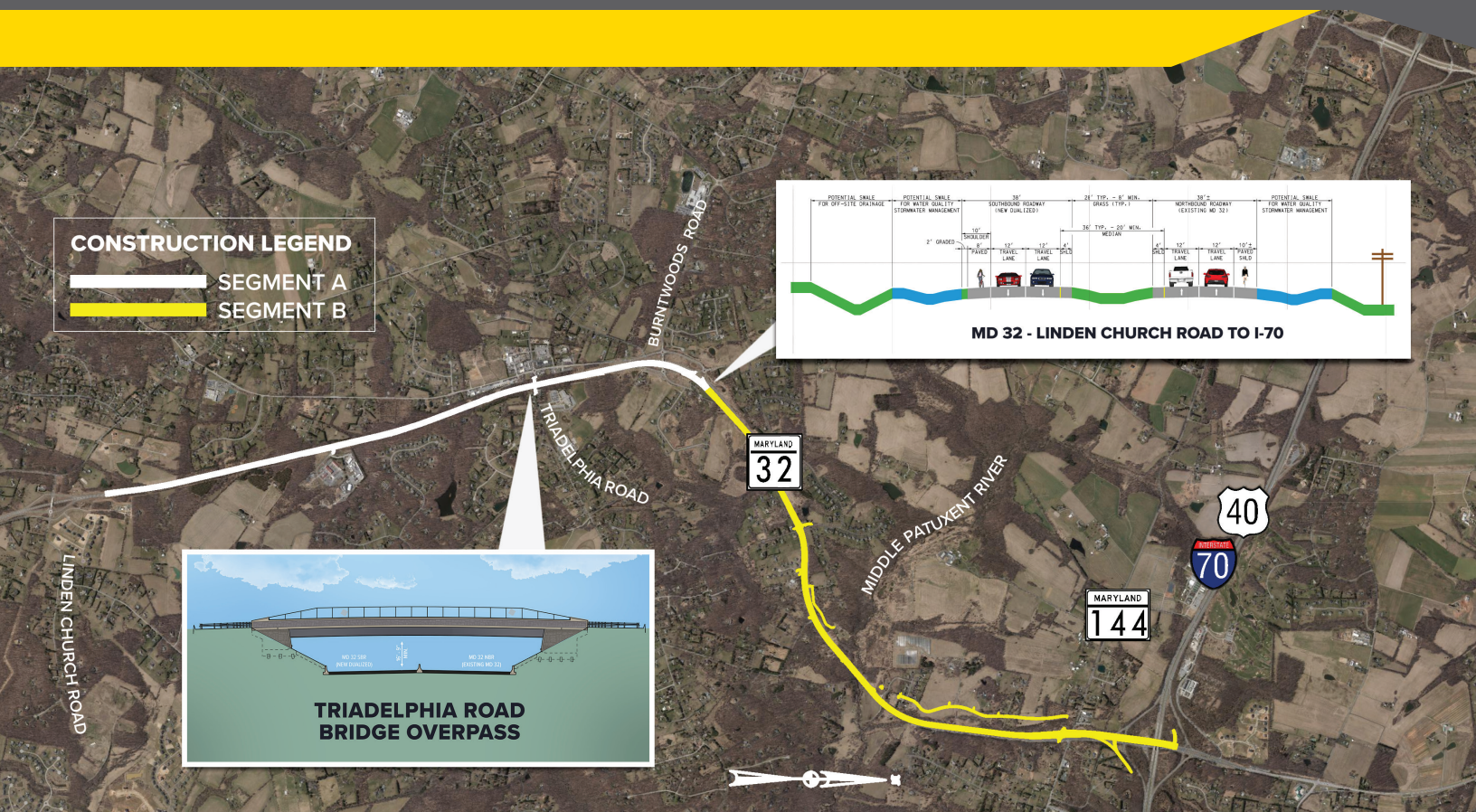


# MD 32— Linden Church Road to I-70

Howard County, MD

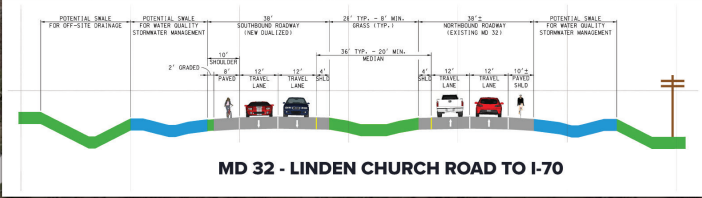
## PHASE TWO — TECHNICAL PROPOSAL

Design-Build  
 Contract No. HO7565370



**CONSTRUCTION LEGEND**

- SEGMENT A
- SEGMENT B



## TABLE OF CONTENTS

<b>4.1 Cover Letter</b>	<b>Pages 1-2</b>
<b>4.2 Safety and Mobility</b>	<b>Pages 3-20</b>
A. Project Description Narrative	Pages 3-14
B. Improvements to Traffic Operations and Crash Reduction	Pages 15-19
C. Project Conditions	Pages 19-20
<b>4.3 Project Schedule &amp; Project Management</b>	<b>Pages 21-30</b>
A. Project Schedule	Pages 21-25
B. Maintenance of Traffic Approach	Pages 26-29
C. Triadelphia Road Bridge Construction Phasing	Pages 29-30
<b>4.4 Well Managed Project</b>	<b>Pages 31-38</b>
A. Approach to Coordinate Potential Utility Relocations	Pages 31-34
B. Avoid and Minimize Impacts to Environmental Resources	Pages 35-36
C. Customer Outreach Plan	Pages 37-38
<b>4.5 Appendix</b>	
1. <i>Copies of ATCs and Approval Letters</i>	
2. <i>Addenda</i>	



# **4.2**

# **SAFETY & MOBILITY**



**4.2.A. PROJECT DESCRIPTION NARRATIVE**

**Our Commitment to Supporting MDOT SHA’s Project Goals and Values**

Understanding the \$85.121M budget, the Myers/WM Team will maximize safe and efficient traffic flow and operations and ensure that they are compatible with future corridor improvements by:

- Adding two MD 32 travel lanes from the Phase 1 limits to MD 144 to increase the highway’s capacity, which minimizes rear-end collisions and provides gaps for accessing vehicle
- Reconstructing the Triadelphia Road overpass bridge of MD 32 with multi-modal features
- Extending the I-70 EB ramp’s weave/merge length with MD 32 SB to reduce rear-end collisions by relocating the MD 32/MD 144 signalized intersection further south (ATC 12)
- Providing J-Turns (non-signalized and at signals) and a Continuous Green “Maryland-T” intersection, which eliminates the MD 32 connecting side streets’ unprotected direct left-turns and enhances mobility along the MD 32 corridor for the adjacent communities
- Consolidating driveway access points to MD 32 with Howard County’s Public Access Place residential roadway (Access Road 4) and shared/multi-lot driveways
- Adding capacity and improving operations along MD 32 at MD 144
- Upgrading all MD 32 and/or incorporating new roadway waterway crossings to eliminate roadway flooding from the appropriate MDOT SHA required storm events

**PROJECT OVERVIEW**

The MD 32 corridor functions as a major regional principal arterial through route connecting I-97 near Annapolis to I-70 with 50/55 mph posted speeds. MD 32 connects to other major regional routes that serves the employment centers of Washington D.C. and Baltimore; it experiences congested conditions during morning and evening weekday peak hours. Historically, portions of MD 32 have higher than statewide average crash rates. A no-build MD 32 would operate at LOS F by 2025. While much of the MD 32 corridor has been constructed as a four-lane divided highway, two remaining phases located towards the north at I-70 continue to operate as a two-lane undivided facility. The Phase 1 dualization project from MD 108 to Linden Church Lane is anticipated to be completed in the Fall of 2018. The MD 32 corridor dualization improvement’s purpose and need, as stated in the Final Environmental Impact Statement (FEIS), is to “improve safety and provide adequate capacity and efficient traffic operations corridor-wide while minimizing right-of-way and environmental impacts.” Future FEIS planned phases consist of MD 32 interchange connections with the Dayton Maintenance Shop entrance, Rosemary Lane, and MD 144; as well as modifications to the I-70 interchange.

**EXISTING CONDITIONS** – The Myers/WM Team has a thorough understanding of the Project corridor, existing conditions, and constraints. The existing MD 32 open-section road consists of a 12’ wide travel lane

in each direction, with 8-10’ varying paved shoulders. There are seven at-grade intersection connections with MD 32 and two recently completed FEIS proposed fully

*Table 4.2.1 MD 32 Existing Features*

<b>At-Grade Intersections</b>	<b>Major Waterway Crossings</b>
<ul style="list-style-type: none"> <li>• Dayton Shop Entrance (HIB)</li> <li>• River Valley Chase</li> <li>• Parliament Place</li> <li>• Stiles Way</li> <li>• Rosemary Lane</li> <li>• Fox Chase Road</li> <li>• MD 144 (Signal)</li> <li>• I-70 EB Ramps 3 &amp; 5 (Signal)</li> <li>• I-70 WB Ramps 7 &amp; 1 (Signal)</li> </ul>	<ul style="list-style-type: none"> <li>• Clydes Branch (CB); 84” CMP</li> <li>• Tributary CB-18; 54” CMP</li> <li>• Tributary CB-16; 84” SSP</li> <li>• Rosemary Tributary to Middle Patuxent River; Dual 10’x6’ box culvert</li> <li>• Middle Patuxent River; three-span bridge</li> <li>• Terrapin Branch; single span bridge</li> </ul>

accessible MD 32 grade separate interchanges at Linden Church Road and Burntwoods Road. Both are compatible to accommodate the proposed dualized MD 32. Also, Triadelphia Road crosses MD 32 with a bridge overpass. Triadelphia Road access to MD 32 is via Ten Oaks Road and the Burntwoods Road Interchange. In addition, 12 existing single-lot or multi-lot driveway connections access MD 32. There are no existing pedestrian facilities within the limits of work, except partially along Triadelphia Road. MD 144 is signed as a designated bike route.

There are six major waterway crossings along the MD 32 corridor. Clydes Branch, several of its tributaries, and the Middle Patuxent River are within designated FEMA floodplains. The provided environmental features mapping shows that there are 12 roadway cross culverts conveying Waters of US under existing MD 32. Terrapin Branch and another tributary to the Middle Patuxent River parallel the roadway at the northern end of the Project, primarily west of MD 32. There are many wetlands within and adjacent to the Project area; these wetlands are associated with streams and isolated. The wetland mitigation area, which includes some stream mitigation, is located north of the Middle Patuxent and west of MD 32. The Project area on both sides of MD 32 is forested. The forest is interrupted by agricultural fields and residential development.

Existing aerial overhead and supporting underground electrical (BGE) and communication (Verizon, Comcast) utilities run along primarily the east side of MD 32 starting at Burntwoods Road through the northern Project limit. Columbia Gas (30") and BGE Gas (20") transmission/distribution lines cross MD 32 north of Linden Church Lane and south of the Dayton Shop. A fiber optic network for Howard County government, public safety, first responders, and public schools runs underground and overhead through the Project limits from their Dayton Shop to MD 144. Howard County has no water or sewer facilities within the Project limits. Private septic systems within the Project limits may exist. An existing septic system within the Project limits has been designated to the east of MD 32, north of Fox Chase Road.

## PROPOSED PROJECT IMPROVEMENTS

The Myers/WM Team's project approach will be to enhance safety along the MD 32 corridor and facilitate future improvements. Our design optimization will focus on maximizing the project elements, improving operations, and minimizing impacts to corridor resources and inconveniences to the traveling public. The Myers/WM Team will design and construct a dualized rural divided four-lane principal arterial highway from the Phase 1 dualization project, through the existing Burntwoods Road interchange to meet the existing dualized MD 32 roadway at MD 144 and the I-70 interchange. We propose the following MD 32 roadway dualization improvements:

- Constructing the two-lane southbound roadway (SBR) along the existing MD 32 alignment from the Phase 1 limit, north of Linden Church Road to MD 144;
- Resurfacing and restriping of existing MD 32 to create the two-lane northbound roadway (NBR) from south of Linden Church (which will remove the Phase 1 lane drop) to MD 144;
- Reconstructing the Triadelphia Road overpass bridge of MD 32 with multi-modal features to accommodate the dualized four-lane MD 32 roadway and the adjacent commercial properties and the Howard County Folly Quarter Middle School;
- Widening and wedge/leveling resurfacing of the existing MD 32 southbound (SB) and northbound (NB) roadways through the Burntwoods Road interchange;
- Realigning/widening of the existing MD 32 roadway at Parliament Place for roadside drainage/grading, and utility relocations; and provide for the future service road connecting Parliament Place to the FEIS planned Rosemary interchange;

- Removing the existing dualized southbound roadway crossovers at Linden Church Road (Completed Phase 1 Project), the Burntwoods interchange, and MD 144.

Our overall Project limits of work will be south of Linden Church Road to the I-70 interchange eastbound Ramps 3 and 5 (southern) intersection.

The Myers/WM Team's will incorporate conditionally approved ATC 12 that realigns the west approach of MD 144 and relocates the signalized MD 144 intersection with MD 32 roughly 1,000' to the south. Access Road 4 serving the Fox Chase Estates and Nixon's Farm will connect to the realigned MD 144. Our realigned MD 144 and relocated intersection will greatly reduce the potential for rear-end collisions on MD 32 by further separating the MD 32 SBR merge/weave conflicts with the I-70 interchange ramp entrance. This approach will improve level of service (LOS) traffic operations at the MD 144 intersection beyond what the RFP concept provides with additional MD 32 through movement capacity. Ultimately, the planned FEIS MD 32/MD 144 interchange and I-70 interchange (loop ramp) modifications will ensure LOS E operations or better in the 2040 design year. However, based on the RFP future traffic volumes and a linear growth rate, the relocate MD 144 intersection will operate at a LOS E for nearly eight years. The realigned MD 144 also provides the future interchange's MD 32 SBR ramp connections with a Terrapin Branch crossing for a 100-year storm event. The relocated intersection will serve as the primary temporary traffic control setup for the eventual construction of the interchange's MD 144 bridge overpass of MD 32. The relocated MD 144 intersection allows for the potential mitigation of the adverse MD 32 SBR superelevation through the existing MD 144 intersection.

Figure 4.2.1 ATC 12 MD 144 Intersection Relocated

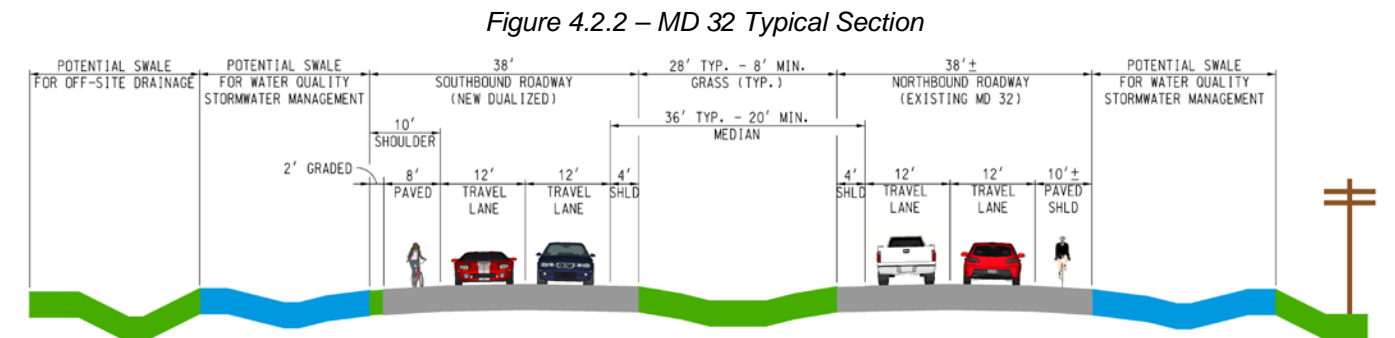


Figure 4.2.2 – MD 32 Typical Section

**TYPICAL SECTIONS** – The Myers/WM Team's proposed MD 32 typical section is generally consistent with the MD 32 dualized corridor: it will include 12' wide travel lanes and a 36' typical width open-section median in accordance with AASHTO clear zone requirements for 60 MPH; ADT over 6000; and 4:1 or flatter slopes. The median width will include 4' paved inside shoulders along both roadways. The new SBR will consist of 8' paved outside shoulders in accordance AASHTO arterial roadway requirements, as well as an additional graded 2' to ensure for compatibility with the future freeway classification for the full buildout of the FEIS interchanges. Outside shoulders along the NBR will typically maintain existing MD 32's 10' paved shoulder (8' minimum paved with 2' graded). Our MD 32 median (inside) left turn auxiliary lanes will be 16' wide at a minimum (12' with a 4' inside

shoulder). The roadside (outside) right turn auxiliary lanes included in our approved ATC 8 will be 10' wide with a 6' paved and 2' graded outside shoulder north of Burntwoods Road for bicycle compatibility. Since bicycles are prohibited south of Burntwoods Road, we will establish 2' paved and 6' graded outside shoulder along right turn auxiliary lanes within that section of the MD 32 corridor.

