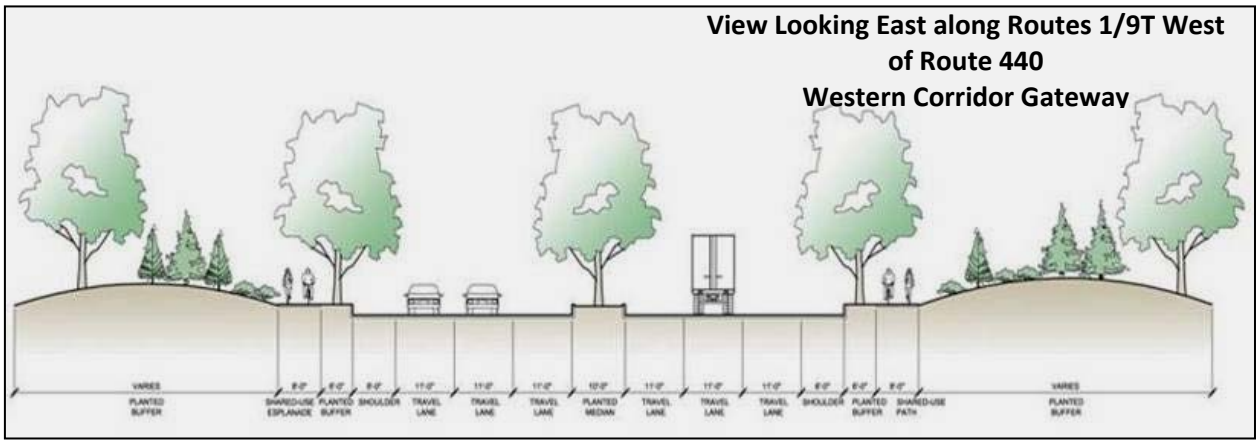
Figure 8.25: LPA Section G – Broadway Frontage



8.2.9 Western Corridor Gateway

The Western Gateway spans a 600 foot section of Route 1&9T from a point 900 feet west of the intersection with Route 440 to the point where the embankment of the bridge crossing over the Hackensack River begins. The bridge has pedestrian walkways on both sides, but lacks discrete facilities for bicycle accommodation. Within the corridor gateway, the LPA provides for a 12 foot wide, 20 inch high, raised planter center median (Figure 8.26) that separates the eastbound and westbound travel lanes, and contains a mix of shrubs and trees with a dense canopy. The raised planter prevents vehicular collisions with trees and oncoming vehicles, and the dense shrubbery deters midblock crossings by bicyclists and pedestrians. The existing travel lanes (three in each direction) and shoulders are maintained along this section.

Figure 8.26: Western Gateway – Lincoln Highway (1&9T) Westbound Approach to Route 440



Along both sides of the roadway, adjacent to the roadway shoulders, a 6-foot wide landscape buffer separates the roadway from an eight-foot wide shared use bicycle/pedestrian path. These landscape strips are elevated 20 inches above the roadway surface, contained by vertical walls with a decorative stone face. Elevation of the strip prevents vehicular collisions with the trees planted within the landscape strips, and the landscaping provides a buffer between the roadway and the bicycle and pedestrian paths. Along the northern side of the roadway, the landscape strip and shared use path will be constructed partially within Lincoln Park, and will serve to buffer the recreational uses within the park from traffic noise while creating an attractive visual edge to the Western Gateway. The strip will vary in width along its length due to the existence of the baseball fields located within Lincoln Park and an increase in elevation of the roadway as it approaches the bridge.

