

5 Roadway and Traffic Signals

The Roadway and Traffic Signal design was developed in close coordination with all other disciplines, but especially with the Track design as a significant portion of the alignment is semi-exclusive or mixed use, and the track and roadway are reflected on the same plan sheets. Similar to that described in Chapter 3 Trackwork and Alignment, changes to the roadway were in support of the development of the Draft Environmental Impact Statement (DEIS). More detailed design began upon receipt of FTA permission to enter the New Starts Preliminary Engineering (PE) phase. Throughout PE, the alignment has been refined to minimize impacts to environmental and community resources along the corridor. Coordination has been ongoing with state and local stakeholders, including Maryland State Highway Administration (SHA), Montgomery County Department of Transportation (MCDOT), Prince George's County Department of Public Works and Transportation (PGDPW&T), Maryland-National Capital Park and Planning Commission, the University of Maryland, the National Park Service, and numerous neighborhood groups along the corridor.

Design for the roadway and traffic signals was based on the criteria prescribed by the agency having jurisdiction, as well as the MTA Light Rail Transit Design Criteria. However, there are a number of locations where design exceptions will need to be approved. Generally, these are areas where the corridor is constrained by existing homes and businesses along the roadway, which would likely be displaced or otherwise adversely impacted if the criteria were met.

The basis for the Roadway and Traffic Signal design since the selection of the LPA is presented from west to east. For ease of reading, the corridor has been broken into specific roadways, or simply from west-to-east for individual traffic signals.

5.1 Roadway

The western-most segment of the LRT alignment is in exclusive ROW and has little direct impact on roadways. However, there are several roadways that the alignment crosses, either over or under, that do need to be modified or relocated as described below, in order to accommodate the alignment and/or specific station platforms. East of Silver Spring, and beginning at Bonifant Street, the alignment is primarily semi-exclusive or in mixed traffic. Most of the roadway in this area will need to be reconstructed to accommodate the transitway, either in the road, in the median, or immediately adjacent to the road. The following describes each roadway affected by the Purple Line alignment and why specific design elements were included.

5.1.1 Newdale Road

Newdale Road was not listed in the Montgomery County Functional Classification Listing of the Master Plan of Highways; therefore, the classification of Tertiary Residential Street with Sidewalk on Both Sides (MCDOT Standard No. 2001.02) was chosen because it most closely resembled the existing right of way and roadway widths. Since there is insufficient space to allow for the 8' buffer and 5' sidewalk between the proposed face for curb and wall locations, a design waiver must be requested from MCDOT.

The baseline of Newdale Road was based upon the existing crown line. The curb and gutter along the roadway on the south side needed to be replaced because it is within an area that will be used to construct the wall along the CCT and the bridge over Connecticut Avenue. A sidewalk was being placed in between the road and the wall in order to accommodate the new pedestrian traffic. The sidewalk shifts along the roadway to avoid existing below-ground gas vaults and above-ground gas meters. Since

the sidewalk was being replaced along the south side of Newdale Road, a new sidewalk ramp was added on the north side of Newdale Road at the intersection with Connecticut Avenue because there was not an existing ramp to receive the pedestrian traffic.

5.1.2 Jones Mill Road

Jones Mill Road was listed in the Montgomery County Functional Classification Listing of the Master Plan of Highways as a Primary Residential roadway. The MCDOT standard was chosen based on existing right of way and roadway widths (MCDOT Standard No. 2003.09). According to the typical section a 6' sidewalk width is required, but the width was reduced to 5' in order to reduce property impacts. The 5' minimum sidewalk width was obtained from "Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines, 2004" Section 403.5.3-Passing Spaces, so a design waiver must be requested from MCDOT. Also in the typical section a 10' buffer between the face of curb and edge of sidewalk is required. This 10' buffer was eliminated due to existing conditions not including a buffer in most of the area and additional property impacts if the buffer was incorporated. Since the buffer is not present, a design waiver must be requested from MCDOT.

The Jones Mill Road baseline was based upon the existing crown line south of the bridge and then curves to match the path of the roadway north of the bridge. This baseline does not follow the centerline of the roadway (striping) south of the bridge and was established because of MOT. The limits of full depth construction were determined by either the limit of excavation for the bridge abutment foundations or the limit of cross slopes transitions to match existing. The bridge widths were set based on the need to maintain minimum lane width requirements during MOT staging, on-road bike facilities and the intersection geometry. Overall permanent impacts to the Hirschhorn property were minimized by creating temporary impacts in order to maintain the minimum required MOT lane width requirements. The median islands were for the most part reconstructed in place since the intersection functionality was not redesigned. The exception is the median island just north of the bridge because the existing limits fell on the bridge. This island north of the bridge was reduced to fall completely off of the bridge and approach slab yet continues to channelize traffic as was its original intention.