We propose maintaining the existing MD 32 tangent roadway's normal crowned section (sloped away from the road centerline) for the new NBR. There are some advantages for maintaining the crowned section:

- More efficiently drains the pavement, which disperses runoff equally to the median and roadside areas and enhances safety for vehicular traffic
- Overlaying the road would not require a wedge course, which would save time and minimize work zone exposure between builders and road users; it also reduces road user delays
- Roadside drainage collection features may be smaller with less contributing impervious areas, which will reduce the Project's footprint or provide more available utility relocation area

We will reduce the median width at the Triadelphia Road crossing to minimize the length of the bridge overpass (as presented in our conditionally approved ATC 4) and at the Terrapin Branch crossing; this approach will eliminate the Structure S2 Retaining Wall and minimize the project footprint adjacent to Terrapin Branch. The MD 32 SBR's profile will generally follow existing MD 32. However, we anticipate providing independent roadway profiles (bifurcation) by raising the new SBR roughly a maximum of 4' at a few isolated areas. We will bifurcate the MD 32 roadways by incorporating a 0 to 8' width 2:1 slope within the 28' grass median width area. Our median design will maintain 4' paved inside shoulders with 2' offsets to protective concrete or W-beam median barriers through both the reduced median width and bifurcated roadway areas. There are several benefits for bifurcating the roadways:

- Reduces the SBR's roadside grading cut slope requirements and the Project's footprint; it potentially eliminates benching requirements for slope heights greater than 20'
- Reduces grading activities and balances the Project's earthwork requirements, overall and within our rough grading sections; it also minimizes on-road hauls and road user delays.

Our Team will incorporate the following typical sections for Triadelphia Road, Access Road 4, and the realigned MD 144 (Relocated) as required for ATC 12:

The Triadelphia Road typical section will conform with the RFP:

- Two-lane undivided road
- 12' wide lanes
- 6' westbound / 8' eastbound shoulders
- 5' sidewalk in the westbound direction

With our conditionally approved ATC 5, we will shift the road to the south 6' +/- with normal crown reversing curves along both approaches to the new bridge overpass of MD 32.

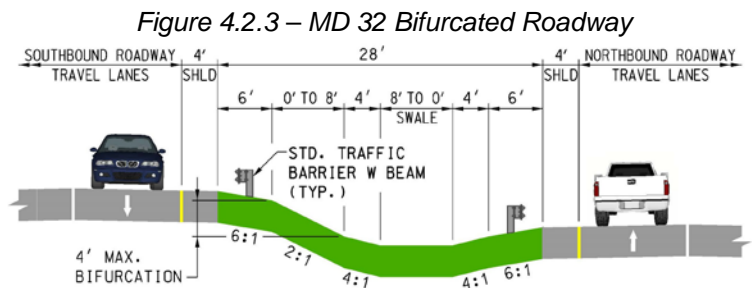
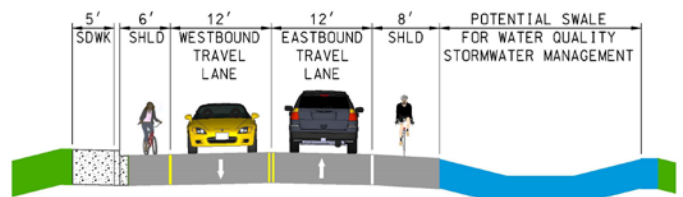


Figure 4.2.3 – MD 32 Bifurcated Roadway

Figure 4.2.3 Triadelphia Road



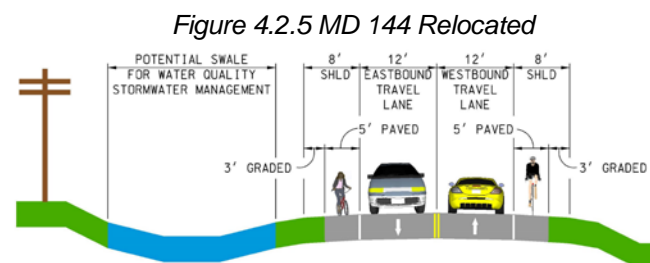
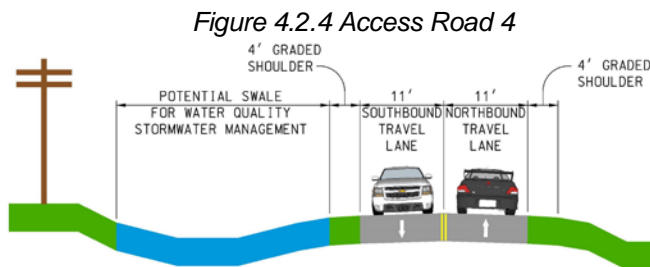
Sidewalk will extend to the entrances of 3901 Ten Oaks Road and 13554 Triadelphia Road.

The Access Road 4 typical section will conform to Howard County residential street classification “Public Access Place” and Standard Detail R-1.01:

- Two-lane undivided roadway
- 11’ wide lanes
- 4’ graded shoulders
- No sidewalks

The MD 144 Relocated typical section will conform to AASHTO requirements for a rural collector roadway:

- Two-lane undivided roadway
- 12’ wide lanes
- 8’ shoulders
- 5’ paved for bikes w/ 3’ graded
- No sidewalks



We will implement median/roadside recoverable 4:1 or flatter embankment/ swale slopes within the clear zone limits to minimize traffic barrier protection throughout the corridor while also minimizing impacts to environmental resources, right-of-way, and utilities. We will install traffic barrier to protect vehicles at obstacles such as drainage, bridge, traffic structures; critical slopes; or non-recoverable embankment slopes without recovery runout areas. Swale check dams/diversion or median crossovers with transverse slopes steeper than 6:1 will be considered obstacles.

**PAVEMENT SECTIONS** – The Myers/WM Team will utilize the RFP provided pavement sections, except potentially for the MD 32 Elements 1 (SBR full-depth construction) and 2 (NBR full-depth base widening). We will evaluate an alternative pavement section utilizing a Foamed Asphalt Stabilized Base (FASB) for the MD 32 Elements 1 and 2. This approach meets the required 25-year design and is equal to, or better than, the sections provided in the RFP. We will base our final determination for incorporating the FASB pavement section on project site setup/staging logistics and asphalt production costs when we are closer to actual construction. Our proposed realigned MD 144 west of MD 32 requires a full-depth construction pavement section sufficient for future traffic and for a 25-year design. Our proposed alternative MD 32 and MD 144 full-depth pavement sections are:

Table 4.2.2 MD 144 Pavement Section

MD 32 Elements 1 and 2 (Alternative)	MD 144 West Approach
<ul style="list-style-type: none"> <li>• 2” Gap-Graded Asphalt Mix 12.5mm for Surface, PG 64E-22, Level 5</li> <li>• 10” Superpave Asphalt Mix 19.0mm for Base, PG 64S-22, Level 2 (2-3” Lifts and 1-4” Lift)</li> <li>• 6” Foamed Asphalt Stabilized Base</li> <li>• 6” Graded Aggregate Base</li> </ul>	<ul style="list-style-type: none"> <li>• 2” Superpave Asphalt Mix 12.5mm for Surface, PG 64S-22, Level 2</li> <li>• 6” Superpave Asphalt Mix 19.0mm for Base, PG 64S-22, Level 2 (2-3” Lifts)</li> <li>• 6” Graded Aggregate Base</li> </ul>

We will provide a positive drainage system (anticipated longitudinal underdrains with outlets) to adequately drain our constructed pavement structures.

**INTERSECTIONS** – The Myers/WM Team’s proposed project will maintain all the existing grade separate interchange ramp access and at-grade public street connections with MD 32 except for Fox Chase Road. Our design eliminates the Fox Chase Road right turn in and right turn out (right-in / right-out) connection with MD 32 SBR with a new full connection to MD 32 SBR and NBR via Vistaview Drive with Access Road 4 and MD 144. We will provide new traffic signalization-controlled intersections along the dualized MD 32 at the Dayton Maintenance Shop entrance (preemptive by



the Shop) and our ATC 12's realigned MD 144. We will modify the existing I-70 interchange eastbound Ramps 3/5 (southern) intersection per our ATC 12. To improve roadway safety and provide corridor mobility, we will integrate J-Turn movements along the dualized MD 32 roadway to eliminate direct left-turn and crossover movements from the connecting side streets at non-signalized intersections. This approach still provides full access to MD 32 from the connecting side streets, but greatly reduces the potential for severe collisions, since it minimizes the conflicts between motorists traveling along those side streets and motorists moving through the intersections along MD 32. The J-Turn movements will be appropriately spaced with the nearby intersection auxiliary lanes and the traffic weave/merge lengths. We will provide the following MD 32 corridor at-grade intersection and roadway mobility improvements:

**Dayton Shop Entrance** – We will provide direct full access with MD 32

- Continuous Green Maryland-T configuration with channelized median left-in/ left turn out auxiliary lanes with MD 32 SBR
- Traffic control signal (actuated by the Shop) with overhead hazard identification beacons (HIB) for “Prepare to Stop When Flashing” signage before the entrance along the MD 32 NBR
- Right-in / right-out auxiliary lanes with MD 32 NBR

The Maryland-T's raised (Type C Curb) divisional / channelization island provides protected enhanced safety for left turning movements exiting and entering the MD 32 SBR from the Dayton Shop Entrance.

Figure 4.2.6 – Dayton Shop Entrance



**Emergency Vehicle Turnaround South of Triadelphia Road** – We will provide a 40' wide MD 32 emergency vehicle only median crossover with 625' long – 12' wide approach deceleration / pull-off inside (median) shoulders and additional paved area along the opposing MD 32 roadway shoulder for necessary “U” turnarounds. We will provide an additional MD 32 median emergency vehicle turnaround crossover at the River Valley Chase / Parliament Place intersection.

Figure 4.2.7 SBR to NBR J-Turn

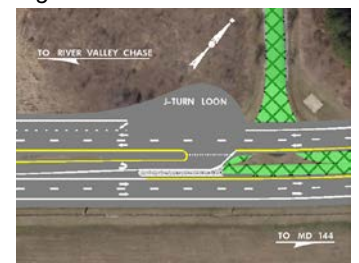


**MD 32 SBR to NBR J-Turn South of River Valley Chase** – We will provide MD 32 SBR access to Parliament Place, Stiles Way; as well as River Valley Chase access to MD 32 NBR.

**MD 32 NBR to SBR J-Turn North of Middle Patuxent River** – We will provide MD 32 NBR access to River Valley Chase;

as well as Parliament Place, Stiles Way, Rosemary Lane access to MD 32 SBR.

Figure 4.2.8 NBR to SBR J-Turn



**River Valley Chase** – We will provide direct partial access with MD 32.

- Right-in / right-out auxiliary lanes with MD 32 SBR
  - Emergency services access only from MD 32 NBR with a 625' long – 12' wide pull-off inside shoulders and median crossover
- Parliament Place** – We will provide direct partial access with MD 32
- Right-in / right-out auxiliary lanes with MD 32 NBR.
  - Emergency services access only from MD 32 SBR with a 625' long – 12' pull-off inside shoulders and median crossover.

The right-in / right-out channelization islands prevent left turns and a crossover to and from River Valley Chase and Parliament Place.

Figure 4.2.9 River Valley Chase



**Stiles Way** – We will provide direct partial access with MD 32.

- Right-in / right-out auxiliary lanes with MD 32 NBR similar to the MD 144 Eastern Approach intersection shown below.

The MD 32 grass median prevents left turns to and from Stiles Way.

**Rosemary Lane** – We will provide direct partial access with MD 32.

- Right turn in and right turn out auxiliary lanes with MD 32 NBR
  - Channelized median left turn in auxiliary lane from MD 32 SBR
- The raised (Type C Curb) channelization island for the median auxiliary lane provides protected left turns from MD 32 SBR and prevents direct left turns from Rosemary Lane to MD 32 SBR.

We will provide continuous acceleration / deceleration auxiliary lanes along MD 32 NBR from the south of the River Valley Chase SBR to NBR J-Turn's acceleration lane through Parliament Place and Stiles Way to Rosemary Lane, since their spacing between one to another is less than 1,500' per AASHTO policy.

**MD 144 Western Approach** – We will provide full direct access for the realigned westerly approach of MD 144 with MD 32 per our ATC 12.

- Full traffic signal (actuated – 5 phases) controlled
- Right-in / right-out auxiliary lanes with MD 32 NBR (Future MD 144 interchange ramps with MD 32 SBR)
- Dual left-turn lanes from MD 144 to MD 32 NBR
- Median left-turn auxiliary lane from MD 32 NBR to MD 144
- MD 32 SBR to NBR J-Turn providing access to existing MD 144 east of MD 32
- Three MD 32 through lanes in each direction adding capacity

**MD 144 Eastern Approach** – We will provide direct partial access for the existing easterly approach of MD 144 with MD 32 per our ATC 12.

- Right-in / right-out only auxiliary lanes with MD 32 NBR
- Three MD 32 through travel lanes in each direction
- Access to realigned MD 144 west of MD 32 will be provided via a MD 32 NBR to SBR J-Turn at the I-70 Ramps 35 intersection

The continuous MD 32 grass median prevents direct left turns to and from MD 32 SBR.

**I-70 Eastbound Ramps 3 and 5** – We will maintain the existing full signal controlled direct access with MD 32, except we will incorporate a signal-controlled MD 32 NBR to SBR J-Turn running concurrently with the left turn phases of Ramp 3 and MD 32 SBR to provide the MD 144 through movement and MD 144 eastbound access to MD 32 SBR. We are not providing any proposed capacity improvements such as the dual MD 32 SBR left turns to Ramp 5 and eastbound I-70.

**I-70 Westbound Ramps 7 and 1** – We will maintain the existing full signal controlled direct access with MD 32. We are not providing any proposed improvements such as dual MD 32 NBR left turns to Ramp 7.

Figure 4.2.10 – Rosemary Lane



Figure 4.2.11 MD 144 Western Approach

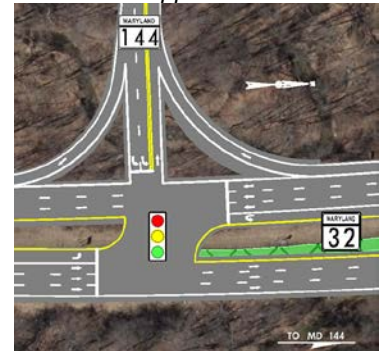


Figure 4.2.12 MD 144 Eastern Approach

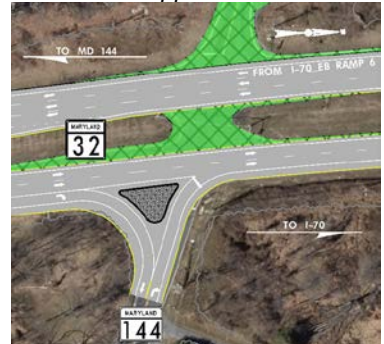


Figure 4.2.13 – I-70 Eastbound Ramps 3 and 5



**TRAFFIC FEATURES** – The Myers/WM Team will provide the new and modified traffic signalization systems for these intersections in conformance with the RFP. We will modify the existing signalization interconnect from the new MD 144 intersection through the I-70 ramps' intersection to MD 99. We will upgrade the interconnect system as noted in the RFP with high speed data communications, ethernet switches in each cabinet, a cellular modem at a cabinet, etc. We will provide partial intersection LED lighting along MD 32 within our project limits, which have traffic signals and left turning movements across MD 32 traffic, including our proposed J-Turns. We will provide partial intersection lighting at the realigned MD 144 and Access Road 4.

We will design, fabricate and install permanent guide signing along MD 32 to meet MD MUTCD expressway criteria. We will update all existing signs to current standards and remove signs that are no longer needed. The Myers/WM Team will evaluate incorporating the MDOT SHA's desired ITS devices as outlined in the RFP. However, our proposed project does not include the proposed closed circuit television (CCTV) cameras at: Fox Chase Road, Burntwoods Road, and south of the Dayton Shop.

**DRIVEWAYS** – The Myers/WM Team will disconnect, consolidate, and/or reestablish accesses for driveways currently accessing MD 32 as generally outlined on the RFP concept plans. We will connect the Fox Chase Estates, Milton Shipley House, Nixon's Solar Farm (A401), and adjacent A402 and A403 driveways to MD 32 via Access Road 4 and MD 144. We will consolidate the accesses for the MD 32 southbound properties between the Fox Valley Estates and the Middle Patuxent River Tributary and utilize a Howard County shared/multi-lot driveway to access the new MD 32 SBR. The Myers/WM Team will further evaluate consolidating access points using new frontage access roads and the Howard County shared/multi-lot driveways. Our designers will work with MDOT SHA to coordinate final disposition of all the current driveways connected to MD 32. We will provide driveway widths of 12' for a single lot or 16' serving multi-lots or match existing, if greater.

