

Figure 17: Pembroke SGA Location Map

Newtown Road to Town Center

From Newtown Road to Town Center, the former NSRR right-of-way is generally straight, running east/west. The majority of the corridor runs through developed areas—commercial, industrial, and residential. See Sheets 1 through 11 for a more detailed layout of this section.

Strategic Growth Areas

The westernmost end of the project corridor, near Newtown Road, is a part of the City of Virginia Beach's Newtown SGA. The Newtown SGA extends through Greenwich Road, bordered on the east by Interstate 264 (see Figure 16). According to the SGA plan, the vision for this area is to create a mixed-use village center, business parks, an educational campus, new light industrial space, and new residential neighborhoods. The guiding recommendations for this SGA include creating interconnected pedestrian and street frameworks, building mixed-use and transit-oriented development, and extending a bicycle and trail system through the site; all of these align with the implementation of a shared-use path.

The next designated area to the east is the Pembroke SGA (see Figure 17). The Pembroke SGA extends along the project corridor starting on the east side of Interstate 264, and stretches through Town Center to the west bank of Thalia Creek. The plan for the vision of this SGA is to be a central urban core with a vertical mix of urban uses. Mobility and transit alternatives are included in these uses. The recommendations established in the Plan include implementing transit-oriented development around planned transit stations; a shared-use path would effectively enhance transit-oriented development and pedestrian mobility. Both the Newtown and Pembroke SGA plans include a shared-use path along the transit way.

Street Crossings

In design of the proposed light rail, HRT will review and consider all north/south crossings of the sidewalk or shared-use path over the proposed light rail tracks. If not at a controlled crossing and where rail operations permit, bicycle and pedestrian traffic will cross the LRT tracks using a Z-crossing (See Figure 18). A Z-crossing is

channelized, controlled pedestrian movement designed to promote safety. As recommended by FHWA, the design of a Z-crossing forces a pedestrian to turn toward an approaching transit vehicle before they cross each track. This configuration helps to ensure that pedestrians are aware of any oncoming traffic before proceeding to cross. In addition to the Z-crossings, fencing and channelizing devices will be installed to force users of the sidewalk and shared-use path to the appropriate crossing locations.

Outlined below, this study specifically focuses on the east/west crossings of the sidewalk or shared-use path across roadways.

The first section of this project, from Newtown Road to Town Center, incorporates at-grade, mid-block, signalized, and elevated street crossings.

Table 2

	At-Grade	At-Grade Mid-Block	At-Grade Signalized	Elevated
Newtown Road			X	
Princess Anne Road			X	
Freight Lane	X			
Greenwich Road		X		
Witchduck Road			X	
Pennsylvania Avenue	X			
Dorset Avenue	X			
Euclid Road		X		
Kellam Road		X		
Independence Boulevard				X
Market Street	X			
Constitution Drive		X		

All at-grade crossings will be handled on a case-by-case basis. Typically, an at-grade crossing will be stop controlled and cross perpendicular to the vehicular travel way. Safety measures including but not limited to signage, flashing beacons, bollards, channelization, and gates will be employed as necessary. Signalized at-grade crossings include intersections with existing signals as well as those with proposed future signal installations. Pedestrian movements will be incorporated into the signal designs.

The first major intersection that the shared-use path will cross is Newtown Road. This crossing will take advantage of the existing signal at the Curlew Drive/Newtown Road intersection to control pedestrian and bicycle traffic moving through the intersection.

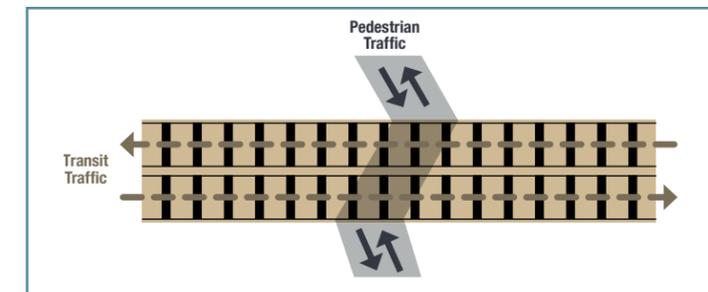


Figure 18: Z-Crossing Schematic

The next significant intersection is at Princess Anne Road. The existing NSRR track crossing infrastructure, distinguished as exempt, is set-up as a mid-block crossing. According to Section 4C.05 of the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), a Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is heavy enough that pedestrians experience excessive delay in crossing the major street. The MUTCD outlines how to identify a location that has a need for a controlled pedestrian crossing; further analysis of each proposed mid-block crossing location will be needed as the shared-use path project progresses. In this particular location, it is expected that a signal will be installed at Princess Anne Road and Freight Lane. Therefore, the shared-use path veers away from the light rail track alignment to follow the existing sidewalk along Princess Anne Road. This brings pedestrian traffic to the signalized intersection at Freight Lane, where they can safely cross. There will be rail crossing signals at this location with gates that lower when a train approaches. This will allow pedestrians and bicyclists to cross Princess Anne Road at the same time as the light rail trains cross.