5.1.3 Brookville Road

Brookville Road from Lyttonsville Place to Warren Street was listed in the Montgomery County Functional Classification Listing of the Master Plan of Highways as an Arterial roadway. The MCDOT standard Suburban Arterial Road was chosen based on existing right of way and roadway widths (MCDOT Standard No. 2004.07A). Brookville Road west of Lyttonsville Place was not listed in the Montgomery County Functional Classification Listing of the Master Plan of Highways, so the classification of Industrial Street was chosen because it most closely resembled the existing conditions regarding existing right of way and roadway widths (MCDOT Standard No. 2006.02). According to the typical section an 8' buffer between the face of curb and edge of sidewalk is required. This 8' buffer was eliminated west of Lyttonsville Place due to the existing conditions not including a buffer in most of the area. Due to the lack of a buffer and additional property impacts if the buffer was incorporated, a design waiver must be requested from MCDOT.

The baseline location was based upon the existing crown line. The cross slope of the eastbound lane transitions from the existing slope to match the incoming grades from the proposed Lyttonsville Place Bridge. The existing condition also has two islands to help channelize traffic. However, due to the inability of trucks (WB-50) to make right turns from Brookville Road onto Lyttonsville Place, only one of the islands is being replaced.

5.1.4 Lyttonsville Place

Lyttonsville Place was listed in the Montgomery County Functional Classification Listing of the Master Plan of Highways as an Arterial roadway. The MCDOT standard and typical section Suburban Arterial Road was chosen based on existing right of way and roadway widths (MCDOT Standard No. 2004.07A). According to the typical section an 8' buffer between the face of curb and edge of sidewalk is required as well as a 5' sidewalk width. The 8' buffer was eliminated due to existing conditions not including a buffer and additional property impacts if the buffer was incorporated. A design waiver for the 8' buffer must be requested from MCDOT.

The sidewalk width was increased to 12' due to anticipated high pedestrian utilization of this sidewalk to access the station, the Operations Center and the County Depot Facility. The typical section has been agreed upon by Montgomery County. Also, the typical section dictates that the distance from curb face to curb face should be 50'. The typical section used in design incorporated a 48' section which most closely mimics the existing conditions. In addition, utilizing a 50' section would increase property impacts. Since it varies from the standard, a design waiver must be requested from MCDOT.

The vertical grades on the bridge were designed to allow the minimum clearance criteria to be met over the tracks in the Lyttonsville Maintenance yard. Full depth paving begins where the alignment shifts from the existing road. Although the new alignment has a horizontal curve, no super elevation was required, due to slow speeds and County design criteria that calls for AASHTO method 2, which doesn't apply for a design speed of 30 mph or less. The roadway cross slopes transition from 2% normal crown slopes to the bridge cross slope which is one continuous 2% cross slope with the right side being the high side. This cross slope was established on the bridge in order to produce the appropriate clearance from the tracks in the Lyttonsville Maintenance yard and to assist in drainage conveyance.

The sidewalk width was increased to 12' due to the anticipated high pedestrian utilization of this sidewalk to access the station, the Operation Center, and the County Depot facility. The typical section has been agreed upon by Montgomery County. There is guardrail present since it is required where fill slopes that are greater than 3:1.

5.1.5 Stewart Avenue

Stewart Avenue was not listed in the Montgomery County Functional Classification Listing of the Master Plan of Highways, so the classification of Industrial Street was chosen because it most closely resembled the existing conditions regarding existing right of way and roadway widths (MCDOT Standard No. 2006.03). According to the MCDOT typical section a 6.5' buffer between the face of curb and edge of sidewalk is required, but was eliminated on the east side of Stewart in order to reduce property impacts and on the west side it was modified to 4' to match existing conditions and reduce property impacts. Since these vary from the standard, a design waiver must be requested from MCDOT. Also, the typical section distance from curb face to curb face should be 50'. The typical section used in design incorporated a 48' section which most closely mimics the existing conditions. In addition utilizing a 50' section would increase property impacts, for which a design waiver must be requested from MCDOT. Finally, according to the typical section and AASHTO-A Policy on Geometric Design of Highway and Streets 2004, the maximum grade for streets in commercial and industrial areas should be less than 8%; however the current design has a maximum vertical grade of 12.5%. This grade improves upon the existing vertical grade of around 14% while minimizing the amount of cut and therefore property impacts. Since this isn't standard, however, a design waiver must be requested from MCDOT.

The crossing track grades were held and the vertical grades and cross slopes along Stewart Avenue were designed to tie into those grades. A depressed curb height of 3" was used in between curb ramps in order to prevent the entire north curb return from being depressed.

A Commercial Access Driveway has been designed at Stewart Avenue to provide commercial access from Stewart Avenue to the property that is being cut off by the tracks. This driveway was designed using MCDOT Standard MC-302.01 – Commercial Driveway as its base. Since there is an existing buffer the standard was modified slightly to conform to existing conditions. A 20' width was used for the driveway with the cross slope from the bifurcated barrier to the hinge point (2' past the edge of driveway) being 2% towards the Storm Water Management Area.