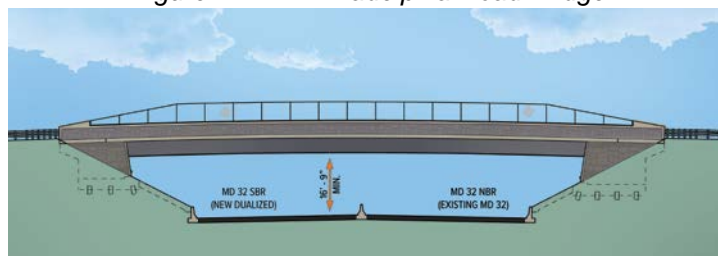
**BRIDGE STRUCTURES** – The Myers/WM Team will provide the following structures for the Project to accommodate the dualization of MD 32:

- S1 – The structure will be located along MD 32 over a Tributary of Clydes Branch (CB-16) approximately 2,300' south of the Dayton Shop. The structure will consist of a 7'-0" wide by 8'-0" high single cell precast concrete box culvert with 1'-0" minimum thick walls and slabs accommodating a 50-year storm event as outlined in the RFP. Each box segment will be positively connected to each other. We will place concrete weir walls in the culvert at a 40' spacing over its full length to accommodate fish passage. At the culvert ends, the last 8' of the culvert barrel, headwalls, wing walls, and footings will be constructed with cast-in-place concrete. The wing walls will include an underdrain system that conforms to MDOT SHA OOS details, with the outlet pipes located above the 2-year storm elevation.
- S2 – The Myers/WM Team preliminary design optimization reduced the MD 32 median width from the Middle Patuxent River to the Terrapin Branch and incorporates a bifurcation of the MD 32 Roadway, which eliminates the MD 32 SBR retaining wall defined in the RFP.
- S3 – The structure will be located along MD 32 over Clydes Branch approximately 2,200' north of the Linden Church Road. The structure will be an 8'-0" wide by 14'-0" high single cell precast concrete box culvert with 1'-0" minimum thick walls and slabs. It will accommodate a 50-year storm event as outlined in the RFP. Each box segment will be positively connected to each other. From the conditionally approved ATC 10, the culvert opening will allow for the headwater over the diameter (HW/D) to decrease to below 2 so the culvert is not subject to MD Pond Code 378 regulations and eliminates the full cast-in-place construction requirement of the culvert.

The opening will also provide for the consolidation of the storm drain outfall pipe from Pond 234, as stated in the approved ATC 2. We will place concrete weir walls in the culvert at a 40' spacing over its full length to accommodate fish passage. At the culvert ends, the last 8' of the culvert barrel, headwalls, wing walls, and footings will be constructed with cast-in-place concrete. The wing walls will include an underdrain system that conforms to MDOT SHA OOS details, with the outlet pipes located above the 2-year storm elevation.

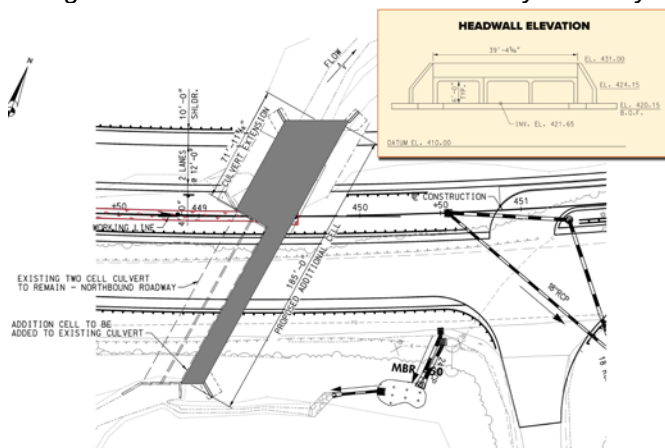
- S4 – The structure will carry Triadelphia Road over MD 32. The bridge length will be reduced to a single span configuration, as presented in the approved ATC 4 to eliminate the pier shown in the RFP. The bridge layout will also shift to the south from the layout shown in the RFP by 6' per the approved ATC 5, which will reduce traffic mobility impacts during construction by reducing the length of the Triadelphia Rd eastbound detour. Stage I construction of the bridge will begin on the south end to allow for two 11' lanes of traffic to be maintained during Stage II construction. The superstructure will consist of six steel girders with a composite, reinforced concrete deck. The abutments will be concrete cantilever, stub abutments supported on deep foundations. The bridge will maintain the required bridge typical section, vertical clearance, traffic requirements, material composition, design methodology, aesthetics, and all other geometric design parameters stated in the RFP.

Figure 4.2.14 – Triadelphia Road Bridge



- S5 – The structure will be located along MD 32 over the Rosemary Tributary of the Middle Patuxent River just south of the Rosemary Lane. We will extend the existing 10'-0" wide by 6'-0" high, two-cell concrete box culvert, and construct an additional 10'-0" wide by 7'-0" high single cell precast concrete box culvert adjacent to the existing culvert. The box culverts will accommodate a 100-year storm event as outlined in the RFP. Walls and slabs will be a minimum of 1'-0" thick. Each precast element will be positively connected to each other. The headwalls, wing walls, footings, and the extension of the existing culvert, will be constructed with cast-in-place concrete. The wing walls will include an underdrain system that conforms to MDOT SHA OOS details, and outlet pipes located above the 2-year storm elevation.

Figure 4.3.15 – S5 MD 32 over Rosemary Tributary

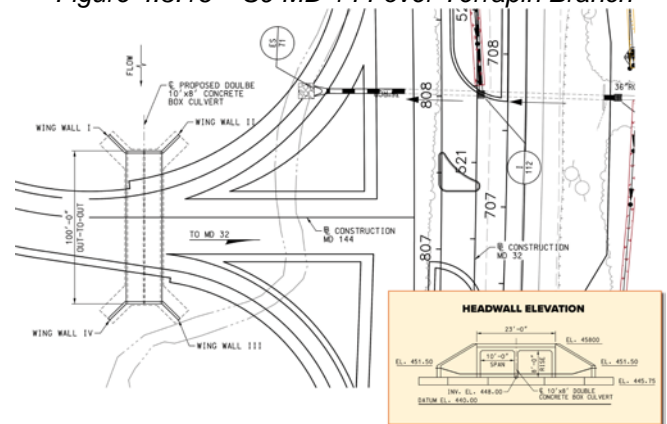


- S6 – The structure will be a dual two-span precast concrete slab bridge over Middle Patuxent River, with span lengths of 55'-0" measured from the center line of bearings. The structure will be located along MD 32 approximately 2,000' north of Rosemary Lane as presented in the RFP concept plans. The structure will accommodate a 50-year storm event as outlined in the RFP. The superstructure will consist of precast, solid prestressed concrete slab elements post-tensioned transversely with steel tie-rods. The superstructure will include a concrete overlay and provide 42" F shape concrete barriers along MD 32 for both the outside and median shoulders. The substructure will consist of concrete cantilever abutments and a concrete wall type pier.

The abutments and pier will be supported on deep foundations and be made continuous for the full width of the bridges. The abutments will also include a jointless configuration.

- S7 – The structure will be dual single span precast concrete slab bridge over Terrapin Branch, with a span length of 55'-0" measured from the center line of bearings. The structure will be located along MD 32 approximately 4,200' south of existing MD 144. The location of the bridge crossing will be optimized in consideration of the Terrapin Branch stream restoration. The structure will accommodate a 100-year storm event as outlined in the RFP. The superstructure will consist of solid precast, prestressed concrete slab elements post-tensioned transversely with steel tie-rods. The superstructure will include a concrete overlay and provide 42" F shape concrete barriers along MD 32 for both the outside and median shoulders. The substructure will consist of concrete cantilever abutments. The abutments will be supported on deep foundations and include a jointless configuration.
- S8 – The structure will be located along MD 32 over a Tributary of Clydes Branch (CB-18) approximately 2,800' south of the Dayton Shop. The structure will consist of a 6'-0" wide by 7'-0" high single cell precast concrete box culvert with 1'-0" minimum thick walls and slabs accommodating a 50-year storm event as outlined in the RFP. Each segment will be positively connected to each other. We will place concrete weir walls in the culvert for its full length at a spacing of 40 feet to accommodate fish passage. At the culvert ends, the last 8' of the culvert barrel, headwalls, wing walls, and footings will be constructed with cast-in-place concrete. The wing walls will include an underdrain system that conforms to the MDOT SHA OOS details, with the outlet pipes located above the 2-year storm elevation.
- S9 – The structure will be located along the realigned MD 144 and west of MD 32, as part of the approved ATC 12. The structure will be designed to accommodate a 100-year storm event without overtopping the realigned MD 144 (or future interchange ramps) and MD 32. Our preliminary design indicates that the structure will consist of a 10'-0" wide by 8'-0" high, two-cell concrete box culvert with 1'-0" minimum thick walls and slabs. If precast, each segment will be positively connected to each other and at the culvert ends, the last 8' of the culvert barrel, headwalls, wing walls, and footings will be constructed with cast-in-place concrete. The wing walls will include an underdrain system that conforms to the MDOT SHA OOS details, with the outlet pipes located above the 2-year storm elevation.

Figure 4.3.16 – S9 MD 144 over Terrapin Branch



**MAJOR DRAINAGE STRUCTURES** – The Myers/WM Team will provide roadway cross culverts to convey waterways/Waters of the US across MD 32, MD 144, and Access Road 4. We will design new cross culverts to pass the design storm based on the roadway classification. We will extend approximately 11 existing RCP pipes, ranging in size from 24" to 36", based on visual inspections to determine good conditions; these pipes will be eligible for waivers from passing the design storm. The 100-year water-surface elevation for all culverts will not increase above existing conditions outside of the MDOT SHA right-of-way. Our design fully replaces the existing CMP pipe culverts with RCP Class IV. The cross culvert sizes will be adjusted to minimize the number of culvert locations

that function as a MD 378 pond embankment. We will also minimize classifying crossings as a small structure. Our design will use multiple culverts, pipe diameters less than five feet, and fill heights greater than the proposed pipe diameters where feasible. The inverts of all culverts in the Waters of the US will be depressed below the channel thalweg to facilitate natural siltation of the culvert, which will promote fish passage. We will provide appropriate outfall protection for all culverts. MDE will review and provide approval for the H&H analyses for all Waters of the US culverts. We will coordinate our designs as they are progressed with MDE to mitigate any potential issues.

**STREAM RESTORATION/WETLAND MITIGATION** – The contract requires mitigation for stream and wetland impacts. The original Phase II Mitigation Plan called for stream and wetland impacts to be mitigated at Nixon Farm wetland mitigation site, Rosemary Lane fish blockage removal, terrapin branch riparian buffer enhancement, and Clyde’s Branch in-kind replacement.

The Nixon Farm wetland mitigation site has been built and is being monitored. The increase in impacts for the combined MD 32 dualization projects and the decrease in credits being given for the Nixon Farm wetland mitigation site, means that we must create an additional wetland mitigation area. MDOT SHA has provided a Phase I plan for a site in the Middle Patuxent River floodplain, adjacent to MD 32. The Myers/WM Team will coordinate with the agencies to determine mitigation requirements based on our design’s impacts and the formula provided in the RFP to meet the acreage requirements. We will also attempt to create additional wetland mitigation acreage as a buffer for future changes that could result in an increase in mitigation needs or decrease in credits given for the site. If we see high potential to successfully create wetland mitigation outside what is identified in the April 2018 Phase I, we will discuss the options with MDOT SHA and the agencies.

Portions of the Nixon Farm wetland mitigation site were given credit as stream mitigation, but the original Phase II plan also mentioned Rosemary Lane fish blockage removal and Terrapin Branch riparian buffer enhancement. The 2007 USACE permit requires stream restoration along the Rosemary Lane tributary from MD 32 to its confluence with the Middle Patuxent River. This section of stream mitigation is part of the contract for this project. The 2007 USACE permit also required stream restoration enhancement from MD 144 to the I-70 interchange. MDOT SHA has coordinated with the agencies to keep this section of stream restoration out of this contract. We do not intend to incorporate stream restoration features north of MD 144. There is a section of Terrapin Branch south of MD 144 that was kept out of the TMDL incentive area. This section of stream is available for additional stream mitigation, should any be required. We will establish regular interval coordination meetings with the environmental agencies to ensure permitting compliance.

**STORMWATER MANAGEMENT** – Runoff leaves the project site at approximately 20 points, entering the Middle Patuxent River, Terrapin Branch, Rosemary Lane Tributary to the Middle Patuxent River, Benson Branch, and Clyde’s Branch, which are all within the Middle Patuxent River watershed (02-13-11-06). The SWM/ESC Approval Authority requires quality and quantity stormwater management for the approximately 40 acres of impervious area added for the project. Since this project is located in a Use IV-P watershed, wet ponds and other SWM facilities containing permanent pools are not allowed. Our general approach to SWM facilities throughout the project site is to use bio-swales and grass swales along the outside of the roadway to meet the ESD requirement. To meet 10-year peak management control, we anticipate providing 16 dry ponds. We propose using some micro-bioretenion facilities, submerged gravel wetlands, and sand filters to meet the overall project stormwater requirements. We will employ over-the-shoulder (OTS) reviews with the IDQM, PRD, and MDE to ensure that our design solutions and proposed construction means and methods were acceptable and RFP-compliant.

**PROJECT SUMMARY**

The scope proposed by the Myers/WM Team includes the maximum MD 32 Dualization and the replacement of the Triadelphia Road Bridge. Our scope also includes ATC 12, which reduces conflict points and corrects the deficient weave at the I-70 eastbound / southbound ramp. This provides great additional value to the MDOT SHA:

- *Safety Benefit will result in Accident Reduction* – The purely economic impact is over \$1M per fatality and between \$7,000 and \$60,000 per injury (per the National Safety Council).
- *Deferral of Full Interchange Construction* – This design will defer the need for the full interchange and the bridge crossing (anticipated cost of \$15M) at the MD 32 / MD 144 intersection. It will push costs out of the current six-year CTP.

In total, the cost savings over the current six-year CTP are between \$15M and \$25M. ATC 12 is a strong example of practical design, which introduces cost savings on one project for the greater benefit to the entire Transportation Network.

The table summarizes the ATCs that we will incorporate into the Project:

*Table 4.2.4 Approved / Conditionally Approved ATCs*

	Maximizes Project Elements	Improves Operations/ Safety	Compatible with Future Improvements	Minimizes Inconvenience	Minimizes Impacts
<b>ATC 2 Combined Structure S-3 and Pond 234 Outlet Culvert:</b> Provides a safer maintenance of traffic alternative and reduces construction duration Reduces costs associated with the culverts.		✓	✓	✓	✓
<b>ATC 4 Triadelphia Road Bridge S-4 Length Reduction and Pier Elimination:</b> Expedites the bridge’s construction durations and therefore minimizes the Triadelphia Rd one WB lane and EB detour MOT duration. Minimizes the project footprint.		✓	✓	✓	✓
<b>ATC 5 Triadelphia Road Alignment Shift and S-4 Staging:</b> Minimizes the Triadelphia Rd one WB lane and EB detour MOT duration. Expedites bridge construction durations.		✓	✓	✓	✓
<b>ATC 8 MD 32 Outside Auxiliary Lane Width Reduction:</b> Provides AASHTO compliant lane -shoulder widths. Expedites road construction durations. Minimizes the project footprint.			✓	✓	✓
<b>ATC 10 Structure S-3 Modification Eliminating Code 378 CIP Requirements:</b> Expedites the box culvert’s construction durations and therefore minimizes mobility impacts to the MD 32 users.		✓	✓	✓	✓
<b>ATC 12 MD 144 Intersection Relocation:</b> Reduces MD 32 rear-end collisions. Improves traffic operations. Provides western improvements of the future interchange. Provides MOT setup for constructing the interchange’s MD 144 elevated crossing.	✓	✓	✓	✓	

## 4.2.B. IMPROVEMENTS TO TRAFFIC OPERATIONS AND CRASH REDUCTION

### FUTURE NO-BUILD CONDITIONS

The MD 32 corridor will experience significant operational and safety issues if the dualization and intersection improvements are not implemented. Future 2040 no-build intersection operations will experience significant delays and queues at the MD 144 and I-70 Ramp intersections, and delays along the side street approaches at other un-signalized intersections with left-turn access to MD 32 will worsen to unacceptable levels.

MD 32 currently experiences a high rate rear-end crashes that exceeds the statewide average corridor-wide due to stopped vehicles along MD 32 accessing side streets and congestion related queues/slow-downs. The MD 32 southbound (SB) approach to MD 144 in particular, experiences significant rear-end crashes due to significant weaving of I-70 Ramp traffic and signal control congestion. Other notable crash issues include:

- Significant fixed object crashes from roadway departures into guardrail and light/ sign structures due to pavement and weather conditions and congestion related vehicle avoidance;
- Significant angle and left-turn crashes at the signalized intersections at the MD 144 and I-70 eastbound (EB) and westbound (WB) ramps;
- Most crashes occur during weekday peak hours, indicating that they are most likely congestion related;
- Significant night-time crashes, especially in areas with limited lighting.

These safety concerns will worsen in the future if the corridor and intersection improvements are not implemented.