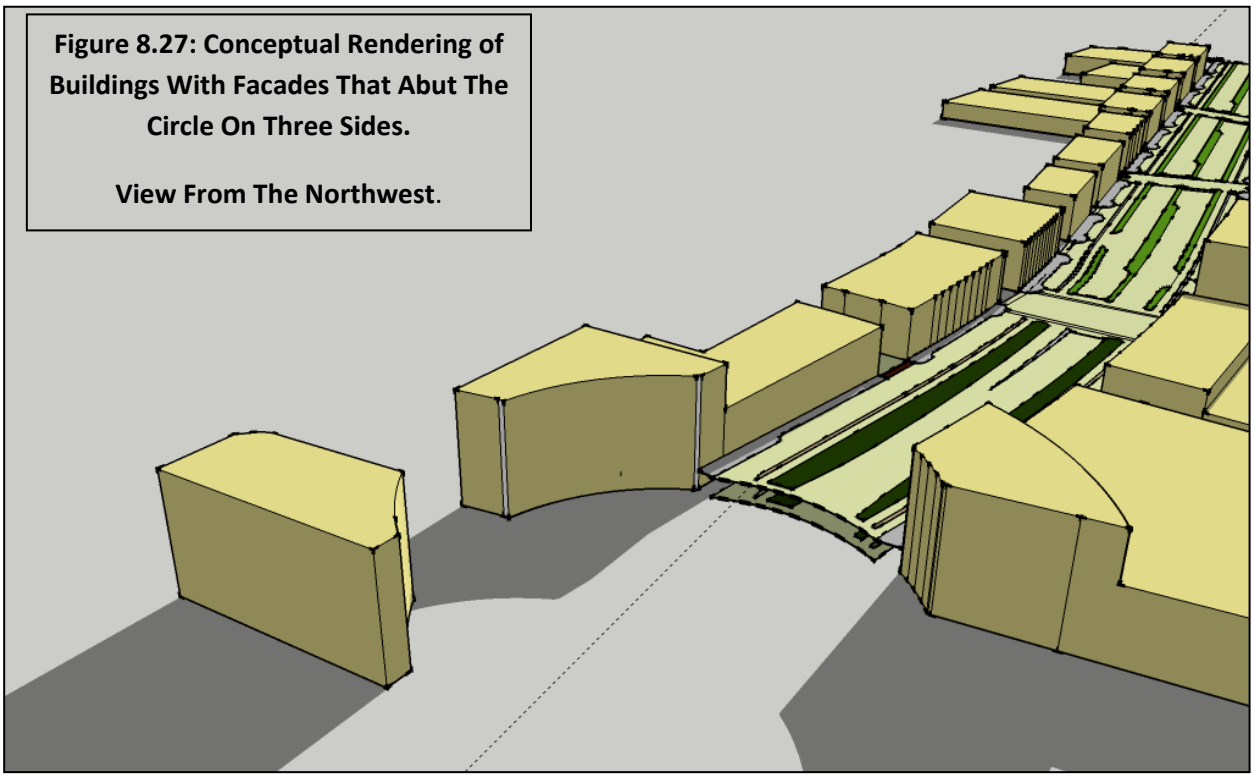
The properties along the southern side of the roadway are planned for redevelopment as recreational uses. A new right-in right-out center spine road will traverse the length of the Hudson Mall Growth Area (See concept grid of local streets in Figure 6.2). Between the bridge and the northern entrance to the center spine road, the landscape strip and shared use path along the southern side of the roadway will be integrated into the redevelopment plans for these properties. Discrete sidewalk and bike paths will be provided along the street between the center spine road and the Gateway Circle, buffered by a similar landscape strip.

8.2.10 Central Circle Gateway

The intersection of Route 440 / Routes 1&9T with Communipaw Avenue / Lincoln Highway represents a key building block of the entire Western Waterfront redevelopment vision. The roadway components of the circle accommodate vehicular travel demand, while the landscaping and public amenities within and surrounding the circle create an attractive public realm and form a focal point of the Western Waterfront, thereby enhancing and supporting a vibrant, livable community. The Central gateway Circle is not simply a component of the transportation infrastructure or an isolated public space. The circle and the amenities it includes are integrated into the surrounding neighborhood, effectively becoming the "front yard" of the future development that surrounds the circle (Figure 8.27).