5.1.6 Talbot Avenue

Talbot Avenue was not listed in the Montgomery County Functional Classification Listing of the Master Plan of Highways, so the classification of Tertiary Residential Street with Sidewalk on One Side was chosen because it most closely resembled the existing conditions regarding existing right of way and roadway widths (MCDOT Standard No. 2001.01). According to the typical section the minimum allowable baseline radius is 100'. The constraints of the proposed alignment and existing physical features do not allow the baseline radii to meet this minimum without severe property impacts. The current design utilizes a minimum baseline radius of 44', which requires a design waiver from MCDOT. The sidewalk buffer requirement in the typical section of 5' between the face of curb and edge of sidewalk is required on one side of the road, but was eliminated on the north side of Talbot in order to reduce property impacts. This requires a design waiver from MCDOT. According to AASHTO-A Policy on Geometric Design of Highway and Streets 2004, the stopping sight distance should be 155' for a 25 mph design speed. The current design at the intersection of Michigan Avenue and Talbot Avenue allows for 80' stopping sight distance equates to a 15 mph design speed. The current design at the curve onto the Talbot Avenue Bridge allows for 80' stopping sight distance, which equates to a 15 mph design speed. A design waiver must be requested from MCDOT.

The roadway was designed to ensure that two passenger cars could make turns at all intersections without conflicting and staying in their own lanes. The vertical grades on the bridge over CSX and the transitway were designed to allow the minimum clearance criteria to be met over the tracks. In order to meet the minimum required clearance over the tracks, the intersection with 4th Avenue was raised and the existing crown along 4th Avenue was changed to one continuous cross slope that matched the vertical grade of the Talbot Avenue vertical profile. The retaining wall along Talbot Ave was introduced to minimize property impacts to Rosemary Hills Elementary School. At the intersection of Lanier Drive and Talbot Avenue, according to Case E in the 2004 AASHTO Green Book on page 674, the sight distance must ensure that the first vehicle at a given stop line should be visible to the first vehicles at all other stop lines.

5.1.7 4th Avenue

4th Avenue was not listed in the Montgomery County Functional Classification Listing of the Master Plan of Highways, so the classification of Tertiary Residential Street with Sidewalk on Both Sides was chosen because it most closely resembled the existing conditions regarding existing right of way and roadway widths (MCDOT Standard No. 2001.02). A five foot (5') buffer between the face of curb and edge of sidewalk is required according to the typical, but the buffer was eliminated in order to reduce property impacts,, necessitating a design waiver from MCDOT. Also, according to the MCDOT typical section the distance from curb face to curb face should be 20'. The typical section used in the design incorporated

an 18' section which most closely mimics the existing conditions. In addition, utilizing a 20' section would increase property impacts, so a design waiver must be requested from MCDOT.

The roadway cross slope transitions from the existing slopes to match the grades from the proposed Talbot Avenue bridge grades. See Talbot Avenue Grades description for more detail.

5.1.8 8600 16th Street

Due to the track alignment falling closer to the 8600 building parking lot, the parking lot traffic flow lanes required a shift. This relocation required a wall to be constructed within the lot to retain the fill created by the shift. This wall handled the grade separation between the upper and lower lots. In some areas the grade separation became so small that curb and gutter was used to accommodate the grade separation.

5.1.9 16th Street

The existing midblock crosswalk across 16th Street was relocated to improve pedestrian safety, especially between the residential areas to the west and the Woodside Station platform to the east. The cross walk was relocated to the area across 16th Street from the shopping center entrance. The location of the full depth reconstruction in the far right lane of southbound 16th Street, 4' offset from the gutter pan, was due to the strap lengths for the MSE wall. Sidewalk bump-outs around the utility poles were established to continue the 5' wide passing zones for pedestrians. The ramps and stairs from the Summit Hills Apartment Complex were designed to minimize walls due to steep grades and accommodate pedestrian access to 16th Street and the Woodside Station platform.

5.1.10 Spring Street

Spring Street was listed in the Montgomery County Functional Classification Listing of the Master Plan of Highways as an Arterial roadway. The MCDOT standard was chosen based on existing right of way and roadway widths, which was Urban Divided Arterial Road (MCDOT Standard No. 2004.05). According to the typical section a six foot (6') buffer between the face of curb and edge of sidewalk is required, but the buffer was eliminated in order to reduce property impacts and match existing conditions which requires a design waiver from MCDOT. Also, according to the MCDOT typical section an 8' sidewalk width is required, but was reduced to 5' in order to reduce property impacts and match existing conditions. The 5' minimum sidewalk width was obtained from "Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines, 2004" Section 403.5.3-Passing Spaces.

Since the designed sidewalk width differs from the standard, a design waiver must be requested from MCDOT. The roadway standard dictates that there are two lanes in each direction measuring 25'-6", however, MCDOT provided a typical section for Spring Street that was incorporated. It included a 16' travel lane and an 8' parking lane in both directions on the bridge and towards 2nd Avenue. Going southbound, between the bridge and 16th St, it filters out into the necessary turn lanes for the signal. Since this was the typical section provided for Spring Street, no design waiver should be required. The final issue was of sight distance where according to AASHTO-A Policy on Geometric Design of Highway and Streets 2004, the stopping sight distance should be 250' for a 35 mph design speed. The current design along Spring Street allows for 200' stopping sight distance which equates to a 30 mph design speed. Due to sight distance, a design exception is required for 30 mph, rather than the preferred 35 mph. The median island width was also reduced in order minimize property impacts and to better align with the bridge outline.