### RFP DESIGN CONDITIONS

With the MD 32 dualization and intersection improvements proposed in the RFP design, the network delay along MD 32 will be reduced compared to the future 2040 no-build conditions due to the increase in capacity with the addition of a travel lane in each direction and access restrictions at un-signalized intersection side streets. The RFP design will improve side street operations at currently full-access un-signalized intersections by prohibiting or protecting left-turn movements or by removing access all together:

- The Dayton Shop Entrance proposed Continuous Green Maryland-T design improves gap acceptance and safety by removing the MD 32 SB conflict point with the WB movement;
- The River Valley Chase direct access will be removed to utilize the longer Burntwood interchange route to access MD 32 and will improve safety by eliminating side-street conflict points;
- The Parliament Place proposed right-in, right-out configuration improves delay and safety by prohibiting left-turns out and use the J-Turn at Fox Chase Road to access MD 32 SB;
- Stiles Way to remain with improved auxiliary lanes that improves safety, and the new J-Turn at Fox Chase Road will also improve operations by providing more direct access for left-turning traffic to MD 32 SB;
- Rosemary Lane improves delay by prohibiting left-turns out and use the J-Turn at Fox Chase Road to access MD 32 SB;
- The Fox Chase Road direct access will be removed to utilize the route of Access Road 4 to MD 144 to access MD 32; which will improve safety, access and operations by providing MD 32 access at the signalized intersection.



Although the RFP design does provide capacity improvements to the signalize intersections at MD 144 and I-70 Ramps, they will still operate at unacceptable levels in 2040. The RFP improvements of the double left turn lanes onto both EB and WB I-70 would work for some time in the future however, long term, loop ramps will be required to mitigate the forecasted 2040 traffic volumes. The significant rear-end, angle and left-turn collision issues have not been fully addressed, because the proximity of the conflict points with the I-70 ramps still exist with this design. Congestion related rear-end and fixed object crashes along the rest of the corridor will be mitigated with the capacity, side street access and roadside improvements along MD 32. Night-time crashes will be reduced with improved lighting at all intersections that have left-turn movements.

### THE MYERS/WM TEAM PROPOSED CONDITIONS

The Myers/WM Team will implement the RFP design along the corridor, except with significant improvements to the MD 144 intersection and minor revisions to the River Valley Chase and I-70 EB Ramp intersection in order to address the operational and safety concerns at the northern limits of the project.

Alignment – As part of ATC 12, the western leg of MD 144 is relocated approximately 1,000' south by using proposed Access Road 4 to intersect MD 32 at approximately Sta. 520+50. This location is set based on appropriate weaving lengths that includes the I-70 off-ramp movements and the proposed J-turn at the signal with MD 32.

The intersection consists of two left turning lanes for EB drivers on relocated MD 144 entering MD 32 NB. MD 32 SB will access MD 144 by using a new slip ramp at the intersection. MD 144 WB will access MD 32 utilizing a new slip ramp provided at the relocated intersection. A continuous lane will be added between the off-ramp from I-70 EB and the relocated MD 144 intersection, as well as a full acceleration lane for drivers entering onto MD 32 SB. Access Road 4 will connect to relocated MD 144, providing a more direct access to MD 32 for Fox Chase Road compared to the RFP design.

The eastern leg of MD 144 is converted to a right-in / right-out only at the existing intersection. WB drivers along MD 144 wishing to continue traveling WB, or seeking to travel SB along MD 32, must turn right and proceed to make a U-turn south of the I-70 EB ramp (southern) terminal intersection. The signal at this intersection will be modified to include a protected U-turn phase that will overlap the green phase for the EB ramp movement from I-70. A loon is provided to accommodate larger vehicles making the U-turn movement. The existing I-70 EB signal is located just beyond the project limits, and the impacts of the MD 144 improvements will not change the current configuration at the signal.

This new MD 144 intersection configurations will maintain all existing traffic movements while providing better improvements to safety, operations, and mobility compared to the RFP design. The MD 144 intersections will be designed according to the latest AASHTO guidance and to all corresponding RFP requirements.

The EB River Valley Chase approach will be revised to a proposed right-in, right-out access and the MD 32 SB left-turn to access Parliament Place will be removed. Adjacent J-Turn intersections to the south of River Valley Chase / Parliament Place and to the north at the removed Fox Chase Road access point will provide full access to MD 32 in both directions to minimize conflict points. The new J-Turn intersections will also better improve operations based on the RFP design by providing more direct access for left-turning traffic to MD 32 in both directions from River Valley

Chase and the consolidate the accesses for the MD 32 SB properties between River Valley Chase and the Rosemary Tributary of the Middle Patuxent River.

**Operations** – The level of service (LOS) of MD 32 throughout the corridor along with the MD 144 intersection will operate at a LOS of E or better based on future 2040 volumes. The relocated MD 144 intersection, west side that will be relocated in ATC 12, will operate at a better LOS than the RFP design. *Table 4.2.5* summarizes these results.

By increasing the through-put of the MD 144 intersection, this improvement allows more MD 32 traffic to reach the I-70 interchange intersections, which are located beyond the northern project limits. Loop ramps at both I-70 EB and WB ramp intersections would improve this condition; however, they are beyond the limits of this project and not included with the current design. The future designs of the interchange at I-70 and grade separation at the MD 144 intersection can be accommodated and have already been accounted for in our design.

*Table 4.2.5 RFP vs. ATC No. 12 – 2040 Operational Analysis Summary*

INTERSECTION	AM LOS	AM Delay (veh/sec)	AM 95 <sup>th</sup> %tile Queue (ft)	PM LOS	PM Delay (veh/sec)	PM 95 <sup>th</sup> %tile Queue (ft)
<b>RFP</b>						
MD 32 and MD 144	B	19.9	1080 (SBT)	E	66.6	3709 (NBT)
<b>ATC 12</b>						
MD 32 and MD 144 SB	A	0.0	0	A	0.0	0
MD 32 NB Ramps and MD 144 Relocated	B	12.8	678 (SBT)	C	22.6	1287 (NBT)

\* Queues are shown shorter than actual length due to MD 32 @ MD 144 signal restricting traffic volumes

**Vehicular Impacts** – ATC 12 will change travel patterns of some movements accessing MD 144 from MD 32. See *Figure 4.2.17* for the RFP traffic volumes and *Figure 4.2.18* for reallocated traffic volumes due to ATC lane configuration changes. The EB and WB movements along MD 144 will have longer travel distances overall.

*Figure 4.2.17 – RFP 2040 Volumes and Configurations*

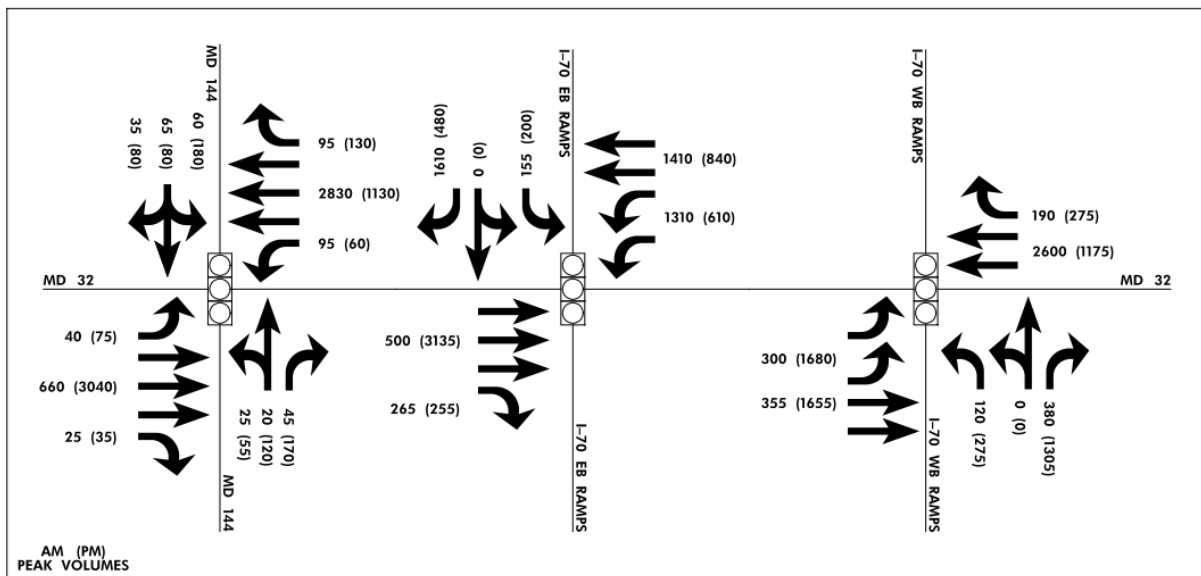
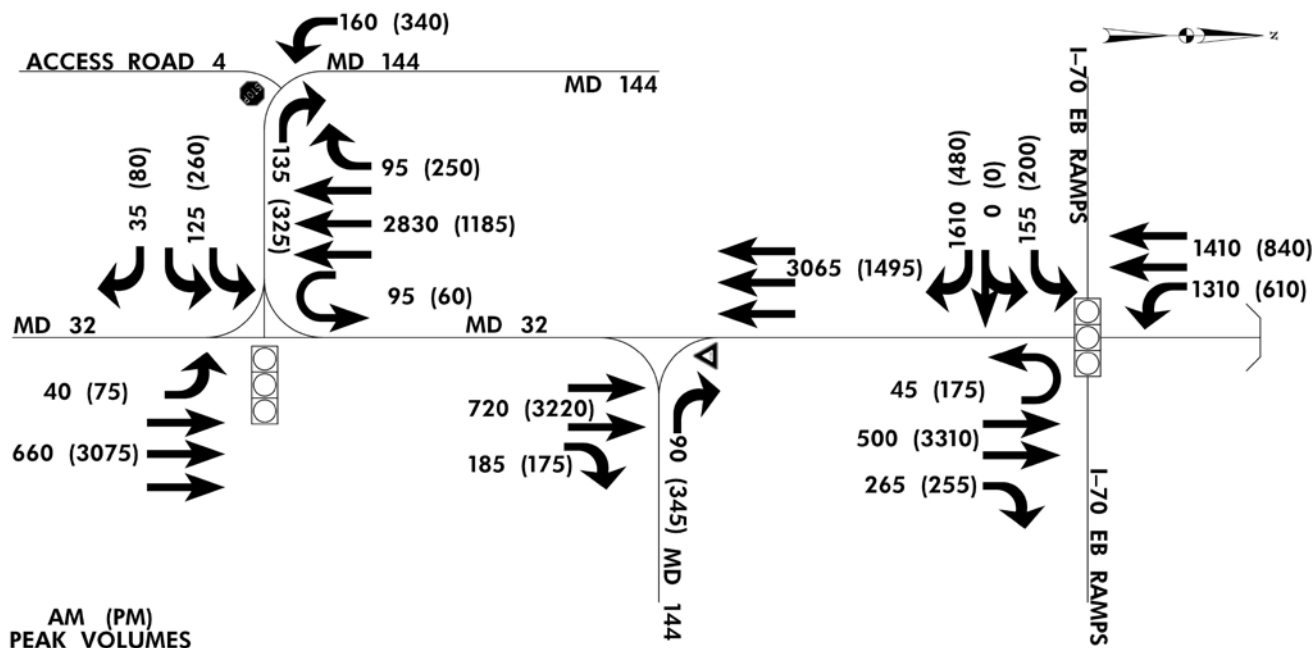


Figure 4.2.18 – ATC 12 2040 Volumes and Configurations



**Safety** – There is a dramatic safety improvement due to the removal and relocation of the weave / merge conflict points at MD 144 and improving congestion. The primary rear-end crash patterns along MD 32 in the area of MD 144 are directly related to the location of the existing signalized intersection and the conflict of the I-70 traffic. Our design will significantly reduce the rear-end crash patterns along MD 32 at the I-70 EB and MD 144 intersections. The short intersection spacing along MD 32 SB between the on-ramp from I-70 EB and MD 144 is improved, as access is shifted to the slip ramps 1,000' further downstream. The number of conflict points and severity of the type of conflict points (more merging conflicts versus crossing conflicts) at both new MD 144 intersections and movements have been reduced compared to the RFP design. Much of the crashes are congestion related, so improved traffic flow with less delay will also reduce the number of crashes.

**COMPATIBILITY WITH FUTURE IMPROVEMENTS**

The future designs of the loop ramps at the I-70 interchange and grade separation at the MD 144 intersection have already been accounted for in our design. All future work would occur off the existing travel way and will have very minimal impact on the traffic flow during construction.

The relocation of the MD 144 intersection proposed in ATC 12 will not provide any time savings in terms of design and construction for these future projects. However, the proposed ATC will provide time savings in the reduction of future work that will need to be provided within the corridor. The proposed improvements simplify the future MOT and the SB portion of the future interchange for future phases. All MOT needed to access MD 144 WB will already be constructed prior to the construction of the overpass.

**CORRIDOR CONDITIONS DURING CONSTRUCTION**

The Myers/WM Team will develop a comprehensive Traffic Management Plan (TMP) to fully understand the existing traffic users, patterns and challenges, and analyze and develop a traffic

control design that is sensitive to those existing traffic conditions. A staged construction approach coupled with easy to follow MOT practices will balance safety and mobility throughout the Project. Our approach to successfully maintaining safe traffic operations during construction includes:

- Maintaining the existing 2-lane, 2-way traffic with reduced shoulders along MD 32 and existing intersection operations throughout construction;
- Minimizing the number of traffic switches required to maintain driver expectations;
- Minimize the need for lane closure flagging operations and detours along MD 32;
- Carefully analyzing sight distance, operations, and safety at J-Turns, Maryland 'T's, service roads, and throughout the corridor;
- Maintaining the existing signals at MD 144 and the I-70 EB Ramp and deploying methods to reduce travel speeds;
- Establishing work area access points in areas that minimize the safety risk conflicts associated with construction vehicles entering/exiting the work area;
- Managing earthwork and grading to reduce trucks on the road;
- Utilizing advanced media, existing and temporary CCTV cameras to monitor work zone incidents, CHART notifications and VMS/temporary signage.

Much of the construction of the future improvements can occur off of the existing alignment and will have minimal MOT required to complete the work.

#### 4.2.C. PROJECT CONDITIONS

Our project will maintain the following MDOT SHA acquired design exceptions:

- For the existing grade (6%) on MD 32 from Stiles way to Rosemary Lane
- For the adverse superelevation on MD 32 through the existing MD 144

The relocated MD 144 intersection as proposed in our ATC 12 allows for the potential mitigation, if not correction of the adverse MD 32 superelevation through the MD 144 intersection utilizing wedge/leveling resurfacing. We will fully evaluate and if feasible incorporate corrective measures.

Based on our preliminary design, the Myers/WM Team's proposed Project does not include any other elements not meeting the 10 AASHTO controlling criteria.

The following are the 10 AASHTO controlling design criteria identified as having substantial safety importance. Special attention was paid to them when making decisions to develop our ATCs:

- 1. Design speed:** The changes proposed in ATC 4 and 12 maintain the design speeds listed in PR 2 of the RFP. For ATC 5, a design speed of 30 mph was used on the west side of the Triadelphia Road Bridge. The reduction from 35 mph to 30 mph allows for a normal crown typical section to be maintained along Triadelphia Road. Due to the proximity of the existing roundabout, the 30 mph is appropriate based on the recommended entering speed at roundabouts per *NCHRP Report 672 (Roundabouts: An information Guide; Section 6.2.1)*.
- 2. Lane width:** ATC 8 changes the outside right-in / right-out auxiliary lane widths throughout MD 32 from 12' to 10'. Per AASHTO's *A Policy on Geometric Design of Highways and Streets, 2011*, Section 9.7.1, "auxiliary lanes should be at least 10 feet wide."
- 3. Shoulder width:** Reducing the MD 32 outside shoulders from 10' to 8' wide reduces the grading and environmental impacts throughout the corridor while still requiring the minimum width of useable shoulders for rural arterials as depicted in Table 7-3 of AASHTO's *A Policy on Geometric Design of Highways and Streets, 2011*.

4. **Horizontal alignment:** Horizontal alignment changes from ATCs 4, 5, and 12 do not deviate from AASHTO requirements. Minimum curve lengths, tangent lengths, and radii were designed to comply with the respective design speeds for MD 32, Triadelphia Road and MD 144. For ATC 5, curve elements are introduced on both the west and east side of the bridge for Triadelphia Road to tie back into the existing roadway. The proposed curve elements on the west side have reversing curves with radii of 2,800' and 3,200' respectively. On the east side of the Triadelphia Road Bridge, two proposed curves have reversing radii of 3,730' each. These curves allow for normal crown pavement cross-slope that will be carried across the tangent alignment of the bridge.
5. **Superelevation:** The inclusion of ATC 12 relocates the MD 32 / MD 144 signalized intersection approximately 1,000' south of the existing intersection and relocates the westerly approach of MD 144. The western leg of existing MD 144 will be closed off and the eastern leg of existing MD 144 will be reconstructed to be a right-in / right-out intersection. This potentially allows the existing superelevation on MD 32 to be adjusted to meet AASHTO requirements for highways with a 60-mph design speed.
6. **Stopping Sight Distance:** The changes proposed in ATC's 4, 5 and 9 have no adverse effects on Stopping Sight Distance. Since the MD 32 / MD 144 intersection is signalized and has protected left-turn signals, based on Case D – Intersections with Traffic Signal Control from AASHTO's *A Policy on Geometric Design of Highways and Streets, 2011*, Section 9.5.3, "generally no other approach or departure sight triangles are needed for signalized intersections". In addition, the profile adjusted for Triadelphia Road was designed to meet minimum SSD requirements for a design speed of 35 mph.
7. **Grade:** Vertical grade requirements for MD 32 were kept consistent with AASHTO maximum grade of 4% for rural, rolling arterial (AASHTO's *A Policy on Geometric Design of Highways and Streets, 2011*, Section 7.2.2, Table 7-2) other than the design exception provided in PR 3.6 of the RFP. The profile for the relocated MD 144 roadway that is proposed in ATC 12 consists of maximum grades of 8% for a rural major collector as stated in Table 6-2 in Section 6.2.1 in *A Policy on Geometric Design of Highways and Streets, 2011*. All roadways have a minimum grade of 0.50% to promote positive drainage.
8. **Cross slope:** The cross slope proposed for MD 32 has not changed from the RFP concept. The typical section for MD 32 maintains the 2% cross slope on tangent sections that slopes to the outside with the point of rotation held at the left edge of the left travel lane. ATC 5 maintains the normal crown typical section for Triadelphia Road and the bridge.
9. **Vertical clearance:** Vertical clearance for ATC 5 was taken into consideration for the horizontal shift of the Triadelphia Road bridge alignment. Upon initial investigation, it appeared that inconsistencies in the existing ground lines made it unclear if the proposed profile from the RFP met the minimum clearance over MD 32. With the proposed alignment from ATC 5, a new profile was established that meets all AASHTO requirements as well as the minimum clearance required in the RFP.
10. **Structural capacity:** All bridges will be designed in accordance with the AASHTO's *Load and Resistance Factor Design* (LRFD) specifications, which will include all applicable provisions for service, fatigue, strength and extreme event limit states. All new bridges and culverts will be rated using the Load and Resistance Factor Rating (LRFR) method, using the latest edition of the AASHTO Manual for Bridge Evaluation and in accordance with MDOT SHA PPM No. D-97-47(4).