Figure 8.27: Conceptual Rendering of Buildings With Facades That Abut The Circle On Three Sides.

View From The Northwest.



Numerous examples of traffic circles serving as a central focal point of a community exist throughout the world. Some are basic in design and treatment, while others are highly ornate and visually spectacular. Detailed design of the public space to be created within the circle is to be developed as part of the preliminary engineering phase of the project delivery pipeline. The design philosophy to be followed is set forth in the Urban Design Guideline Manual (see section 10). Figure 8.28 depicts but one example (Columbus Circle) of the use of space within a traffic circle for the creation of a vibrant public space. Columbus Circle is located at the intersection of

Eighth Avenue, Broadway and Central Park South (59th Street) in the borough of Manhattan in New York City, at the southwest corner of Central Park.

The diameter of the outer edge of the outer travel lanes of the Columbus Circle (approximately 310 feet) is slightly less than the diameter of the Gateway Circle (360 feet). Columbus Circle incorporates five travel lanes around the circle, leaving an interior space of approximately 160 feet in diameter (0.47± acres) compared to the 300 foot diameter (±1.65 acres) interior space and two travel lanes of the Gateway Circle.

This is an example of a more ornate treatment of the public space within a circle. Many of the basic principles that will govern the final design of the circle in the Western Waterfront are exhibited in the example treatment, incorporating a central feature with a high vertical scale surrounded by a large, open and well lighted public gathering space. Extensive landscaping enhances the public space, with wide hardscaped pathways providing access to the center of the circle. Crossing of the circle travel lanes is accommodated at multiple signal-controlled locations around the circle. Land development abuts the outer ring of the circle, serving to integrate the circle into the surrounding neighborhood.

Figure 8.28: Example of Urban Design Treatment of a Circle

Columbus Circle – Borough of Manhattan, New York City ***Source: theolinstudio.com***