5.1.11 Colesville Road

All of the work on Colesville Road is to place full depth pavement to accommodate turning movements into Silver Spring Transit Center due to structure placement, and to relocate the stairs to the Metro station due to pier location for the over-head Capital Crescent Trail.

5.1.12 Bonifant Street

West of Georgia Avenue, the Purple Line is along the south side of the street. It moves to the north side of Bonifant Street as it crosses Georgia Avenue (MD 97). The traffic pattern along Bonifant Street east of Georgia Avenue will be modified to only allow one-way traffic coming in from Georgia Avenue; heading west on the west side of Georgia Avenue and heading east on the east side of Georgia Avenue. Based on discussions with Montgomery County, Bonifant Street east of Georgia Avenue will be re-stripped to accommodate 2 eastbound lanes and on-street parking. The northern most eastbound lane will be shared with the eastbound light rail vehicle and will be used as a left turn lane into the two existing alleys and to bypass any double parked trucks that may be blocking the right lane. A total of 8 on-street parallel parking spaces will be provided on the south side of the street in addition to 4 parallel spaces provided adjacent to the plaza area at the Silver Spring Library building. The design along Bonifant Street was optimized to avoid reconstructing the existing sidewalks. The curb ramps at the intersection of Dixon Avenue, Georgia Avenue and Fenton Street will be reconstructed to meet current ADA guidelines.

5.1.13 Wayne Avenue

As the Purple Line exits the Silver Spring Library it will operate in the middle of Wayne Avenue and will share the lanes with vehicular traffic along the majority of the road. The typical section of Wayne Avenue consists of four lanes where the inside lanes are shared between the light rail vehicle and vehicular traffic. The inside lanes are 12 feet with a 3 foot separation between them. This separation is required to accommodate the dynamic envelope of the light rail vehicle. In addition, the centerline of the inside lanes are offset by 1 foot from the track centerline to try to prevent vehicular tires from riding on the rails. The outside lanes are 11 feet to the face of curb. A design waiver was submitted to Montgomery County for the 11 foot outside lanes. On the north side, a five foot buffer and the 8 foot Green Trail are proposed. On the south side, a 6 foot sidewalk is proposed. The typical section for Wayne Avenue was developed in coordination with Montgomery County and the community in order to minimize impacts to adjacent properties. The reconstruction of Wayne Ave will require many driveways and entrances to be reconstructed to match the proposed grade. For some properties existing stairs will also need to be reconstructed and/or modified to match the proposed grades. The superelevation of the inside lanes follows the superelevation required by the light rail vehicle. In accordance with Montgomery County Standards, AASHTO Low Speed Urban superelevation guidelines were followed for Wayne Avenue.

The curb ramps at the intersection of Fenton Street and Wayne Avenue will be reconstructed to meet ADA guidelines and to accommodate the widening required. In addition, the traffic signal at this location will be reconstructed. Along Wayne Avenue, between Fenton Street and Cedar Street, the eastbound trains departing the Silver Spring Library station share the inside lane with vehicular traffic.

As a result of the westbound semi-exclusive alignment approaching the Fenton Street Intersection and the Silver Spring Library Station, and based on discussion with Montgomery County, the existing intersection with the Whole Foods parking lot entrance will be re-configured as a right-in right-out. The eastbound traffic that wants to access the Whole Foods parking lot will do so by making a left at Cedar Street and a second left at Pershing Drive. Vehicles exiting the Whole Foods Parking that want to head

eastbound on Wayne Avenue would make a right onto Cedar Street and then a left at the signalized intersection with Wayne Avenue. A new exclusive eastbound left turn lane will be provided at Cedar Street. In the westbound direction, the inside lane will be shared but becomes an exclusive left turn drop at Fenton Street and the light rail vehicle will be positioned in a dedicated lane to turn into the Silver Spring Library Station. The light rail vehicle needs to be in a dedicated lane to prevent vehicles from following the light rail into the Silver Spring Library station.

At the Fenton Street intersection a westbound through and a second westbound through-right turn lane will be provided. The existing Green Trail will be extended east from the Whole Food entrance as an 8 foot trail with a 5 foot buffer on the north side of Wayne Avenue. At the intersection with Cedar Street, no buffer is being proposed to avoid impacting the existing retaining wall and stairs adjacent to 801 Wayne Avenue. The Green Trail will be 9 feet wide when adjacent to retaining walls.