Freight Lane is a minor street crossing. It will be an at-grade crossing with the shared-use path parallel to the track. The traffic volumes on Freight Lane are low, and no specific traffic control will be used for the pedestrians and bicyclists other than stop signs on the paths.

The next street crossing heading east is South Lowther Drive. This is a two-lane road that serves a Dominion Power facility north of the light rail tracks. The Dominion Power facility has access from Greenwich Road and the conceptual HRT plans show this crossing to be closed south of the tracks. Therefore, the shared-use path will not be in conflict with vehicles at this location.

As the light rail tracks near the Interstate-264 underpass, the track alignment shifts north to have sufficient clearance through the existing piers. Because of this constraint, a sidewalk will not be provided on the north side of the tracks for this segment. Only the 14-foot shared-use path on the south side of the tracks will fit within the constrained right-of-way.

A mid-block crossing will be used for the 14-foot shared-use path at Greenwich Road. There will be rail crossing signals at this location that will warn motorists of approaching trains. This will allow pedestrians and bicyclists to cross Greenwich Road at the same time as the light rail trains cross. At all other times, stop signs will control pedestrians and bicyclists as they cross Greenwich Road. As a part of the improvements to Interstate 264, there will be a new Greenwich Road overpass of Interstate 264 constructed. When this occurs, existing Greenwich Road will become a cul-de-sac east of the rail crossing and traffic volumes will drop significantly.

The shared-use path will continue parallel to the tracks and under the elevated Interstate 264 crossing until South Witchduck Road. HRT's current typical section design under Interstate 264 is shown in Figure 19. At South Witchduck Road, the LRT tracks will be elevated to cross over Witchduck Road. Traffic from the shared-use path will cross under the LRT tracks, and continue north to the signalized intersection at Witchduck Road, the on-ramp to Interstate 264 and Southern Boulevard (which is the access to the Witchduck Transit Station). The Witchduck Road/Southern Boulevard intersection will be signal-controlled, and the shared-use path crossing will be at-grade. To ensure pedestrian traffic takes this route, channelization and traffic calming measures will be used, deterring any uncontrolled mid-block crossings. Pedestrian and bicycle traffic from the shared-use path will continue through the intersection, turn south on a 14-foot path parallel to Witchduck Road, pass under the elevated LRT track structure, and head eastward south of the LRT tracks. A sidewalk also will parallel Southern Boulevard to connect Witchduck Road to Witchduck Station.

Pennsylvania Avenue and Dorset Avenue are minor streets east of the Witchduck Road crossing that provide access to industrial facilities. These will be at-grade crossings with the shared-use path parallel to the track. The traffic volumes on the two minor streets are low, and no specific traffic control will be used for the pedestrians and bicyclists other than stop signs and stop bars on the path. Bollards, or other path-traffic calming measures, will be considered at the street crossings during the design stage of the shared-use path.

The next major intersection is with Euclid Road. At this location, the light rail tracks will cross Euclid Road at a skew. Holland Drive, Southern Boulevard, and Opal Avenue also converge near this point. The HRT light rail project proposes to realign the intersections both north and south of the rail crossing so that each road meets Euclid Road at a 90-degree angle. Since none of the intersections in this vicinity are signal-controlled, a mid-block crossing has been identified as the best approach to safely cross Euclid Road with the shared-use path traffic. The 14-foot shared-use path and 5-foot sidewalk will be stop-sign controlled. The alignment of the path will curve to slow traffic and create 90-degree crossings.