8.3 HBLR Grade Separated Crossing Design Considerations

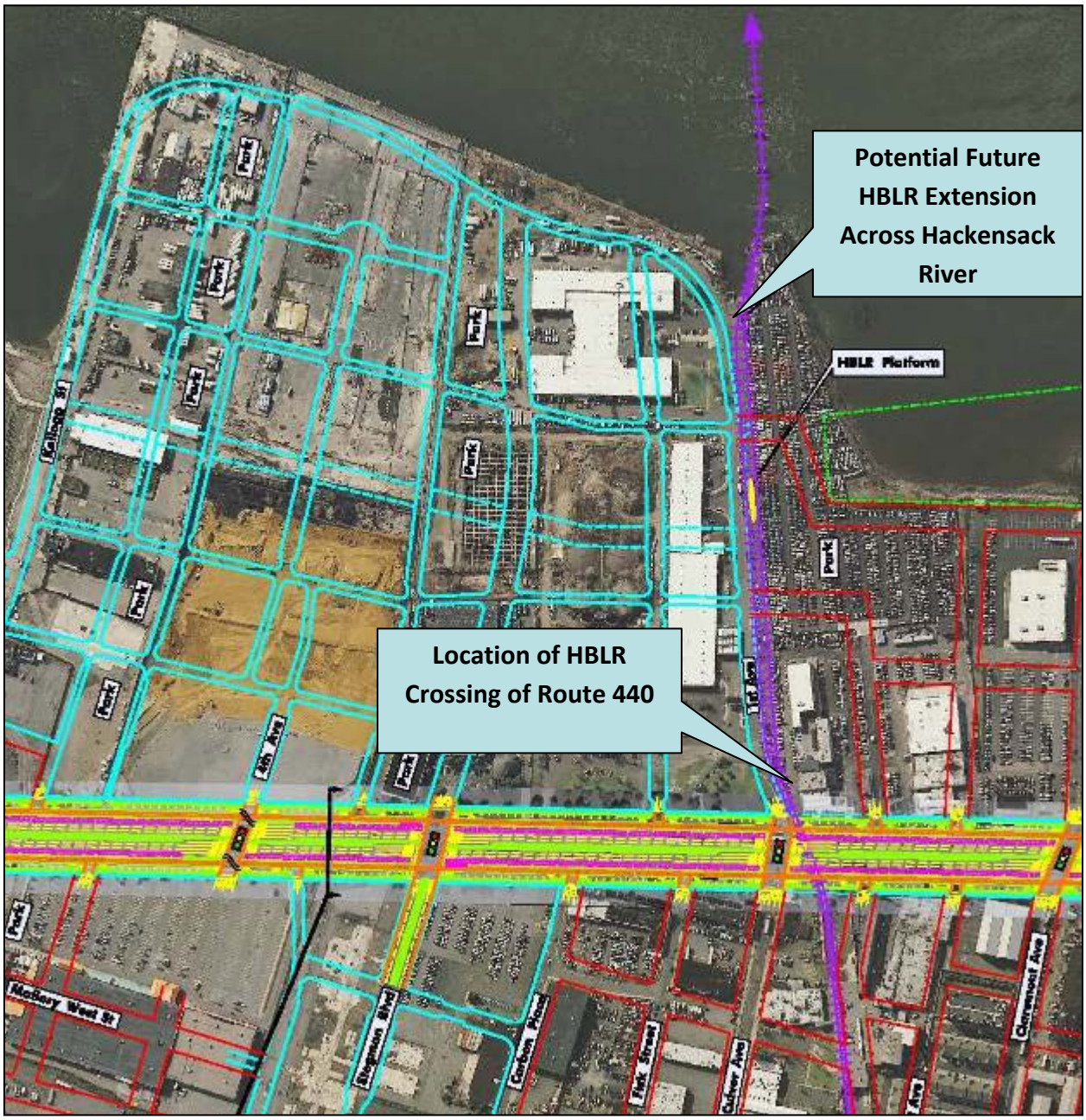
One goal of the urban boulevard concept focuses on achieving a truly multi-modal approach to connecting the waterfront redevelopment areas to residential and commercial areas east of Route 440/Routes 1&9T. NJ TRANSIT has completed a Hudson-Bergen Light Rail Route 440 Extension Alternatives Analysis, which evaluated alternatives for extending the existing Hudson-Bergen Light Rail (HBLR) from its existing terminal station located in the vicinity of West Side Avenue and Claremont Avenue. In their report *Hudson Bergen Light Rail Route 440 Extension Alternatives Analysis – Jan 28, 2011,* NJ Transit identified their preferred alternative for an HBLR extension to the northern edge of Bayfront (figure 6.3).

The Route 440/Routes 1&9T study is not responsible for the planning or design of the HBLR extension; however, it is to the benefit of future corridor design for the Route 440/Routes 1&9T study to incorporate the spatial requirements for the HBLR extension into the LPA. This way, the potential future extension of the HBLR will be less likely to conflict with planned or completed improvements associated with the Route 440/Routes 1&9T study. The following sections describe the spatial and design considerations associated with light rail transit (LRT) infrastructure development. Standards, regulations, and guidelines described in the following sections are established by NJ TRANSIT or other agencies and apply to all LRT projects in New Jersey.

8.3.1 Alignment

The preferred alternative of the NJ Transit study is an extension that is located generally within the old Central Railroad of New Jersey (CRRNJ) right-of-way which extends in a westerly direction from the existing West Side Avenue Station to the intersection of Culver Avenue and Route 440 to the waterfront where the remnants of the original CRRNJ Bridge across the mouth of the Hackensack River remain today. This is consistent with the alignment that is envisioned in the Circulation Element of the Jersey City Master Plan. Figure 8.29 depicts the Locally Preferred Alternative alignment of the crossing of Route 440, immediately north of Culver Avenue, as well as the alignment of a potential future additional extension that is envisioned by the Circulation Element of the Jersey City Master Plan, but was not a subject of the NJ Transit Alternatives Analysis