# 4.3

# PROJECT SCHEDULE & PROJECT MANAGEMENT



### 4.3.A. PROJECT SCHEDULE

The Myers/WM Team is committed to maximizing the project elements, improving operations and safety, and minimizing construction impacts as reflected in the proposed schedule as follows:

- Opening dualized Segment A (South of Burntswood Road) in November 2021
- Reaching Substantial Completion in July 2022
- Fully dualizing the roadway from the completed Phase 1 dualization to MD 144
- Improving operations and safety at the MD 144 intersection
- Maintaining existing MD 32 traffic movements during construction
- Reducing the duration of the detour at Triadelphia Road bridge from 14 months to 7 months
- Limiting traffic impacts to two major traffic shifts

Segmenting the Project for Substantial Completion and utilizing Sections for rough grading as shown in *Figure 4.3.1* expedites the schedule while accounting for the unique project constraints. These constraints include construction of the Triadelphia Road bridge, right-of-way acquisition, and utility relocation North of Burnt Woods Road, drainage areas, and environmental resources. By breaking the bulk earth moving and drainage work into three sections, construction will commence earlier, expediting the opening of the dualized roadway. Two final roadway segments allow for less lane shifts and improve corridor safety by expediting the dualization of Segment A, which will be utilized by the traveling public almost a year in advance of project completion.

Substantial Completion of Segment A will be completed in Nov. 2021, dualizing the 3.2 miles of roadway from south of Linden Church Road (Sta. 217) to north of Burntwoods Road (Sta. 387). In addition, the duration of the detour at Triadelphia Road Bridge has been reduced by 50%, from 14 months to 7 months.

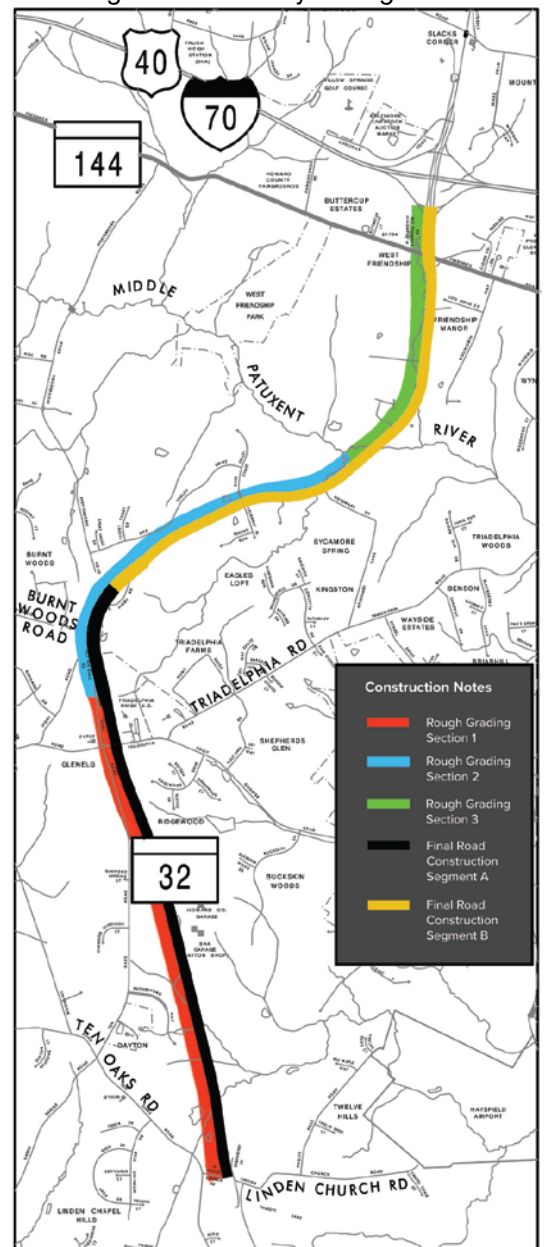
Segment B north of Burntswood Road (Sta. 387) to I70 (Sta. 560), a distance of 3.3 Miles, will reach Substantial Completion in July 2022 and the roadway will be fully open to traffic.

To reach the proposed Final Completion date of Dec. 2022, final paving and landscaping will be completed using short-term night-time lane closures, as needed.

### Reducing Traffic Impacts

The Myers/WM Team proposed schedule reduces the duration of the Triadelphia Road Bridge detour by 50%, from 14 months to 7 months, by shifting the bridge alignment approx. 6' to the South. This shift allows construction of two lanes on the new bridge during Phase 1 and opens two lanes of traffic during Phase 2 construction.

Figure 4.3.1 – Project Segments



## DESIGN AND CONSTRUCTION PACKAGES

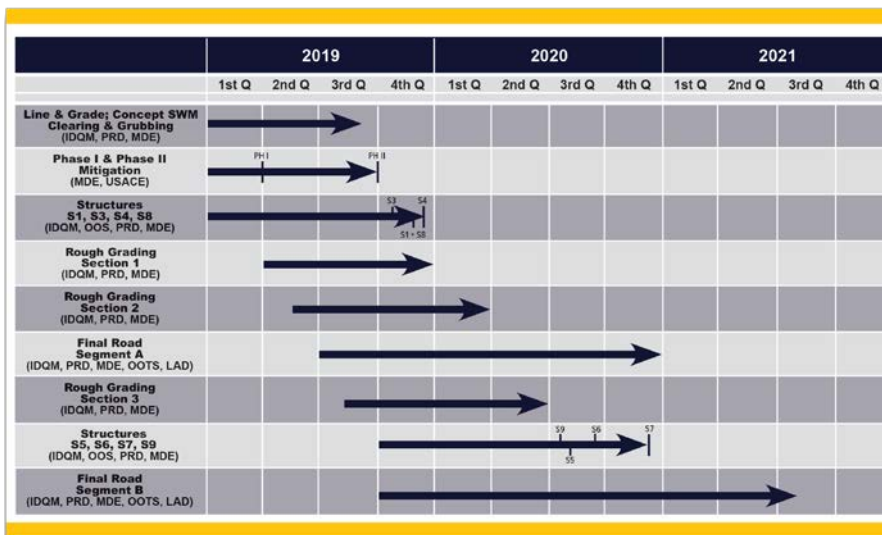
To expedite the start of construction, we will implement a “rolling” design package submission process to allow for a continuous construction flow independently within each section.

- A complete corridor wide perimeter ESC/preliminary clearing package will be submitted first to initiate a formal PRD and NPDES approval for the Project.
  - Rough grading/drainage submissions (with MOT) will be developed for each section.
  - Separate TS&L/ foundation and structural details design will be submitted for the new Triadelphia Bridge and the MD 32 waterway crossing structures.
  - Independent ESC and MOSF plans for each section will expedite PRD/MDE maintenance of stream flow (MOSF), ESC and H&H analysis approvals of waterway crossings.
  - Separate Final Design Roadway Plans will then be developed for each segment.
- The Myers/WM Team will minimize inconvenience to the community and the traveling public by:
- Maintaining traffic in its existing configuration while constructing the new SB roadway
  - Constructing the project in three sections to facilitate grading and drainage work
  - Installing culvert crossings and constructing structures in phase with roadway construction
  - Expediting installation of new lights and signals to utilize permanent structures in lieu of temporary facilities

The general phasing of construction for the Project will construct the new roadway pavement section, switch traffic to the new pavement, resurfacing and widening the existing pavement section, split traffic, complete the median curb construction, open the dualized roadway, and complete final surface paving. We will prioritize construction of the Triadelphia Road Bridge overpass of MD 32 and the new dualized MD 32 SB roadway will be constructed in Sections 1, 2, and 3. Construction activities on the northern end of the project will commence once right-of-way and utility corridors are established and approvals/permits are obtained.

Construction packages will mirror the design submission packages and will commence with the installation of initial corridor-wide traffic controls and perimeter controls. Construction within each Section will follow the design package approvals for phased MOT controls, ESC, clearing & grubbing, rough grading/drainage, and final roadway. Lane closures/traffic shifts will be minimized by constructing culvert crossings and structures in phase, with the new roadway area being built first and the existing roadway area built on a closed roadway section after traffic is shifted. This approach improves safety, minimizes construction impacts, and optimizes the efficiency of construction operations. Final corridor-wide construction activities will include median swales, SWM facilities, final stabilization, signals, final paving, and landscaping.

Figure 4.3.3 – Timeline for Design Submittal Packages





Activity ID	Activity Name	Original Duration	Start	Finish	2019																																			2020												2021												2022											
					Jul	A	Sep	Oct	N	D	Jan	F	M	Apr	M	Jun	Jul	A	Sep	Oct	N	D	Jan	Feb	M	Apr	M	Jun	Jul	A	Sep	Oct	N	D	Jan	F	Mar	A	M	Jun	Jul	A	Sep	Oct	N	D	Jan	F	M	Apr	M	Jun	Jul	A	Sep	Oct	N	D																	
<b>MD 32 from Linden Church Road to I-70 Design-Build</b>					863	15-Jul-18	19-Dec-22	[Gantt bar from 15-Jul-18 to 19-Dec-22]																																																																			
<b>Pre-Construction</b>					863	15-Jul-18	19-Dec-22	[Gantt bar from 15-Jul-18 to 19-Dec-22]																																																																			
<b>Project Milestones</b>					788	19-Nov-18	19-Dec-22	[Gantt bar from 19-Nov-18 to 19-Dec-22]																																																																			
AMS0000010	Notification of Apparent Low Bid	0	19-Nov-18*		◆ Notification of Apparent Low Bid																																																																						
AMS0000020	Notice to Proceed	0	17-Dec-18*		◆ Notice to Proceed																																																																						
AMS0009500	Begin Triadelphia Road Detour	0	10-Sep-19		◆ Begin Triadelphia Road Detour																																																																						
AMS0009510	Open Triadelphia Road to 2-Way Traffic	0	05-Mar-20		◆ Open Triadelphia Road to 2-Way Traffic																																																																						
AMS0009520	Complete Triadelphia Bridge / Road Work	0		31-Aug-20*	◆ Complete Triadelphia Bridge / Road Work																																																																						
AMS0009800	Open Segment A Dualization	0		23-Nov-21	◆ Open Segment A Dualization																																																																						
AMS0009980	Substantial Completion - Dualization Complete	0		15-Jul-22	◆ Substantial Completion																																																																						
AMS0009990	Final Completion	0		19-Dec-22	◆ Final Completion																																																																						
<b>Interim Milestones</b>					350	30-Mar-21	19-Dec-22	[Gantt bar from 30-Mar-21 to 19-Dec-22]																																																																			
<b>Project Administration</b>					37	19-Nov-18	20-Feb-19	[Gantt bar from 19-Nov-18 to 20-Feb-19]																																																																			
<b>Design Quality Control Plan</b>					22	19-Nov-18	11-Jan-19	[Gantt bar from 19-Nov-18 to 11-Jan-19]																																																																			
<b>Project CPM Schedule</b>					37	19-Nov-18	20-Feb-19	[Gantt bar from 19-Nov-18 to 20-Feb-19]																																																																			
<b>Miscellaneous Efforts</b>					23	17-Dec-18	20-Feb-19	[Gantt bar from 17-Dec-18 to 20-Feb-19]																																																																			
<b>Geotechnical</b>					234	19-Nov-18	06-Mar-20	[Gantt bar from 19-Nov-18 to 06-Mar-20]																																																																			
<b>General Items</b>					58	19-Nov-18	04-Apr-19	[Gantt bar from 19-Nov-18 to 04-Apr-19]																																																																			
<b>Subsurface Investigations &amp; Lab Analysis</b>					90	26-Dec-18	02-May-19	[Gantt bar from 26-Dec-18 to 02-May-19]																																																																			
<b>Geotechnical Subsurface Investigation Summary Report</b>					86	31-Jan-19	12-Jul-19	[Gantt bar from 31-Jan-19 to 12-Jul-19]																																																																			
<b>Final Geotechnical Reports</b>					95	15-Jul-19	25-Nov-19	[Gantt bar from 15-Jul-19 to 25-Nov-19]																																																																			
<b>Section 1 - Sta. 217 to Sta. 360</b>					55	15-Jul-19	30-Sep-19	[Gantt bar from 15-Jul-19 to 30-Sep-19]																																																																			
<b>Section 2 - Sta. 360 to Sta. 443</b>					45	26-Aug-19	28-Oct-19	[Gantt bar from 26-Aug-19 to 28-Oct-19]																																																																			
<b>Section 3 - Sta. 443 to Sta. 545</b>					45	24-Sep-19	25-Nov-19	[Gantt bar from 24-Sep-19 to 25-Nov-19]																																																																			
<b>Pavement Geotechnical Investigation &amp; Reports</b>					211	16-Jan-19	06-Mar-20	[Gantt bar from 16-Jan-19 to 06-Mar-20]																																																																			
<b>Pavement Investigation Plan Report</b>					30	16-Jan-19	26-Mar-19	[Gantt bar from 16-Jan-19 to 26-Mar-19]																																																																			
<b>Interim Pavement Report</b>					92	26-Aug-19	06-Mar-20	[Gantt bar from 26-Aug-19 to 06-Mar-20]																																																																			
<b>Design</b>					405	17-Dec-18	17-Feb-21	[Gantt bar from 17-Dec-18 to 17-Feb-21]																																																																			
<b>Traffic Management Plan</b>					46	17-Dec-18	09-Apr-19	[Gantt bar from 17-Dec-18 to 09-Apr-19]																																																																			
<b>Roadway</b>					405	17-Dec-18	17-Feb-21	[Gantt bar from 17-Dec-18 to 17-Feb-21]																																																																			
<b>Clearing/ESC/MOT</b>					123	20-Feb-19	20-Sep-19	[Gantt bar from 20-Feb-19 to 20-Sep-19]																																																																			
<b>Rough Grading</b>					233	20-Mar-19	04-Jun-20	[Gantt bar from 20-Mar-19 to 04-Jun-20]																																																																			
<b>Section 1 - Rough Grading, MOT, ESC, Drainage Design</b>					150	20-Mar-19	09-Dec-19	[Gantt bar from 20-Mar-19 to 09-Dec-19]																																																																			
<b>Section 2 - Rough Grading, MOT, ESC, Drainage Design</b>					145	31-May-19	05-Mar-20	[Gantt bar from 31-May-19 to 05-Mar-20]																																																																			
<b>Section 3 - Rough Grading, MOT, ESC, Drainage Design</b>					141	26-Aug-19	04-Jun-20	[Gantt bar from 26-Aug-19 to 04-Jun-20]																																																																			
<b>Stormwater Management Design and Reports</b>					118	17-Dec-18	07-Aug-19	[Gantt bar from 17-Dec-18 to 07-Aug-19]																																																																			
<b>Concept Plans</b>					118	17-Dec-18	07-Aug-19	[Gantt bar from 17-Dec-18 to 07-Aug-19]																																																																			
<b>Roadway Design</b>					405	17-Dec-18	17-Feb-21	[Gantt bar from 17-Dec-18 to 17-Feb-21]																																																																			
<b>Line and Grade Plans</b>					66	17-Dec-18	15-May-19	[Gantt bar from 17-Dec-18 to 15-May-19]																																																																			
<b>Final Roadway/ESC/SWM/Drainage/MOT/Landscape Plans</b>					299	22-Jul-19	17-Feb-21	[Gantt bar from 22-Jul-19 to 17-Feb-21]																																																																			
<b>Signing, Markings, Lighting &amp; ITS Design</b>					201	17-Dec-18	21-Jan-20	[Gantt bar from 17-Dec-18 to 21-Jan-20]																																																																			
<b>Design Request Forms</b>					29	17-Dec-18	05-Mar-19	[Gantt bar from 17-Dec-18 to 05-Mar-19]																																																																			
<b>Signing &amp; Markings Roll Plans</b>					82	06-Mar-19	29-Jul-19	[Gantt bar from 06-Mar-19 to 29-Jul-19]																																																																			
<b>Lighting &amp; Signals Roll Plans</b>					91	06-Mar-19	12-Aug-19	[Gantt bar from 06-Mar-19 to 12-Aug-19]																																																																			
<b>Final Lighting, Signals &amp; Interconnect Package</b>					81	13-Aug-19	21-Jan-20	[Gantt bar from 13-Aug-19 to 21-Jan-20]																																																																			
<b>Final Signing and Markings Package</b>					86	30-Jul-19	09-Jan-20	[Gantt bar from 30-Jul-19 to 09-Jan-20]																																																																			
<b>Landscape Design</b>					235	20-Feb-19	15-May-20	[Gantt bar from 20-Feb-19 to 15-May-20]																																																																			
<b>Preliminary Landscape Plans</b>					140	20-Feb-19	21-Oct-19	[Gantt bar from 20-Feb-19 to 21-Oct-19]																																																																			
<b>Pre-Final Landscape Plans</b>					120	10-Sep-19	15-May-20	[Gantt bar from 10-Sep-19 to 15-May-20]																																																																			
<b>Structures</b>					202	14-Feb-19	11-Mar-20	[Gantt bar from 14-Feb-19 to 11-Mar-20]																																																																			
<b>Structure S-1 - Box Culvert / Bridge @ Sta. 255+00</b>					172	21-Feb-19	07-Jan-20	[Gantt bar from 21-Feb-19 to 07-Jan-20]																																																																			
<b>TS&amp;L &amp; Foundation Plans/Report</b>					72	21-Feb-19	29-Jun-19	[Gantt bar from 21-Feb-19 to 29-Jun-19]																																																																			
<b>MOT &amp; ESC/MOSF Plans</b>					146	21-Feb-19	01-Nov-19	[Gantt bar from 21-Feb-19 to 01-Nov-19]																																																																			
<b>H&amp;H Plans/Report</b>					98	21-Feb-19	13-Aug-19	[Gantt bar from 21-Feb-19 to 13-Aug-19]																																																																			
<b>Structural Details</b>					56	14-Aug-19	19-Nov-19	[Gantt bar from 14-Aug-19 to 19-Nov-19]																																																																			
<b>Final Design</b>					18	20-Nov-19	07-Jan-20	[Gantt bar from 20-Nov-19 to 07-Jan-20]																																																																			
<b>Structure S-3 - Box Culvert @ Sta. 227+45</b>					174	14-Feb-19	07-Jan-20	[Gantt bar from 14-Feb-19 to 07-Jan-20]																																																																			
<b>Structure S-4 - Bridge #13045 Tridelphia Road over MD 32</b>					119	21-Feb-19	17-Sep-19	[Gantt bar from 21-Feb-19 to 17-Sep-19]																																																																			
<b>Structure S-5 - Box Culvert / Bridge @ Sta. 450+00</b>					151	24-May-19	11-Mar-20	[Gantt bar from 24-May-19 to 11-Mar-20]																																																																			