The curb ramps at the intersection of Wayne Avenue and Cedar Street will be reconstructed to meet ADA guidelines and to accommodate the widening required for the exclusive eastbound left turn lane. In addition the traffic signal at this location will be reconstructed. Along Wayne Avenue, between Cedar Street and Dale Drive, the light rail vehicles will continue sharing the inside lanes. In the westbound direction the light rail vehicle will depart the Dale Drive station platform in a dedicated lane and will merge into the westbound inside lane which will be shared up to Cedar Street. The existing mid-block crossing at Springvale Road is currently shown to be maintained, but this needs to be confirmed with Montgomery County.

The curb ramps at the intersection of Wayne Avenue and Dale Drive will be reconstructed to meet ADA guidelines and to accommodate the widening required for the exclusive eastbound and westbound left turn lanes and the proposed Dale Drive Station platform. In addition the traffic signal at this location will be reconstructed. The light rail vehicle in the eastbound direction will operate in a shared lane while the light rail vehicle in the westbound direction will transition into a dedicated lane approaching the station platform. The westbound light rail vehicle will move on a queue jump signal phase after stopping at the station platform prior to the westbound through movement signal phase.

The existing Silver Spring International Middle School entrance is located 150 feet east of Dale Drive. This entrance is being relocated 600 feet to the east of Dale Drive. After extensive coordination with Montgomery County Public School and Montgomery County DOT a design was agreed upon to split the parking lot into two different parking areas. The northern lot would have a full access intersection at Dale Drive and the southern lot would have a right-in/right-out driveway off of Wayne Avenue. Both lots have been graded to allow a fire and rescue vehicle to drive from the southern lot to the northern lot through a depressed curb area between the two lots. The parking lot reconstruction work has to occur during the summer months; however, the grading and retaining wall work necessary for the southern lot will also be limited to the summer months, but can begin in April.

Along Wayne Avenue, between Dale Drive and Sligo Creek Parkway, the eastbound light rail vehicle transitions from a shared lane at the platform onto a dedicated lane at the intersection of Sligo Creek Parkway. The light rail vehicle needs to be in a dedicated lane prior to entering the tunnel to prevent vehicles from following the light rail vehicle into the tunnel. The inside eastbound through lane will become a dedicated left turn lane drop at Sligo Creek Parkway. In the westbound direction, the light rail vehicle will be on the inside shared lane, then transitions onto a dedicated lane at the Dale Drive Station platform as indicated above.

The parking lot adjacent to the Sligo Creek Park gets partially reconstructed. All measures should be taken to minimize parking disruptions. The curb ramps at the intersection of Wayne Avenue and

Mansfield Road will be reconstructed to meet ADA guidelines and to accommodate some additional widening required for the transitway. In addition the traffic signal at this location will be reconstructed. The bridge over Sligo Creek is being relocated further west and reconstructed. A one percent cross slope across the whole length of the Sligo Creek Bridge is required to be maintained for constructability purposes. Guardrail treatments are required on all four sides of the bridge for safety purposes.

The curb ramps at the intersection of Wayne Avenue and Sligo Creek Parkway will be reconstructed to meet ADA guidelines and to accommodate some additional widening required for the transitway. In addition the traffic signal at this location will be reconstructed. At this intersection a dedicated eastbound and westbound left turn lane will be provided. In the eastbound direction only one lane will continue up to the limit of work north of Manchester Place. In the westbound direction two lanes of traffic will continue with the inside lane being shared with the light rail vehicle.

The curb ramps at the intersection of Wayne Avenue and Manchester Road will be reconstructed to meet ADA guidelines and to accommodate some additional widening required for the transitway. In addition a new traffic signal is being proposed at this intersection. The eastbound left, northbound thru, and southbound thru and left movements will be restricted with the construction of an island in the intersection. These movements will be accommodated through additional access points off of Sligo Creek Parkway and Wayne Avenue. A new traffic signal is being proposed at the entrance into the Plymouth Tunnel.

5.1.14 Arliss Street

The Locally Preferred Alternative (LPA) along Arliss Street had the transitway in dedicated lanes in the median of Arliss Street. At the request of the Montgomery County Planning Board, the transitway was moved to the south side of Arliss Street, so as the Purple Line exits the Plymouth Tunnel, the transitway will continue in dedicated, embedded lanes, running along the side of Arliss Street.

The typical section of Arliss Street consists of three, 11' lanes with 8' (min.) sidewalks on each side. On the north side of the roadway, the sidewalk will run adjacent to the curb line; on the south side, the sidewalk will run outside the transitway, instead of the roadway. The center lane will accommodate left turns at the intersection with Flower Avenue, the proposed northern entrance to the Giant, the intersection with Garland Ave / Walden Road and the intersection with Piney Branch Road. All on-street parking has been eliminated at the direction of the Montgomery County Planning Board.

Walden Road and Garland Avenue have been reconfigured to have Walden Road intersect into Arliss Street, and Garland Avenue into Walden Road. A pedestrian crossing is being proposed at this intersection from the south side of Arliss Street to the north side. The specific type of traffic control at this intersection is being discussed with Montgomery County DOT.