Figure 8.29: Location of Planned HBLR Crossing of Route 440



Hudson Bergen Light Rail Route 440 Extension Alternatives Analysis – Jan 28, 2011

The existing HBLR line at West Side Avenue is grade separated. The preferred alignment being advanced by NJ TRANSIT would continue to be grade separated from West Side Avenue to a new stop within Bayfront on the north side of First Avenue. Vertically, there are no steep

grades to overcome in order to provide adequate clearance over Route 440. Horizontally, the alignment would mostly be on tangent track or very large curves. It is anticipated that no exceptions to the NJ TRANSIT light rail transit (NJT LRT) design standards will be required.

Figure 8.30: Double Track Light Rail on Viaduct

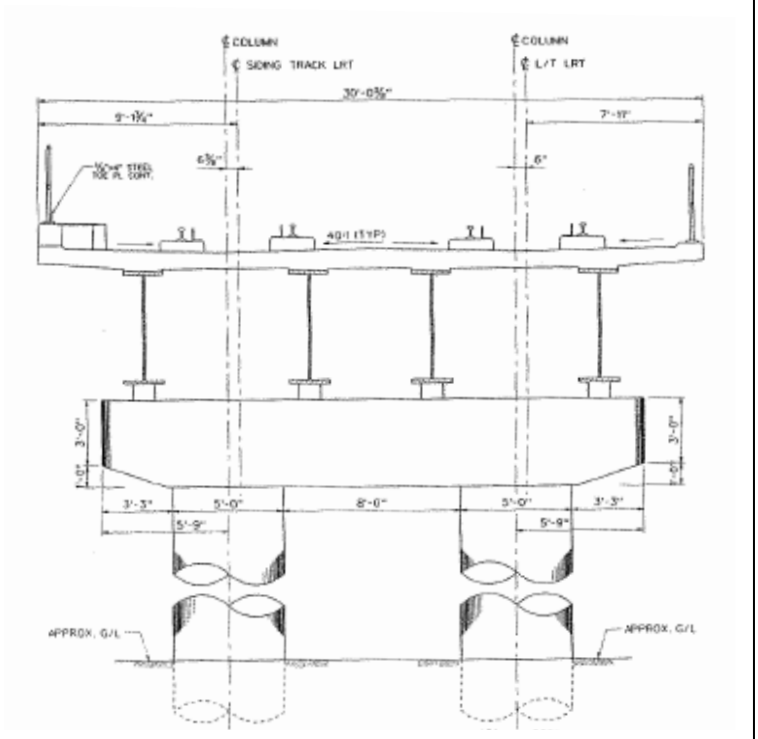
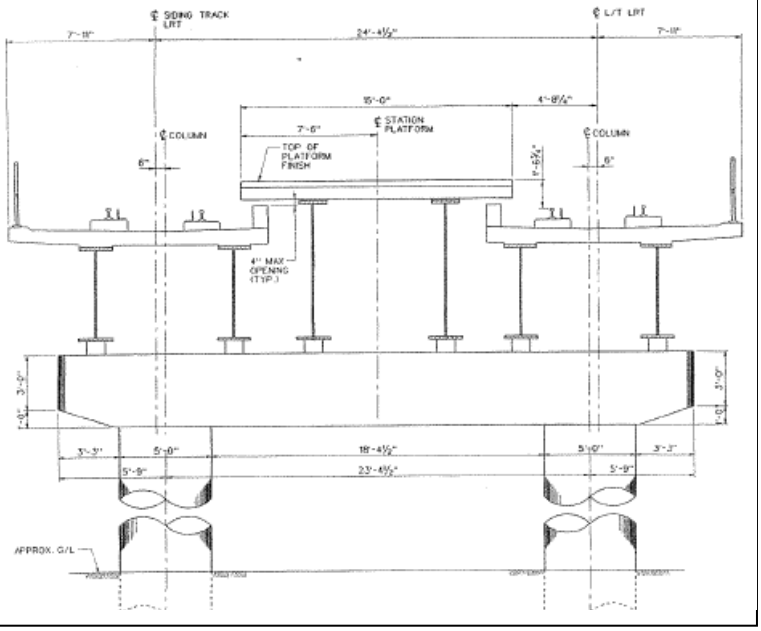