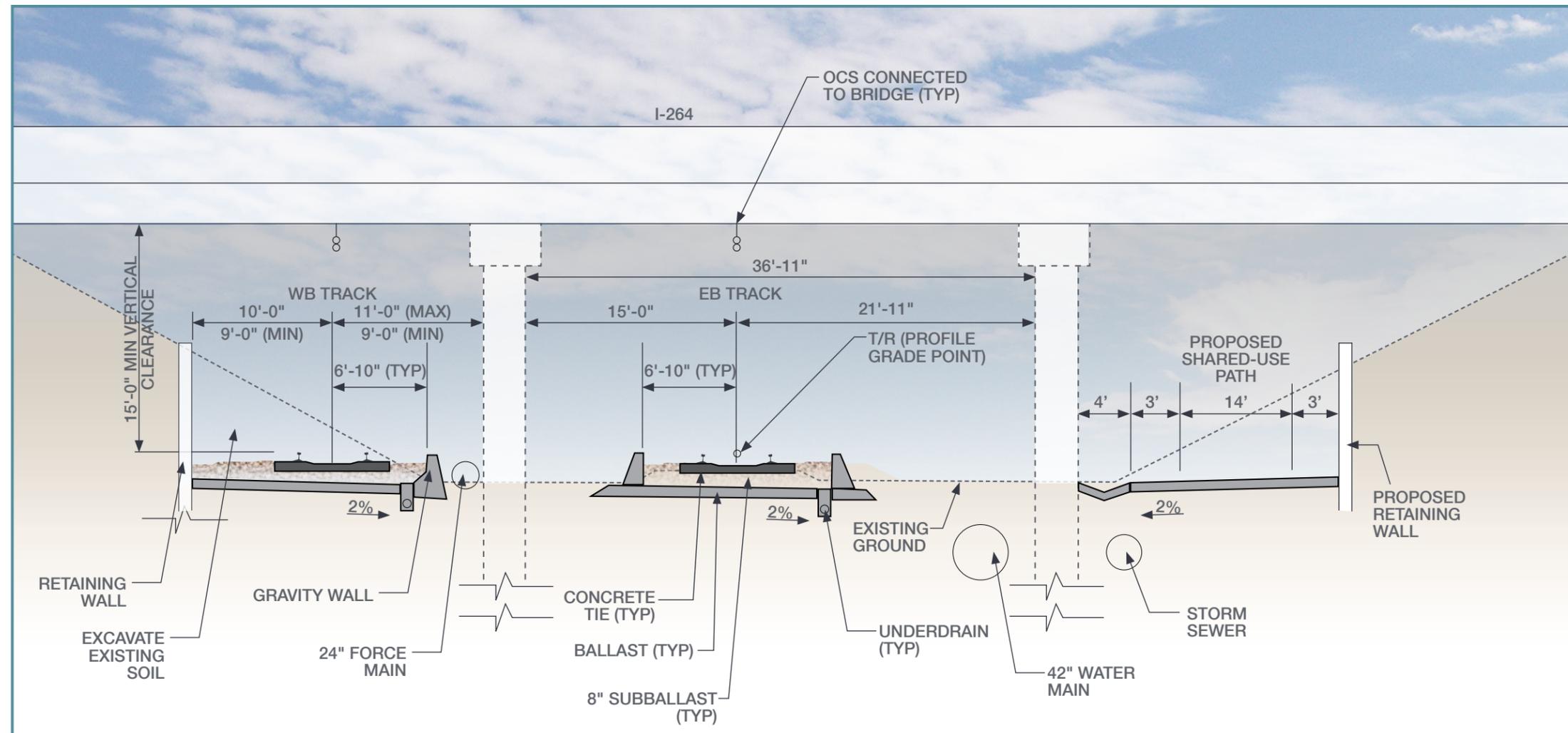


Figure 19: HRT's current typical section design under Interstate 264

The shared-use path and sidewalk also cross Kellam Road. It has been determined that a station will be included at Kellam Road. There will be crossings associated with that station utilizing sidewalks along Kellam Road. Shortly after crossing Kellam Road, the alignment of the LRT tracks curve to the north to avoid conflicts with the Dominion Power transmission lines. Because of this, there is not space within the right-of-way to continue the 5-foot sidewalk on the north side of the LRT tracks.

The crossing over Independence Boulevard requires special attention. As the 14-foot shared-use path approaches Independence Boulevard, the path will begin to elevate. The LRT track and shared-use path will both be grade-separated structures at this location. Although each requires a 16.5-foot clearance over Independence Boulevard, the two structures will be separate due to the different requirements for LRT versus pedestrians/bicyclists. The shared-use path will begin to elevate approximately 600 feet west of Independence Boulevard. The desirable grade for the shared-use path is 3.5 percent.