Activity ID	Activity Name	Original Duration	Start	Finish	2019																																																				2020																																																				2021																																																				2022																																																			
					Jul				A				S				O				N				D				Jan				F				M				A				M				J				J				Jan				F				M				A				M				J				J				Jan				F				M				A				M				J				J																																																																																																							
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31																																																																																				
Structure S-6 - Bridge #13022 MD 32 over Middle Patuxent River		186	21-Feb-19	06-Feb-20																																																					06-Feb-20, Structure S-6 - Bridge #13022 MD 32 over Middle Patuxent River																																																																																																																																																											
Structure S-7 - Bridge #13021 MD 32 over Terrapin Branch		163	21-Feb-19	09-Dec-19																																																					09-Dec-19, Structure S-7 - Bridge #13021 MD 32 over Terrapin Branch																																																																																																																																																											
Structure S-8 - Box Culvert @ Sta. 250+00		175	21-Feb-19	13-Jan-20																																																					13-Jan-20, Structure S-8 - Box Culvert @ Sta. 250+00																																																																																																																																																											
Structure S-9 - Box Culvert @ Sta. 520+50		157	05-Apr-19	21-Jan-20																																																					21-Jan-20, Structure S-9 - Box Culvert @ Sta. 520+50																																																																																																																																																											
Environmental		144	17-Dec-18	19-Sep-19																																																					19-Sep-19, Environmental																																																																																																																																																											
Phase 1 Rosemary Lane Tributary Stream/Wetland Mitigation		83	17-Dec-18	11-Jun-19																																																					11-Jun-19, Phase 1 Rosemary Lane Tributary Stream/Wetland Mitigation																																																																																																																																																											
Phase 2 Rosemary Lane Tributary Stream/Wetland Mitigation		130	30-Jan-19	19-Sep-19																																																					19-Sep-19, Phase 2 Rosemary Lane Tributary Stream/Wetland Mitigation																																																																																																																																																											
Permits		18	08-Jul-19	02-Aug-19																																																					02-Aug-19, Permits																																																																																																																																																											
Procurement		172	21-Mar-19	09-Feb-20																																																					09-Feb-20, Procurement																																																																																																																																																											
Vendor Procurement		22	21-Mar-19	19-Apr-19																																																					19-Apr-19, Vendor Procurement																																																																																																																																																											
Shop Drawings		113	19-Jun-19	15-Jan-20																																																					15-Jan-20, Shop Drawings																																																																																																																																																											
Fabrication		194	31-Jul-19	09-Feb-20																																																					09-Feb-20, Fabrication																																																																																																																																																											
Right-of-Way		1	17-Dec-18	17-Dec-18																																																					17-Dec-18, Right-of-Way																																																																																																																																																											
Utilities		1060	15-Jul-18	08-Jun-21																																																					08-Jun-21, Utilities																																																																																																																																																											
UCP 1 - Triadelphia Road		240	15-Jul-18	11-Mar-19																																																					11-Mar-19, UCP 1 - Triadelphia Road																																																																																																																																																											
UCP 2 - MD 32		316	25-Oct-19	04-Sep-20																																																					04-Sep-20, UCP 2 - MD 32																																																																																																																																																											
UCP 3 - Access Road #4		330	14-Jul-20	08-Jun-21																																																					08-Jun-21, UCP 3 - Access Road #4																																																																																																																																																											
Construction		624	29-Aug-19	14-Nov-22																																																																																																																																																																																																																
Section 1 - Sta. 217+00 to Sta. 360+00		624	29-Aug-19	14-Nov-22																																																																																																																																																																																																																
Phase 1		624	29-Aug-19	14-Nov-22																																																																																																																																																																																																																
Maintenance of Traffic		22	29-Aug-19	03-Oct-19																																																					03-Oct-19, Maintenance of Traffic																																																																																																																																																											
Erosion Control Measures / SWM		399	10-Sep-19	30-Sep-21																																																					30-Sep-21, Erosion Control Measures / SWM																																																																																																																																																											
Roadway		585	05-Nov-19	14-Nov-22																																																																																																																																																																																																																
MD 32 - Sta. 217+00 to Sta. 246+00		287	10-Dec-19	22-Jun-21																																																					22-Jun-21, MD 32 - Sta. 217+00 to Sta. 246+00																																																																																																																																																											
MD 32 - Sta. 246+00 to Sta. 275+00		364	05-Nov-19	28-Sep-21																																																					28-Sep-21, MD 32 - Sta. 246+00 to Sta. 275+00																																																																																																																																																											
MD 32 - Sta. 275+00 to Sta. 304+00		455	09-Dec-19	05-May-22																																																					05-May-22, MD 32 - Sta. 275+00 to Sta. 304+00																																																																																																																																																											
MD 32 - Sta. 304+00 to Sta. 333+00		517	09-Dec-19	11-Aug-22																																																					11-Aug-22, MD 32 - Sta. 304+00 to Sta. 333+00																																																																																																																																																											
MD 32 - Sta. 333+00 to Sta. 360+00		560	08-Jan-20	14-Nov-22																																																																																																																																																																																																																
Triadelphia Road Approaches		39	02-Dec-19	05-Mar-20																																																					05-Mar-20, Triadelphia Road Approaches																																																																																																																																																											
Structures		150	09-Sep-19	30-Jun-20																																																					30-Jun-20, Structures																																																																																																																																																											
Structure S-1 @ Sta. 255+00		59	18-Nov-19	02-Apr-20																																																					02-Apr-20, Structure S-1 @ Sta. 255+00																																																																																																																																																											
Structure S-3 @ Sta. 227+45		66	18-Nov-19	20-Apr-20																																																					20-Apr-20, Structure S-3 @ Sta. 227+45																																																																																																																																																											
Structure S-4 @ Sta. 335+00		84	09-Sep-19	05-Mar-20																																																					05-Mar-20, Structure S-4 @ Sta. 335+00																																																																																																																																																											
Structure S-8 @ Sta. 250+00		52	06-Apr-20	30-Jun-20																																																					30-Jun-20, Structure S-8 @ Sta. 250+00																																																																																																																																																											
Phase 2		420	05-Mar-20	05-May-22																																																																																																																																																																																																																
Maintenance of Traffic		207	05-Mar-20	07-Apr-21																																																					07-Apr-21, Maintenance of Traffic																																																																																																																																																											
Erosion Control Measures / SWM		372	10-Mar-20	26-Jan-22																																																					26-Jan-22, Erosion Control Measures / SWM																																																																																																																																																											
Roadway		416	12-Mar-20	05-May-22																																																																																																																																																																																																																
MD 32 - Sta. 217+00 to Sta. 246+00		4	16-Apr-21	21-Apr-21																																																					21-Apr-21, MD 32 - Sta. 217+00 to Sta. 246+00																																																																																																																																																											
MD 32 - Sta. 246+00 to Sta. 275+00		126	20-Apr-21	11-Nov-21																																																					11-Nov-21, MD 32 - Sta. 246+00 to Sta. 275+00																																																																																																																																																											
MD 32 - Sta. 275+00 to Sta. 304+00		134	21-Apr-21	30-Nov-21																																																					30-Nov-21, MD 32 - Sta. 275+00 to Sta. 304+00																																																																																																																																																											
MD 32 - Sta. 304+00 to Sta. 333+00		195	22-Apr-21	19-Apr-22																																																					19-Apr-22, MD 32 - Sta. 304+00 to Sta. 333+00																																																																																																																																																											
MD 32 - Sta. 333+00 to Sta. 360+00		204	26-Apr-21	05-May-22																																																					05-May-22, MD 32 - Sta. 333+00 to Sta. 360+00																																																																																																																																																											
Triadelphia Road Approaches		7	12-Mar-20	26-Mar-20																																																					26-Mar-20, Triadelphia Road Approaches																																																																																																																																																											
Structures		312	05-Mar-20	23-Sep-21																																																					23-Sep-21, Structures																																																																																																																																																											
Structure S-1 @ Sta. 255+00		47	20-Apr-21	01-Jul-21																																																					01-Jul-21, Structure S-1 @ Sta. 255+00																																																																																																																																																											
Structure S-3 @ Sta. 227+45		54	22-Apr-21	16-Jul-21																																																					16-Jul-21, Structure S-3 @ Sta. 227+45																																																																																																																																																											
Structure S-4 @ Sta. 335+00		105	05-Mar-20	31-Aug-20																																																					31-Aug-20, Structure S-4 @ Sta. 335+00																																																																																																																																																											
Structure S-8 @ Sta. 250+00		53	01-Jul-21	23-Sep-21																																																					23-Sep-21, Structure S-8 @ Sta. 250+00																																																																																																																																																											
Phase 3		24	14-Oct-21	23-Nov-21																																																					23-Nov-21, Phase 3																																																																																																																																																											
Maintenance of Traffic		2	14-Oct-21	15-Oct-21																																																					15-Oct-21, Maintenance of Traffic																																																																																																																																																											
Erosion Control Measures		2	18-Oct-21	19-Oct-21																																																					19-Oct-21, Erosion Control Measures																																																																																																																																																											
Roadway		20	20-Oct-21	23-Nov-21																																																					23-Nov-21, Roadway																																																																																																																																																											
Phase 4		50	29-Nov-21	21-Mar-22																																																					21-Mar-22, Phase 4																																																																																																																																																											
Maintenance of Traffic		3	29-Nov-21	01-Dec-21																																																					01-Dec-21, Maintenance of Traffic																																																																																																																																																											
Roadway		13	02-Dec-21	21-Mar-22																																																					21-Mar-22, Roadway																																																																																																																																																											
Section 2 - Sta. 360+00 to Sta. 443+00		433	09-Mar-20	27-May-22																																																																																																																																																																																																																
Phase 1		402	09-Mar-20	01-Apr-22																																																																																																																																																																																																																
Maintenance of Traffic		3	09-Mar-20	11-Mar-20																																																					11-Mar-20, Maintenance of Traffic																																																																																																																																																											



### 4.3.B. MAINTENANCE OF TRAFFIC APPROACH

The Myers/WM Team provides local resources with deep experience and understanding of the project area and similar corridors. This understanding is pivotal to safely maintaining traffic while expediting the schedule and reducing construction impacts. Our experience on includes the MD 404 and US 113 design-build dualization projects provides first-hand knowledge and understanding of the challenges associated with designing and constructing a four-lane divided highway.

#### Implementing Lessons Learned

MD 404 Dualization was completed by our team members without any construction related crashes. Mobility impacts were limited to lane switches, and face-to-face discussions with local residents and businesses prior to the switching traffic patterns ensured that the transitions would be smooth.

We are committed to incident and injury-free construction of the MD 32 Dualization Project. The Myers/WM Team's safety culture and programs will incorporate safety planning for both the traveling public and our workers into operations and a design that reduces incidents post-construction. Our corridor knowledge reinforces the understanding that crash rates increase during the peak weekday commuter usage and MD 32 crash rates exceed the statewide average. Design and construction staff will work closely together throughout the Project to minimize traffic impacts, improve corridor operations, and safely implement all traffic patterns.

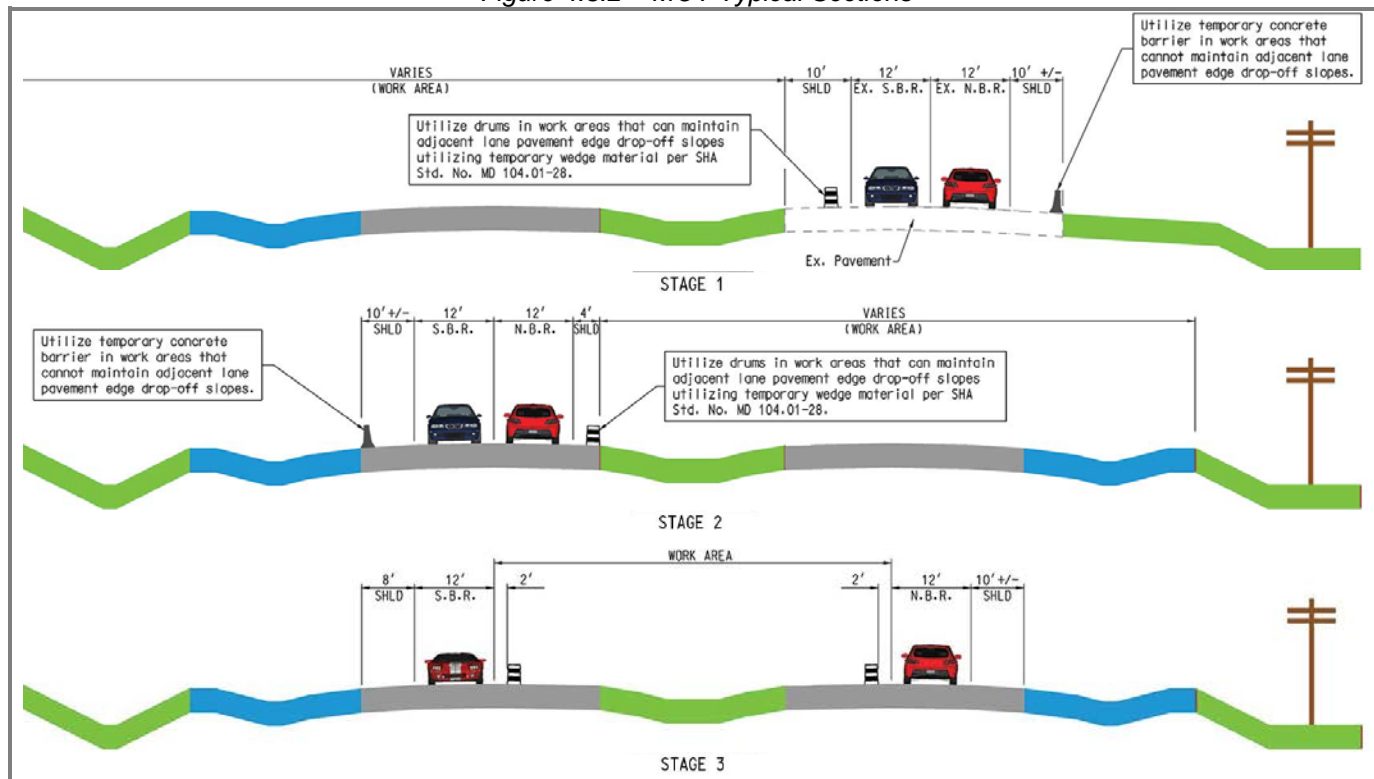
### MAINTENANCE OF TRAFFIC PLAN

A comprehensive Transportation Management Plan (TMP) will be developed for approval prior to the start of construction, and will include the sequence of construction, intersection operations at each stage, supporting studies for intersection operations levels of service (LOS), incident management plan, construction access plan, and safe access for all properties. The phased Maintenance of Traffic (MOT) Plans will indicate all temporary traffic control devices and methods to maintain traffic through the work area. The MOT and Erosion & Sediment Control Plans will be coordinated to ensure all design components are included in the respective work areas/sequence. Our construction approach will minimize impacts to the motoring public. All lanes of traffic along the connecting state and county roadways will be maintained during construction. Maximizing work completed during non-peak periods will improve safety and optimize efficiency. Lane closures will be implemented when needed during non-peak periods, and may require flagging operations. Our Traffic Engineers and Construction Traffic Managers will work closely to ensure the traffic plans reflect construction means and methods and are implemented properly in the field. Traffic will utilize the existing roadways and traffic operations during clearing, grubbing, and rough grading until completion of the new dualized sections. Temporary crossovers at the Burntwoods Road interchange will shift traffic from the existing road onto the new roadway and will be constructed in accordance with AASHTO, MD-MUTCD and MDOT SHA standards. Full-time shoulder closures will be required for construction of the dualized roadway, with barrier only minimally required since most of the work will occur outside of the roadway clear zone. If work is performed within the clear zone, flagging operations will be required during non-peak periods and the area will be made traversable before reopening the roadway. Existing light levels will be maintained during construction until the ultimate intersection lighting is implemented. Detours along MD 32 are not anticipated for construction; however possible detour routes may be needed in case of emergencies that would cause MD 32 to be shut down during construction. The TMP will provide possible emergency detour routes that will require coordination with emergency personnel if a detour is implemented. As discussed in Section 4.4.C, the Myers/WM Team will coordinate traffic impacts with local stakeholders, including emergency responders.