Figure 8.31: Double Track Light Rail on Viaduct with Center Platform



The 2-track HBLR extension would most likely be on viaduct that would range in width from a minimum of 30 feet to approximately 45 feet dependent upon station and emergency access requirements along the route. NJ TRANSIT light rail design criteria requires that all rail on viaduct exceeding 350 in length be directly fixed to the concrete deck of the viaduct, not placed on ballast, which is permitted for viaduct lengths of less the 350 feet. As the total length of the route on viaduct is approximately 2,600 feet, this requirement applies to the potential HBLR extension located on viaduct. Additionally, as per Federal Highway Administration regulations, the viaduct structures must clear a vertical distance of 16 feet, 6 inches when they pass over Route 440. Figures 8.30 and 8.31, taken from the HBLRT MOS-3, 8th Street Bayonne Extension, typify anticipated viaduct configurations.

8.3.2 Support Columns within the Boulevard

While the NJ Transit study does not define design details for the preferred alternative, it is envisioned that the HBLR will cross Route 440 above grade, with a minimum under clearance of 16 feet – 6 inches from the road surface to the bottom of the HBLR viaduct structure. Allowance will need to be made for the increase in elevation of the existing roadway surface that is envisioned by the LPA. Within the Central Section, the roadway surface elevation will be increased to 14 feet. Allowing for a 16-foot 6-inch clearance from the road surface to the bottom of the overpass, and approximately four feet for structural elements on the overpass, the HBLR rails will be approximately 20-foot 4-inches above the roadway surface. Hammer-head type bridge piers will likely be employed to support the structure. In their typical configuration, two piers are utilized adjacent at each support location, one center beneath each track. The base of the pier is approximately 5-feet in diameter, with the piers spaced approximately 13-feet on center. In this configuration, an area of approximately 5-feet by 18-feet must be reserved for each support location.

Figure 8.32 depicts a likely configuration for the general locations of the support piers for a crossing of Route 440. Assuming that the width of the Route 440 Boulevard in the vicinity of the anticipated HBLR crossing totals 232 feet, and that the HBLR would cross at a slight angle, a span of approximately 250 feet would be required. To accommodate the minimum depth of structure on the bridge itself, up to five (5) pier locations could potentially be required. While use of fewer piers is physically possible, reducing the number of pier locations would increase the length of unsupported bridge spans, increasing the depth of structure required to support the track and the cost of construction. In the 5-pier configuration, a pier would be placed within each median,