After crossing Independence Boulevard at the minimum required 16.5-foot clearance above the roadway, the pedestrian structure will begin to decline at a 3.5 percent grade. One viable option to bring the shared-use path traffic back to grade before Market Street is to implement an ADA compliant two-level pedestrian ramp. If the path remained straight, the ramp would meet existing ground immediately before Market Street, without sufficient room to stop safely. The implementation of the pedestrian ramp would allow for walkers and bicyclists to return to ground level at a safe speed and with ample room to stop before crossing Market Street. The ramp would run at a 3.5 percent grade and change direction twice with more than 200 feet in each direction, as shown in (Figure 20). The pedestrian ramp would incorporate a full 14-foot path width. This design provides a safe and effective path for walkers and bicyclists to safely cross over Independence Boulevard and cross Market Street at grade. As a second option, the path could instead utilize the Circuit City property to create a meandering path and

avoid the switchback design. This would inspire a promenade design and act as a feature point on the final design of the lot. Future development plans will be considered during the shared-use path design phase to assist in the determination of the best path alignment.

The current plan is that the Town Center transit station will be located east of Constitution Drive. The shared-use path will cross Constitution Drive mid-block. Pedestrian and bicycle traffic on the paths will be stop-sign controlled unless there is a train present. When a light rail vehicle is crossing, the shared-use path traffic can cross Constitution Drive.

Transit Stops

The pathway will start at the existing transit station at Newtown Road, near the City of Virginia Beach limits. The next proposed transit stop is the Witchduck Station, located to the east of Witchduck Road near Jersey Avenue. A station west of Kellam Road

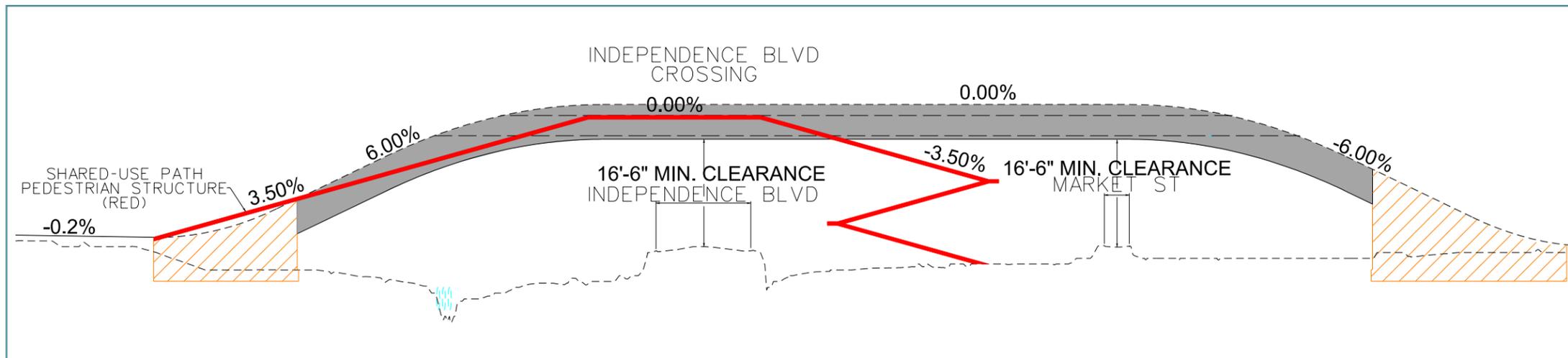


Figure 20: Profile of Pedestrian Crossing Over Independence Boulevard



Figure 21 : Layout of Pedestrian Crossing Over Independence Boulevard with Ramp to Market Street (for conceptual purposes only)

is being planned as part of the 30 percent design. The last stop in this series is proposed to be located in the Town Center area. The location of the station in Town Center is expected to be just east of Constitution Drive.

Drainage

In the development of the shared-use path, it is important to consider the facility as a stand-alone project. If the development of transit does not occur, the path should be able to operate as a functional bicycle and pedestrian facility. Along the majority of the corridor, the former NSRR right-of-way includes ditches along either side of the railroad tracks. Generally, there is 10 feet or more between the edge of the path and the right-of-way limit. However, in various locations, this existing ditch may be paved over by the path. In these cases, improvements to the drainage system will be required.

To identify outfalls for this section of the project, further studies will need to be conducted. Information and detail beyond conceptual plans need to be developed to identify off-corridor stormwater management. To transport stormwater runoff to each outfall, shallow wet or dry swales with an underground piped drainage system may be needed. Wet or dry swales will help to account for water quality and quantity. Rock check dams may also need to be used to meet quantity requirements. If this BMP is not sufficient, permeable pavement is an option as a supplemental BMP.

Preliminary Opinion of Probable Cost

Based on the conceptual level study, it is expected that the construction cost of the shared-use path facility for 3.5 miles from Newtown Road to Town Center will be about \$17.8 million. This includes the estimated \$6.5 million elevated structure over Independence Boulevard. On a cost per mile basis, this section comes in at roughly \$3.7 million per mile.