## CONSTRUCTION PHASING AND SEQUENCING

Given the safety considerations and the limited allowable disturbed areas, the Myers/WM Team has sequenced construction in three sections for rough grading following clearing/grubbing of the entire project length to commence construction early and two segments during final construction to expedite opening the southern end of the dualized roadway. We have minimized the traffic shifts and will implement three stages of construction shown in *Figure 4.3.2* within each section.

*Figure 4.3.2 – MOT Typical Sections*



**CLEARING AND GRUBBING** – Traffic will utilize the existing two-lane two-way roadway lanes with shoulder widths reduced and intersection configurations maintained. Non-peak night-time lane closures will be utilized as required. Work will be completed from the southern to northern limits, including clearing and grubbing of the entire project area and relocation of impacted utilities.

**ROUGH GRADING** – Traffic will continue to utilize the existing two-lane two-way roadway lanes with shoulder widths reduced and intersection configurations maintained. Work will be completed from south to north in Sections 1, 2, and 3. Dividing the Project into three sections helps start construction sooner and implement the safety benefits of the dualization earlier. Work will include rough grading of each section including Triadelphia Road in Section 1, relocation of impacted utilities, installation of ESC, and installation of culvert/bridge structures and lighting.

**FINAL ROADWAY/GRADING** – Work will be completed in two segments from south to north:

- **Segment A (Southern Half)** – Dualization from south of Linden Church Road (Sta. 206) to North of Burntwoods Road (Sta. 387). Work includes the MD 32 SB continuous green “T” and NB right in/out at-grade intersection access to the Dayton Maintenance Shops entrance.
- **Segment B (Northern Half)** – Dualization from the north of Burntwoods Road (Sta. 387) to I-70 (Sta. 560). Work will include the MD 32 intersections/access modifications at River Valley Chase, Parliament Place, Stiles Way, Rosemary Lane, the new Middle Patuxent River bridge crossing, Fox Chase Road, MD 144 and the I-70 ramps, and Access Road 4/MD 144.

**MAINTENANCE OF TRAFFIC**

**STAGE 1** – Traffic will primarily continue to utilize the existing roadway network through the project limits with existing traffic movements and patterns maintained. Work will include:

- Construction of proposed southbound dualized MD 32 roadway sections, connecting side roads and access roads/driveways
- New intersection signal, lighting, and overhead signing

**STAGE 2** – Once the proposed southbound sections of MD 32 are completed, traffic will be transitioned onto the new roadway while maintaining one lane in each direction with the shoulder widths reduced. We will utilize portions of the new MD 32 southbound roadway constructed under the Burntwoods Road Interchange and the Linden Church Road Interchange/Phase 1 Dualization projects for MOT crossovers. Work will include:

- Rehabilitation/ reconstruction of the northbound roadway and roadside sections, connecting side roads and access roads/driveways
- Completing culvert/ bridge structure installations
- Continued intersection signal, lighting, and overhead signing

**STAGE 3** – Once the rehabilitated northbound sections of MD 32 are completed, traffic will be transitioned onto the dualized roadway while maintaining one lane in each direction with the shoulder widths reduced. Work will include:

- Completing the construction of proposed center median, connecting side roads and access roads/driveways, and connections to adjacent segments
- Remaining intersection signal, lighting, and overhead signing

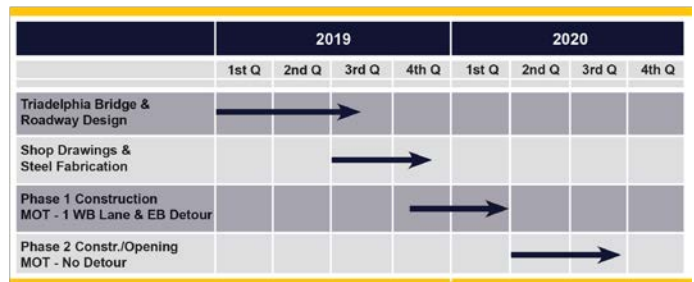
**FINAL** – Fully open MD 32 dualized roadways and connecting intersection configurations; complete the installation of final pavement surface, SWM, landscaping, permanent signing, and pavement markings; and address punch list items/closeout project.

**TRIADELPHIA ROAD BRIDGE MOT** – We will detail specific MOT for the staged construction of this bridge over MD 32, maintaining traffic along Triadelphia Road and MD 32. As detailed in Section 4.3.C, the detour will be implemented for eastbound Triadelphia Road traffic during this construction. Our Team has reduced the duration of this detour by 50% to 7 months.

**WATERWAY CROSSING MOT** – We will include specific MOT (tied to the MOSF) for the construction of the MD 32 waterway crossing structures using staged construction. As much of the structures will be installed off the existing travelway as possible while maintaining existing operations, with short-term off-peak lane closure flagging operations to complete the installations.

**INTERSECTION MOT** – As summarized in *Table 4.3.1*, there are six existing and three new intersections within the project limits. We will maintain existing intersection operations during construction to maximum extent possible. Existing left-turn movements will be limited, requiring right-turns and merging movements to improve intersection operations and safety. The proposed intersection controls will be implemented once each intersection is built. Left-turn movements are ready to be restricted once J-Turn intersections are open and can accommodate U-turn movements. New intersection controls will be phased to implement improvements early. One through lane will

Figure 4.3.3 – Triadelphia Bridge Detour



be provided initially to allow room to continue work once the new controls are online and allow users to acclimate to the new configuration. The interim operations will still exceed existing conditions with just one lane in each direction.

Table 4.3.1 Intersection MOT Schemes

MD 32 INTERSECTION	EXISTING CONTROL	PROPOSED CONTROL	IMPLEMENTATION PHASING SEQUENCE
Dayton Shop Entrance	Actuated HIB w/ SB Jug-handle	MD T w/o SB Jug-handle	Open with SB dualization completed, Jug-handle maintained as long as possible
J-Turn 1	None	SB J-Turn	Open with SB dualization completed
River Valley Chase/Parliament Place	Two-way Stop Control	Right-in, Right-out	Open after J-Turn 1 & 2 completed
Stiles Way	NB Right-in Right-out	NB Right-in, Right-out w/ Improved Aux Lanes	Open after J-Turn 1 & 2 completed
Rosemary Lane	One-way Stop Control	NB Right-in, Right-out w/ SB Left-Turn	Opened after J-Turn 2 completed
J-Turn 2	None	NB J-Turn	Open with SB dualization completed
Fox Chase Road	SB Right-in Right-out	Intersection Eliminated w/ MD 32 access relocated via Access Road 4 from MD 144 West Relocated	Open after MD 144 West Relocated completed
MD 144 West Relocated/ J-Turn 3	None	Signal w/ SB J-Turn	Open with SB dualization completed
MD 144 East	Signal	NB Right-in, Right-out w/ Improved Aux Lanes	Open after MD 144 West Relocated/ J-Turn 3 & J-Turn 4 completed

### 4.3.C. TRIADELPHIA ROAD BRIDGE CONSTRUCTION PHASING

To reduce mobility impacts to local traffic along Triadelphia Road, the Myers/WM Team will shift the alignment of Triadelphia Road to the south, as noted in *Figures 4.3.4 and 4.3.5*. This alignment shift allows for Stage I construction to be performed on the south side of the bridge and make provisions for two 11' lanes of traffic along Triadelphia Road during Stage II construction. Pedestrian access across the bridge will only be provided during Stage I construction. The six-girder configuration maintains one lane of vehicular traffic and pedestrian traffic during future deck replacements. We will also optimize the design to reduce the bridge length and provide a single-span structure over MD 32 to minimize both mobility impacts and construction effort, as stated in ATC #4.

Figure 4.3.4 – ATC 5 Triadelphia Bridge Alignment Shift and Construction Staging – Stage 1 Construction

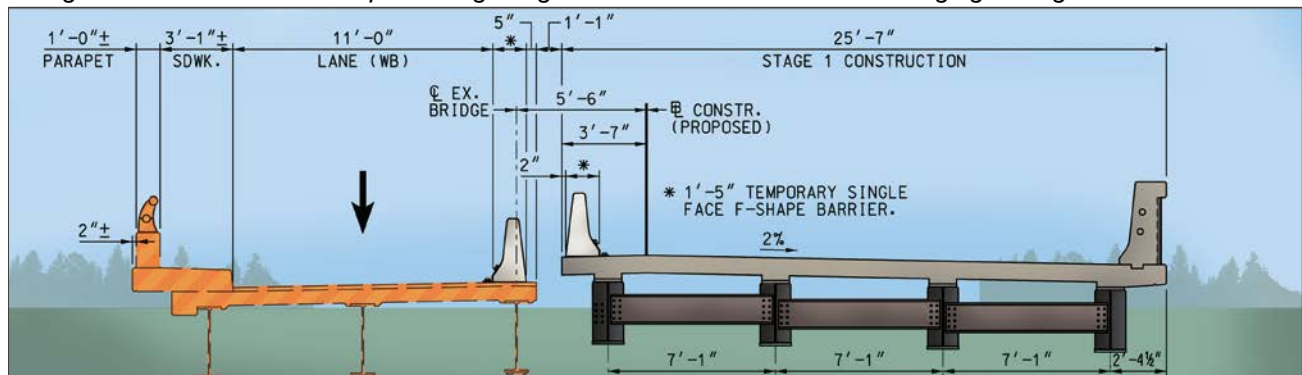
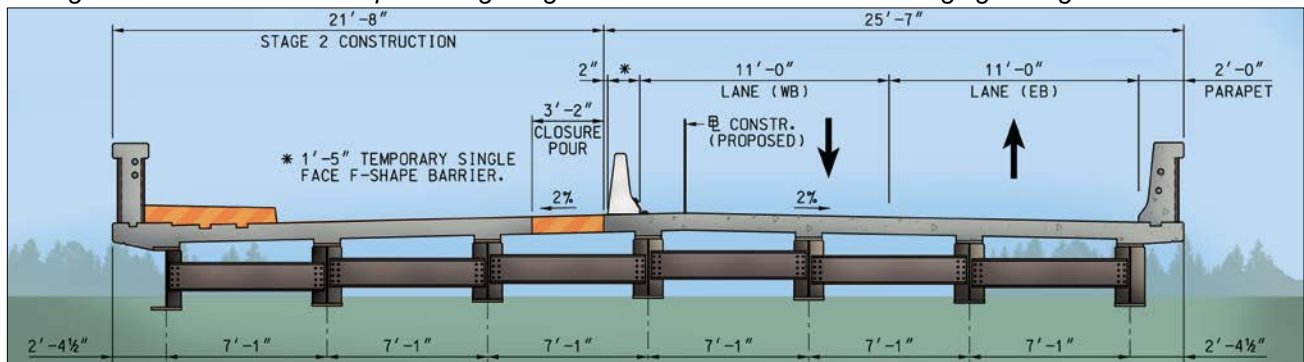


Figure 4.3.5 – ATC 5 Triadelphia Bridge Alignment Shift and Construction Staging – Stage 2 Construction



The Myers/WM Team will obtain permit approval, perform utility coordination, and coordinate with the Howard County Department of Public Works on construction impacts and post-construction changes with the alignment of Triadelphia Road, as well as perform public outreach to the surrounding communities. The Myers/WM Team will schedule Stage I Construction for the bridge replacement to begin in September 2019 and ending in March 2020, a total of 7 months and half the allowable duration of 14 months. To meet this schedule, our Team will work closely with MDOT SHA to streamline the design approval process and expedite Stage I Construction.

We will prioritize construction of the Triadelphia Road Bridge overpass of MD 32 and the new dualized MD 32 SB roadway south of Burntwoods Road. Construction inconveniences will be minimized, and ongoing information will be provided to the traveling public about travel impacts. The general construction/MOT sequence for Triadelphia Road bridge will be as follows:

- Install and implement the detour for eastbound traffic of Triadelphia Road along the bridge.
- Maintain traffic on existing westbound Triadelphia Road.
- Install temporary support of excavation and remove the southern portion of the bridge. Maintain pedestrian access along the sidewalk at northern end of the existing bridge.
- Construct the Stage I portion of the new bridge to the south of the existing bridge.
- Remove eastbound detour and place both westbound and eastbound traffic on the Stage I portion of the new bridge. Pedestrian traffic across the bridge will not be provided.
- Remove north portion of the existing bridge and construct Stage II of the new bridge.
- Install final pavement markings and place traffic into final configuration on Triadelphia Road.
- Construct widened section of MD 32 for dualization.

Understanding the project budget, we will maximize safe and efficient traffic flow and operations ensuring that they are compatible with future corridor improvements. We will select cost-effective design, materials, and construction methods; maximize the use of performance-based requirements; design intersections geometrics-layouts focused on safety and mobility; and incorporate added corridor traffic operation features and elements of future improvements as feasible. Potential ATCs that we will investigate to provide the maximum project value include:

- Reducing the EB Triadelphia Road Detour by shifting the alignment of Triadelphia Road to the south and eliminating provisions for a sidewalk across the bridge during Stage 2 construction for the proposed bridge, as presented in ATC #5
- Optimizing the Triadelphia Road Bridge length by reducing the median crossing, eliminating the pier to provide for a single span configuration, and incorporating F-Shape Barriers within the new bridge abutment slopes, as presented in ATC #4.





# 4.4

# WELL MANAGED PROJECT

## 4.4.A. APPROACH TO COORDINATE POTENTIAL UTILITY RELOCATIONS

### DESIGN AND CONSTRUCTION COORDINATION

Utility relocations will be necessary to install new facilities and widen/ reconstruct MD 32 throughout the Project limits. The Myers/WM Team is very familiar and experienced with utility coordination for MDOT SHA projects and has dedicated design and construction utility coordination staff to complete the project in a timely and cost-effective manner.

Promptly following Notice to Proceed, we will schedule a coordination meeting with all impacted utility owners to present the proposed design and construction schedule and confirm locations where the relocation design plans may need to be changed. Monthly utility coordination meetings will continue throughout design and construction. The Myers/WM Team will also prepare a Utility Conflict Matrix (UCM) incorporating all known utility impacts and will maintain this matrix throughout the Project. Each utility owner will receive a copy of the UCM to track impacts, avoidance, and planned relocations.

Our Design Team will mitigate the number of required utility relocations by adjusting the design to avoid relocations and potential utility shutdowns and outages as is feasible/reasonable, particularly regarding the existing large diameter gas transmission mains. Where utility relocations cannot be avoided, Myers/WM will conduct task force design meetings for direct collaboration between our design Team and the utility owners' design Team to streamline the design process and ensure a synchronized design with all parties utilizing the latest design CAD files. We will also prepare utility scroll plans depicting existing utilities, proposed roadway improvements, and proposed utility relocations that the Team can use for quick references and to identify potential design conflicts.

Once utility relocation construction has begun, the Myers/WM Team plans to obtain and maintain real-time as-built field data on the installed utilities. We will field-survey and plot newly installed utility poles, hand boxes, and other visible appurtenances within the CAD design files to coordinate these tasks with ongoing design and construction efforts – which ensures that installed utilities will not conflict with future phases of construction. Where installed utilities are not visible, we will request as-built records from the utility owners to incorporate them into the design plans.