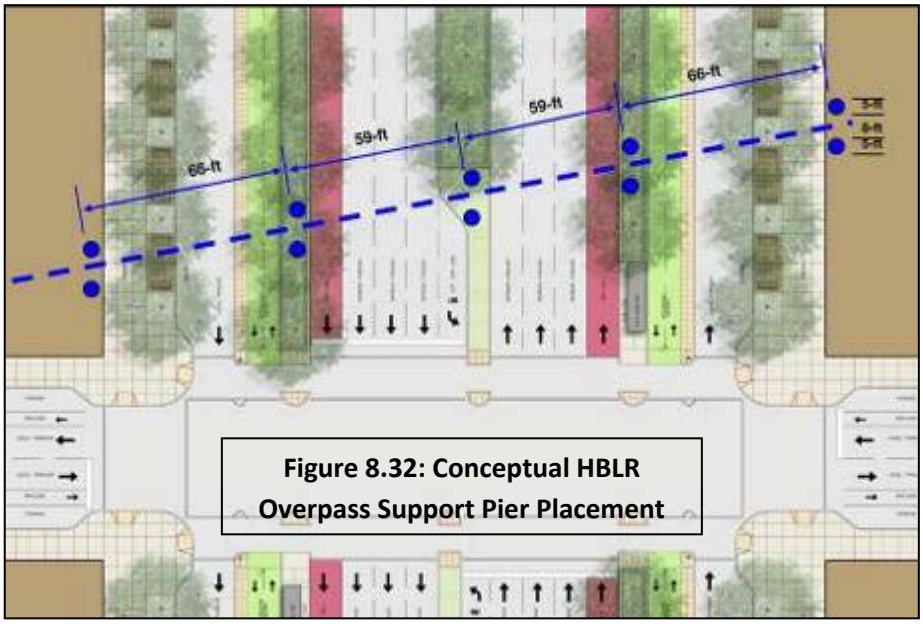


Figure 8.32: Conceptual HBLR Overpass Support Pier Placement

and on each side of the boulevard outside of the planned building lines. This would create four bridge spans, two of approximately 66-feet in length and 2 of approximately 59 feet.

Exact dimensions and placement of the piers will be determined by NJ Transit in their future design of the HBLR extension. As part of the final design process, consideration would need to be given to the exact placement of the subsurface utilities that exist within the areas planned as planted medians. Most critical would be the minor median separating the through lanes from the local lane on the northbound side of the boulevard. A 36-inch diameter force main runs along the roadway within this median. Based upon a review of available utility plans, this force main generally runs along the western edge of the median beneath the area envisioned as a 10-foot wide planting space. Assuming that the force main is directly up against the western edge of the median, a total of 7 feet of lateral space would remain for placement of the bridge piers. The exact location would be determined in the preliminary and final design process. Further, the piers could be skinned with materials of different color or texture to integrate with and enhance the visual and aesthetic environment that will characterize the Route 440 Boulevard.

8.3.3 Vertical and Horizontal Clearance

In New Jersey, LRT service draws electric traction power from an overhead contact wire system. This would be true of the proposed HBLR extension, as well. To ensure safe transmission of electric traction power, vertical clearance above the roof of the light rail vehicle is required. Table 8.3 summarizes vertical clearances from the top of high rail of any given section of track to the soffit or low chord of any overhead structure.

Table 8.3: HLRT Minimum Vertical Clearances

Vertical Clearance	Design Evaluation
19 feet 6 inches	Preferred Minimum
15 feet 0 inches	Desired Minimum
14 feet 3 inches	Absolute Minimum

Horizontal or lateral clearance from a centerline of track to the nearest point on an obstruction (e.g. catenary pole, railing, structure, etc.) must be 9 feet 0 inches.

8.3.4 Pedestrian Access across the Boulevard to the Bayfront HBLR Station

The signalized intersections along the corridor have been designed to provide adequate time as part of the signal phasing to safely accommodate pedestrian crossing of the corridor at grade. Pedestrian bridges over the boulevard are unnecessary, inconsistent with the vision of the LPA, and would have a detrimental aesthetic impact to the boulevard.

8.3.5 Emergency Access

NJ TRANSIT requires an emergency walkway and/or maintenance path for the entire length of LRT viaduct structures. A minimum clear width of 30 inches (48 inches desirable) is required between the clearance envelope of the LRT vehicle and any continuous obstruction alongside the track. Given the anticipated design of the HBLR extension, it is anticipated that at least one point of emergency egress will be required from the viaduct between West Side Avenue and Route 440. This width is incorporated in the viaduct sample schematics depicted previously (Figures 8.30 and 8.31).

8.3.6 Maintenance Access

NJ TRANSIT requires access to all areas of LRT viaduct structures. The access path is typically located directly underneath the structure or adjacent to the structure. Due to safety and security reasons, NJ TRANSIT typically prohibits anything being built or stored under the viaduct, and access under the viaduct is limited. Design and construction of the BRT stations proximate to Culver Avenue will be coordinated with NJ Transit as part of the preliminary engineering phase of this study.