Based on input from WRIT, owners of the property that currently holds the Giant, two access points along Arliss Street have been included. One is located at the western property edge and one just north of the Long Branch Station platform, which will accommodate the site's future development plans.

It is assumed that Arliss Street will be completely reconstructed, though the intent is to match existing grade where possible. At the intersection with Walden Road, the existing roadway is currently graded from south to north, which is being matched to reduce impacts. Retaining walls will be used to reduce impacts to adjacent properties. The Flower Branch Apartments parking lots will be widened and restriped to accommodate additional parking spaces, which partially replaces parking spaces lost in the parking lot along Piney Branch Road.

The typical section along Arliss Street at the shopping center's southern entrance, just north of the Long Branch Station platform, is being discussed with WRIT and Montgomery County. The current concept calls for 3 lanes. A 4-lane typical has been developed as an alternative.

5.1.15 Piney Branch Road

At the intersection with Piney Branch Road, the Purple Line will continue into dedicated, embedded lanes in the median of Piney Branch Road. A curb and gutter on both sides will separate the transitway from the roadway.

The typical section of Piney Branch Road will consist of a 12' inside lane, an 11' outside lane and a 5' bicycle lane, compliant with SHA's bicycle guidelines and a five foot sidewalk on both sides of the street. The widening will require the lengthening of the existing Long Branch Stream culvert and the addition of a secondary pipe to better convey the stream and mitigate frequent flooding. All curb ramps along Piney Branch Road from Greenwood Avenue to University Boulevard will be reconstructed due to the proposed widening and will meet ADA guidelines.

The section between Greenwood Avenue and Arliss Street will be widened to accommodate the transition from no transitway to transitway in the median east of Arliss Street. The typical section will consist of one 11' left turn lane, a 12' inside lane, an 11' outside lane and a 5' bicycle lane. At Greenwood Avenue the traffic signals and curb ramps on all four corners will be reconstructed to meet ADA guidelines.

The entrance for the Flower Branch Apartments is realigned to opposite Garland Avenue and a new traffic signal will be built at this intersection. Left turns from Piney Branch Road will not be permitted at Garland Avenue or Barron Road, or in the westbound direction at Arliss Street since dedicated left turn lanes are not provided. U-turns will be permitted at University Boulevard and left turns will be permitted at Greenwood Avenue to access the side streets.

Due to limited building frontage, the alignment has been designed to reduce impacts to adjacent properties. As a result, retaining walls will be used to reduce adjacent property impacts. In some areas building entrances will be reconstructed using stairs and ADA compliant pathways, where existing and applicable.

5.1.16 MD 193 (University Boulevard)

The proposed typical section along MD 193 (University Boulevard) consists of two 11' vehicular through lanes in each direction for the length of reconstruction of University Boulevard. For outside vehicular through lanes, an additional foot is provided for the gutter pan. A through lane in each direction was removed between MD 320 (Piney Branch Road) and West Park Drive (except the westbound approach to MD 320) in order to minimize displacements, property impacts and cost, and to improve pedestrian safety. Extensive coordination has taken place with SHA, Montgomery and Prince George's County, and the public.

Dedicated five foot bike lanes have been proposed for the entire length of reconstructed University Boulevard in accordance with SHA's June 2011 Policy on Marked Bicycle Lanes. The recently released May 2013 Policy may require that the MTA apply for a design waiver for the portion east of West Park Drive and west of Carroll Avenue, since the new criteria requires a six foot bike lane for speeds greater than 35 mph, but less than or equal to 45 mph.

Pedestrian facilities are designed to exceed ADA requirements along University Boulevard between MD 320 (Piney Branch Road) and West Park Drive. In areas where space is available, a 3 foot grass buffer has been provided in front of a 5 foot sidewalk. In areas where a 3 foot buffer cannot be provided, the sidewalk width has been increased to 6 feet. In areas where stormwater management facilities are proposed, an 8 foot wide buffer is proposed. Within the vicinity of the Piney Branch, Takoma/Langley Transit Center and Riggs Road platforms, the sidewalk width has been increased to 8 feet to accommodate the increased pedestrian volumes. Sidewalk layouts have been coordinated and are acceptable to SHA.

The proposed roadway cross slopes along MD 193 throughout the corridor are designed for -2% flowing away from the track with the exception being at 3 intersections. The proposed cross slope for eastbound University Boulevard at the intersection of MD 195 (Carroll Avenue) adjusts from -2 to -1%. The cross slope revision enables the vertical profile along MD 195 (Carroll Avenue) south of MD 193 to tie in without requiring any full depth reconstruction. The proposed cross slopes at the intersections of MD 650 (New Hampshire Avenue) and MD 212 (Riggs Road) each have the proposed cross slope for eastbound University Boulevard transitioning from -2 to +2%. The cross slopes at these intersections transition in order to match the superelevation of the track as well as to reduce the vertical alignment tie-in points along MD 650 (New Hampshire Avenue) and MD 212 (Riggs Road) south of University Boulevard.

Sidewalk ramps widths at Piney Branch Road, Takoma/Langley Transit Center, and Riggs Road Platforms are proposed 10 feet wide to accommodate anticipated higher pedestrian volumes.

Intersection configurations along University Boulevard have been designed in accordance to recommendations provided by MD 193 Corridor Study (April 2013). Right and left turn lane widths are designed at 11 feet in width with an additional 1 foot being provided when the lane is adjacent to a curb.

Pedestrian refuge space has been provided at all crossings along University Boulevard in order to provide a safety refuge for pedestrians crossing University Boulevard and the LRT. It is intended that the pedestrian signal phase will accommodate a single stage crossing, but the nature of the pedestrian behavior across the University corridor suggests the need for some median refuge where possible.

The dedicated transitway has been separated from the roadway vehicular lanes by a combination ballast/roadway curb in areas where the through lane is directly adjacent to the LRT and a raised median where left turn lanes are being developed. This was proposed to better delineate the transitway space from the vehicular space.

The roadway profiles follow the track profiles for track 1 and track 2 from MD 320 (Piney Branch Road) to the Northwest Branch structure. Following the track profiles simplifies the roadway/track design by reducing the number of profiles needed for the contractor to stakeout.

Parking lot tie-ins throughout University Boulevard are designed to minimize parking impacts. Proposed parking lot curb and resurfacing limits are designed to match existing conditions.

The existing third eastbound through lane along University Boulevard has been proposed to be dropped at the intersection of MD 320 (Piney Branch Road). The lane drop allows us to transition from a three lane section to a two lane section across the intersection.

A third westbound through lane is proposed to develop east of the intersection of MD 320 (Piney Branch Road) within the vicinity of the displaced Capobianco property. The through lane was developed to minimize impacts to the New Hampshire Estates Park.

Pedestrian access to the Piney Branch Platform is proposed between the center of the tracks and has been raised to a height of 8 inches above the rail in order to provide a vertical separation between the pedestrians and the LRT.

Sidewalk plaza areas at all four corners of the intersection of MD 320 (Piney Branch Road) and University Boulevard have been designed to allow for anticipated higher pedestrian volumes within the vicinity of the station. The proposed plaza areas allow space for pedestrians to congregate while waiting to cross without blocking the sidewalk from other pedestrians who are walking on the sidewalk.

Access to the Piney Branch Road Platform is provided from the west only. Access to the east of the platform cannot be provided due to geometric constraints of the LRT track.

It is proposed that no sidewalk buffer be provided within the vicinity of New Hampshire Estates Neighborhood Park in order to minimize park impacts. A 6' sidewalk width with no buffer has been coordinated with the M-NCPPC.

The geometry of the track and roadway was designed in order to miss the existing service drive both east and west of the MD 195 (Carroll Avenue) intersection.

The north curblineline of University Boulevard within the vicinity of Takoma/Langley Transit Center is set to match the curblineline of the transit center. Per the direction of the MTA, the alignment is designed match the transit center both horizontally and vertically.

Pedestrian access has been provided at both ends of the Takoma/Langley Transit Center Station platform. Two points of access provide easier accessibility to the platform.

Pedestrian access to the Takoma/Langley Transit Center Station platform is proposed between the tracks. Pedestrian access to the west of the platform has been raised to a height of 8 inches above the rail in order to provide a vertical separation between the pedestrians and the LRT. Pedestrian access to the east of the platform has been raised to a height of 3 inches above the rail in order to provide a vertical separation between the pedestrians and the light.

A monolithic median has been designed on the north side of the Takoma/Langley Transit Center Platform between the LRT and roadway to provide space for a fence to prohibit midblock pedestrian crossings from Takoma Langley Transit Center.

A retaining wall is proposed on the south side of University Boulevard to the entrance to Takoma/Langley Transit Center. The wall has been proposed in order to save the bank drive through which is located south of MD 193. The retaining wall is designed to tie into the existing Langley Park retaining wall. Other than the tie-in, the Langley Park retaining wall is not affected by University Boulevard reconstruction.

Sidewalk plaza areas at the southwest and northeast corners of the intersection of MD 650 (New Hampshire Avenue) and University Boulevard have been designed to allow for anticipated higher pedestrian volumes within the vicinity of the station. The proposed plaza areas allow space for pedestrians to congregate while waiting to cross without blocking the sidewalk from other pedestrians who are walking on the sidewalk.

Two existing channelized turn lane islands are removed from the intersection of MD 650 (New Hampshire Avenue) within the southwest and northeast corners. The islands were removed in order to reduce the distance traveled by pedestrians to and from the Takoma/Langley Transit Center Station platform.

An additional lane is added to the exit ramp from Inner Loop I-495 to southbound MD 650 (New Hampshire Avenue). The additional lane is designed in accordance to recommendations provided by MD 193 Corridor Study (April 2013) as mitigation for reducing MD 193 from 6 to 4 through lanes.