For the HBLR extension, access discussions should take place with NJ TRANSIT early in the planning process of the project to discuss circulation under the proposed viaduct. NJ TRANSIT may require fencing or another form of barrier beneath the viaduct to limit unauthorized access to the overpass structure and the tracks. These requirements may affect pedestrian and bicycle circulation along Route 440 in the vicinity of the HBLR overpass.

8.4 Summary and Conclusions

Of all of the varied alternative concepts evaluated, the Locally Preferred Alternative detailed above best addresses the defined purpose and need, and supports the goals and objectives of the Circulation Element of the Jersey City Master Plan. The transportation infrastructure is

designed to accommodate future traffic demand through the year 2050, at which time it is anticipated that the Western Waterfront of Jersey City will be fully developed. Key features and benefits of the LPA include:

- The boulevard and complete street is designed to accommodate heavy trucks traveling along and across the corridor. Even if heavy through trucks are diverted to other travel paths, there will still be a need for heavy trucks to service the future developments in the Western Waterfront.

- Segregated through-travel lanes within the central boulevard (Danforth Avenue to Communipaw Avenue), separate traffic from the adjacent development creating a calm environment and supporting livability and quality of life in the existing and future neighborhoods along the corridor.

- Local travel lanes are provided within the central boulevard to accommodate neighborhood access and circulation. Local neighborhood and boulevard circulation are enhanced by a network of local cross-streets.

- The boulevard and complete street provided improved traffic operations and reduced congestion along the length of the corridor. All approaches to all intersections along the corridor operate at acceptable levels of service during the peak travel demand periods through the year 2050.

- On-street parking is provided along the length of the local lanes, accommodating short-term parking needs while providing a buffer between the local travel lane and the sidewalk, helping to reduce noise and enhance public safety.

- The entire corridor is posted with a speed limit of 30 mph. This reduced speed limit reduces road noise and supports a calm traffic environment that encourages bicycle and pedestrian activity. The reduced speed limit coupled with the spacing of the traffic signal controlled intersections supports a coordinated traffic signal timing plan that minimizes vehicle stopped delay time along the corridor, reducing congestion of vehicle emissions that degrade air quality.

- A variety of public transit alternatives, including local bus service, BRT service and an extension of the HBLR are incorporated into the boulevard and complete street to further reduce dependence on the automobile for travel to, from and within the Western Waterfront.

- An attractive and safe network of sidewalks providing access to all neighborhoods and existing and future parks along the corridor, as well as access to public transit opportunities is provided. These sidewalks provide pedestrian accommodation both along and across the boulevard, and include space for pedestrian amenities such as sidewalk cafés, kiosks, benches, street trees, etc.

- A comprehensive network of bicycle paths providing access to all neighborhoods and existing and future parks along the corridor, as well as access to public transit opportunities is provided. This network of bicycle paths along and across the boulevard provides a recreational amenity for bicyclists and connections to the existing and future parks along the corridor as well as the East Coast Greenway.

- Safe crossing of the corridor by bicyclist and pedestrians is accommodated at all traffic signal controlled intersections with the exception of the at-grade intersection under the Gateway Circle. Bicyclists and pedestrian crossings of Communipaw Avenue are accommodated on the Gateway Circle above the intersection.

- Landscaping along a majority of the corridor is placed in continuous 20" high raised planters. The height of the planters combined with the dense landscaping within deter mid-block crossing of the corridor by bicyclists and pedestrians.

- Extensive landscaping is provided throughout the corridor creating a visually appealing environment and reducing impervious cover and enhancing sustainability.

- The elevated traffic circle provided approximately 1.65± acres within its interior for creation of a new public space. This space is accessibly by bicyclists and pedestrians at four traffic signal controlled intersections around the circle.

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