The proposed retaining wall that is proposed just west of MD 650 (New Hampshire Avenue) on the westbound side is proposed to reduce impacts to the existing Wells Fargo drive-thru. The retaining wall has been designed to allow space for proposed steps to access the parking lot. The proposed steps are meant to replace the existing steps that connect the parking lot to the existing sidewalk along University Boulevard.

The horizontal alignment between MD 650 and 15th Avenue has been set so that widening of University Boulevard occurs on the north side of the existing roadway which results in the loss of a service drive. The alignment was set through this area to avoid the need for retaining walls and business' parking impacts on the south side of University Boulevard.

Pedestrian access to the Riggs Road Platform is proposed between the tracks and has been provided from 15th Avenue and MD 212 (Riggs Road). Pedestrian access to both sides of the platform has been raised to a height of 8 inches above the rail in order to provide a vertical separation between the pedestrians and the LRT.

Sidewalk plaza areas at the southwest and northeast corners of the intersection of MD 212 (Riggs Road) and University Boulevard have been designed to allow for anticipated higher pedestrian volumes within the vicinity of the station. The proposed plaza areas allow space for pedestrians to congregate while waiting to cross without blocking the sidewalk from other pedestrians who are walking on the sidewalk.

An existing channelized turn lane island is removed from the intersection of MD 212 (Riggs Road) in the southwest corner. The island was removed in order to reduce the distance traveled by pedestrians to and from the Riggs Road Station platform.

Southbound MD 212 (Riggs Road) has been widened by one lane to allow for an additional left turn lane. This widening was designed in accordance to recommendations provided by MD 193 Corridor Study (April 2013).

The horizontal and vertical alignments between MD 212 (Riggs Road) and Guilford Road were set to avoid properties along the eastbound side of University Boulevard. The alignments were set so that the existing store entrances could be maintained.

A median is proposed along westbound University Boulevard for the intersection with Guilford Road between the through lane and the left turn lane. The median is proposed to separate the double left turn lanes at the intersection of MD 212 (Riggs Road) from the single left turn lane at Guilford.

The horizontal alignment between Guilford Road and Phelps Road was designed so that the existing service drive along the eastbound side can be maintained.

The horizontal alignment between 23rd Avenue and Northwest Branch Bridge was designed so that the existing service drive along the eastbound side could be maintained. In addition, the southern curbline within the service drive was held horizontally and vertically in order to minimize impacts to the adjacent

properties. As a result, the existing parking along the westbound side of University Boulevard had to be reconfigured. The proposed parking lot configuration was chosen to maximize the number of parking spaces and the raised medians were proposed in order to maintain existing light poles that reside within the parking lot.

Pedestrian facilities are designed to meet ADA requirements along University Boulevard between West Park Drive and Campus Drive. In areas where stormwater management facilities are required, an 8' buffer has been provided between the curb and 5' sidewalk. In areas where stormwater management facilities are not required, a 5' sidewalk is proposed directly behind the curb. Sidewalk that is proposed directly behind the curb is designed to minimize impacts to park land and private property through this stretch of University Boulevard.

A retaining wall is proposed along the westbound side of University Boulevard east of West Park Drive. This retaining wall was proposed to allow regrading of an existing drainage ditch that flows to the Northwest Branch. The retaining wall is proposed to minimize impacts to the Northwest Branch Park.

Sidewalk within the vicinity of the Northwest Branch Bridge is proposed directly behind the back of curb. Sidewalk is proposed within this location in order to minimize the width of the structure. The sidewalk width along the westbound side of the structure varies in width from 6'-6" to 8'. The sidewalk width varies to counteract the varying width of the roadway typical section. As a result, the width of the structure can be consistent throughout the length of Northwest Branch.

The horizontal alignment between Northwest Branch Bridge and Campus Drive was set to allow space for proposed sidewalk along westbound University Boulevard. The proposed sidewalk was designed at the request of Prince George's County and the MTA.

Separate roadway profiles are developed for eastbound and westbound University Boulevard between Northwest Branch Bridge and Campus Drive in order to minimize grading within the vicinity of the park and adjacent properties.

The entrance to Tulane Drive is designed to match existing conditions. The University of Maryland has requested that Tulane Drive be kept as a right out only onto University Boulevard. The design of the entrance prohibits vehicles traveling eastbound on University Boulevard from turning right into Tulane Drive.

Additional head-in parking is provided for the Graduate Hills apartment complex. This additional parking helps offset the parking spaces that are lost due to roadway widening along Campus Drive.

The exit from the Graduate Hills Apartments onto Adelphi Road is designed to mimic existing conditions.

5.1.17 Campus Drive

The intersection of Campus Drive with University Boulevard and Adelphi Road is designed as an at-grade intersection. Lane widths were designed at 11' and the lane configuration remains the same. For outside lanes, an additional 1' is provided for the gutter pan. Extensive coordination has taken place with SHA, Prince George's County and the University of Maryland with regards to the design of the intersection.

Dedicated bike lanes have been proposed for the entire length of reconstructed Campus Drive in order to satisfy requirements set forth by SHA Policy on Marked Bicycle Lanes (June 2011) and as requested by University of Maryland.