The Myers/WM Team's sequence of construction and CPM schedule reflect the goal to relocate utilities before they conflict with the new work. In our experience, this best-case scenario is not always achievable due to reasons outside of the design-build Team and MDOT SHA's control. When utility relocations have been delayed on other design-build projects, including the US 113 Phase 3 Dualization, our Team has utilized innovative strategies to progress the work such as temporary relocations, concrete encasement, above ground conduits, and overhead shielding.

### POTENTIAL UTILITY RELOCATIONS AND MEASURES TO AVOID IMPACTS

As outlined by the RFP, utility relocation will occur in three separate Utility Construction Phases (UCP). We have incorporated the relocations of each impacted facility into the CPM schedule and will sequence these relocations as follows:

#### Approach to Identifying and Mitigating Utility Conflicts

- Meet early and regularly with all Utility Owners with facilities along the corridor
- Extensively research/review utility records and relocation plans
- Confirm potential conflicts with subsurface test holes
- Prepare and maintain a Utility Conflict Matrix for each potential utility impact
- Maintain real-time utility as-built drawings as relocations are installed
- Prepare Utility Scroll Plans for proposed roadway and utility relocation designs

- **UCP-1: Triadelphia Road Bridge Area.** Relocation work for utilities at the Triadelphia Road bridge is planned to begin in July 2018 and conclude in March 2019.
- **UCP-2: Mainline MD 32.** Relocation work for utilities from the southern-most project limits to Access Road 4 is scheduled to occur from October 2020 to September 2020.
- **UCP-3: Access Road 4.** Relocation work for utilities from Access Road 4 to MD 144 and I-70 will begin in July 2020 and conclude in June 2021.

### **BGE GAS**

The status of BGE Gas facilities within the project corridor is based on records and relocation plans provided within the RFP, as BGE Gas did not participate in the 5/24/2018 Utility One-on-One meeting. BGE Gas maintains multiple facilities within the MD 32 project limits, including crossings of a 20" main at Sta. 271+20, a 4" main at Sta. 334+50, a 4" main at Sta. 377+40, and a 6" main at Sta. 427+25. The existing 4" main at Sta. 334+50 (near Triadelphia Road) will be relocated under UCP-1. We don't anticipate other impacts to BGE gas crossings. BGE also plans to cut and cap their existing 6" plastic gas main at River Valley Chase at the edge of the proposed work area. A 20" gas main also lies near the proposed limits of disturbance, parallel to MD 32, from Sta. 217+50 to Sta. 271+20. We do not anticipate impacts to this facility.

### **COLUMBIA TRANSMISSION**

Columbia Transmission owns and maintains a 30" diameter gas transmission main within the MD 32 project limits at Sta. 220+00. Columbia Transmission did not participate in the 5/24/2018 Utility One-on-One meeting. The Myers/WM Team recognizes that existing large diameter gas transmission mains, such as those owned by Columbia Transmission, are the 'least maneuverable' utilities within the MD 32 project limits, and would require the greatest amount of time for designing and constructing relocations, could result in significant additional relocation cost, and would impact the project schedule. To avoid conflicts with Columbia Transmission facilities, our Team will coordinate closely with Columbia Transmission during design and construction to identify concerns and mitigate conflicts/concerns early; design storm drain/ SWM facilities outside of gas easements; provide the specified cover of 36" min to 60" max constantly throughout construction; and coordinate oversight by Columbia Transmission during construction near buried facilities.

### **Challenges of Gas Transmission Mains**

Large diameter gas transmission mains, such as those owned by Columbia Transmission and BGE, are the 'least maneuverable' utilities within the MD 32 project limits, and would require the greatest amount of time for designing and constructing relocations. The Myers/WM Team plans to avoid impacts to these facilities in the following ways:

- Coordinate closely with the utility owner during design and construction to identify concerns and avoid impacts early-on
- Avoid placing storm drain and SWM facilities within gas facility easements or over gas mains
- Prepare designs that meet the Utility Owner requirements for cover (36" minimum, 60" maximum) at all times during construction
- Notify utility owners in advance of construction near buried facilities so owner representatives can observe the work

### **BGE ELECTRIC**

BGE maintains overhead electric lines along MD 32 at the Triadelphia Road bridge overpass and from Pfefferkorn Road to I-70. Based on the RFP plans and conversations with BGE, we understand that BGE will be relocating most of their electrical facilities within the corridor to avoid the proposed construction. BGE electrical relocation is included within each of the three utility construction phases. Our Team will implement the following mitigation/avoidance measures:

- Working closely with BGE during design to ensure that relocation plans are coordinated with the final design
- Coordinating construction schedules with BGE crews
- Protecting existing poles with a 10-15 ft. zone of unexcavated soil until relocation is complete
- Maintaining minimum vertical clearances from overhead utility lines for all construction operations

### **COMCAST**

Comcast maintains both aerial and underground facilities within the project limits. Comcast did not provide records for their aerial facilities, but from field observation their aerial facilities appear to be located on many of the BGE poles within the project corridor and will require relocation in accordance with the BGE relocation plans. Comcast relocations are anticipated to be included in UPC-1, 2, and 3. Our Team will implement the following mitigation/avoidance measures:

- Coordinating relocation of Comcast facilities during the design and construction phases.
- Proactively partnering with Comcast to minimize impacts/disruptions to buried facilities.
- Ensuring that Comcast has access to other owners' relocation plans if required

### **VERIZON**

Verizon maintains aerial and underground communication facilities at various locations along the project corridor. Verizon did not provide records of their aerial or fiber optic facilities within the project limits, has not provided any conceptual relocation plans so far, and did not participate in the Utility one-on-one meeting. The status of Verizon final design plans is currently unknown. Field observation shows that Verizon has aerial lines on BGE poles between Pfefferkorn Road and I-70. These lines will require relocation onto the relocated BGE poles and will require coordination with BGE and Verizon. Verizon will need completed BGE relocation plans to complete their aerial facility relocation plans. From utility designation and field observation, the Myers/WM Team also believes that Verizon buried facilities are present at various locations within the project corridor, including along residential driveways near Nixons Farm. We will confirm this information during the design phase and coordinate any relocations coordinated as may be needed. We anticipate relocating Verizon utilities in each of the three utility construction phases. Our Team will implement the following mitigation/avoidance measures:

- Working closely with Verizon during design to ensure that Verizon relocation plans are coordinated with the final design plans
- Coordinating construction schedules with Verizon crews
- Coordinating relocation of Verizon facilities during the design and construction phases
- Protecting existing poles until relocation is complete and the existing pole can be removed

### **HOWARD COUNTY FIBER OPTIC**

Howard County owns and maintains a fiber optic line that is an integral part of the County communications because it connects schools, County offices, and emergency service communication facilities. The Myers/WM Team understands that these facilities are a critical component of the County's communications backbone, and that the existing facilities can't be disturbed until a relocated line is installed and made operational.

The facilities are located along much of the project corridor, and are already planned for relocation to accommodate the proposed construction. Howard County Fiber Optic relocations will be included in UPC-1, 2, and 3. The RFP includes preliminary relocation plans for these facilities; however, these

### **Aerial Utilities Relocation**

The Myers/WM Team expects that relocation of aerial utilities will follow the standard 'top-down' approach, which will install BGE electrical facilities at the top of the poles. In our experience this is followed by relocations from third-party communication companies (Comcast, Howard Co Fiber Optic), and concluding with Verizon relocations beneath all other utilities.

plans may require revisions based on the final roadway design plans. We will determine if revisions are required during the design phase and coordinate potential changes with the owner. Our Team will implement the following mitigation/avoidance measures:

- Locating and re-marking these facilities during construction to prevent damages to the existing facilities and any installed relocations
- Coordinating with Howard County and their utility designer during every phase of design and construction to ensure that these facilities are not interrupted
- Maintaining an unexcavated soil buffer during any excavation near the lines to protect the existing lines until relocation is complete
- Utilizing phase grading (rough grading with steeper side slopes, followed by finish grading to final slopes/grades) to mitigate conflicts

#### **PRIVATE WATER WELLS AND SEPTIC FIELDS**

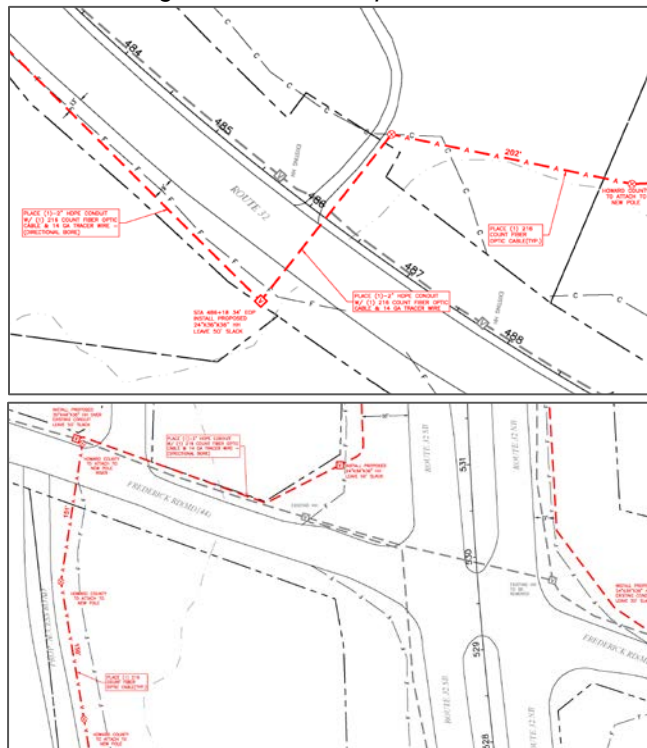
The MD 32 project limits are outside of the public water and sewer service area, with all adjacent properties served by on-lot water wells and sewage disposal systems. The RFP identifies one property (2920 Route 32) as possibly requiring relocation for the septic drain fields due to a conflict with the RFP cut/fill lines. Our Team will implement the following mitigation/avoidance measures:

- Reviewing available records and performing additional sub-surface investigation to confirm the drain field limits if needed
- Coordinating with the Howard County Department of Health and the property owner during final design to confirm impacts to the fields
- Coordinating with the Howard County Health Department and the property owners to prepare/process plans for relocating the septic field to an appropriate location if required

#### **UTILITY CONNECTIONS FOR MDOT SHA OWNED UTILITIES**

Our design provides service connections to utility suppliers for proposed MDOT SHA-owned and maintained utilities including roadway lighting, sign lighting, and traffic signals. The design provides electrical service connections for the proposed roadway lighting, sign lighting, and traffic signals at yet-to-be-determined locations. Once we have completed the preliminary lighting plans and preliminary traffic signal plans, the Myers/MM Team will coordinate with the MDOT SHA D7 Utility Engineer to submit service applications to BGE for the needed electrical service drops to the proposed facilities. We will also coordinate the construction sequencing with BGE to ensure timely installation. The RFP requires the upgrade of the traffic signalization interconnect system along MD 32 between MD 144 and MD 99 with high speed data communications and integrated into the ATMS. Ethernet switches and a cellular modem will be installed at the signal cabinets within the system. Once we have completed the preliminary interconnect design, our Team will coordinate with the MDOT SHA D7 Utility Engineer to submit a service application to Verizon (or another communication service provider if necessary) so we can install the required service connections.

Figure 4.4.1 Fiber Optic Conflicts



#### 4.4.B. AVOID AND MINIMIZE IMPACTS TO ENVIRONMENTAL RESOURCES

The MD 32 project includes numerous environmental features that require permits and approvals for project impacts. Natural resources include forests, wetlands, waterways, and 100-year floodplains, including the named streams of Clyde’s Branch, Middle Patuxent River, and Terrapin Branch. The Project is adjacent to the Nixon Farm wetland and stream mitigation site. There are three resources determined eligible for listing in the National Register of Historic Places around the project area. On June 1, 2017, the Maryland Historical Trust agreed the project will have no adverse effect to these resources. The Myers/WM Team will avoid changes that would alter this determination.

The permits issued to date include environmental commitments regarding natural resources. These commitments include reducing waterway impacts at Clyde’s Branch; minimizing culvert lengths; providing fish passage; and providing amphibian and land animal passage at select stream crossings. Stream mitigation is required along the Rosemary Lane tributary. Wetland mitigation for additional impacts resulting from this phase of the project is required. Minimizing Forest Interior Dwelling Species (FIDS) impacts is required, including no clearing from April through August.

#### AVOIDING AND MINIMIZING IMPACTS

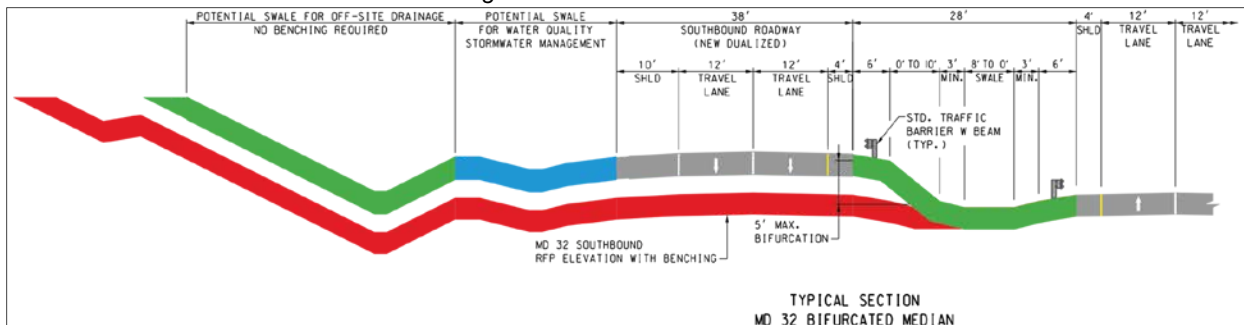
Impacts to wetlands, waterways, and forested areas have been evaluated, and Myers/WM recognizes MDOT SHA’s goal to further avoid and minimize these impacts. Myers and WM will work together to evaluate potential design changes to reach this goal.

**CULVERTS AND BRIDGES** – Myers/WM proposes building some stream crossings off-line from the existing structures. This approach allows maintenance of stream flow design to remain in the existing channel longer, minimizing temporary impacts to aquatic organisms. The Team proposes bridges at S-6 and S-7. A bridge will consistently maintain natural stream bed material and will improve fish, aquatic organism, amphibian, and land animal passage compared to a culvert. Bridges can be built around the stream, which minimizes stream impacts during construction.

To minimize the stream impacts from culverts, Myers/WM will evaluate steeper roadside slopes with traffic barrier and culvert headwalls instead of end sections. This approach reduces culvert lengths by designing the proposed headwalls higher or longer than the standard. Myers/WM will choose end treatments that balance constructability, roadway safety, and environmental impacts. Myers/WM will remove the three existing driveway bridges over Terrapin Branch for improved environmental conditions and will provide stream restoration/stabilization for the driveway removals.

**ROADWAY PROFILE AND TYPICAL SECTION** – Myers/WM is investigating bifurcating MD 32 in some locations to better fit the typical section into the existing topography, which will minimize the toe of fill/top of cut impacts to natural resources. The bifurcation can also eliminate some slope benching, which further reduces the LOD (see *Figure 4.4.2*). Myers/WM will evaluate the MD 32 roadway profile at hydraulic crossings to minimize the required length of proposed culverts.

Figure 4.4.2 – MD 32 Bifurcation



We propose narrowing the typical section by using AASHTO 8' shoulders instead of the RFP 10' shoulders. Although we are also proposing the median to be 2' wider to eliminate traffic barrier, the overall section will be shorter, which minimizes the toe of fill/top of cut impacts to natural resources. ATC 8 includes narrowing acceleration and deceleration lanes from 12' to 10' wide, reducing the roadway footprint. Myers/WM will investigate minimizing access road typical sections, evaluating the allowances by County requirements and AASHTO Low Volume Roadway Guidelines. ATC 4 includes a MD 32 median width reduction at Triadelphia Road, further reducing the LOD footprint. **STORMWATER MANAGEMENT (SWM)/EROSION AND SEDIMENT CONTROL (ESC)** – Each outfall location will require SWM ponds to manage the 10-year peak discharge. The pond design will be integrated into the existing contours to minimize the total footprint required for the cut and fill. Our design will balance the cut and fill requirements that may impact forested lands with the requirement to maintain 30' vegetated stream buffers and 15' no woody zones at the pond embankment base.

Our ESC design will utilize phased construction to minimize the amount of exposed earth during clearing and grading. Clear water diversions for offsite runoff will minimize the burden on ESC devices and reduce runoff, which would ultimately create erosive conditions. Near environmentally sensitive resources, the Team will minimize waste by using lower impact ESC devices, such as diversion fence.

**SCHEDULE** – Our schedule will be phased to plan the initial clearing and grubbing outside the April to August FIDS breeding season. This work will start at the beginning of September 2019. We will coordinate installing the cross culverts in WUS with the in-stream restriction periods to install the maintenance of stream flow; construct the culvert; remove the diversion; and restore the stream outside of the in-stream restriction period, unless unforeseen circumstances require otherwise.

### PROACTIVE COORDINATION

We will coordinate proactively with review agencies to obtain permits, approvals, and modifications for the project without impacting schedule, and subsequently, the traveling public. We start this process early with the pre-permitting meeting, and continue it with monthly agency meetings.

**SWM/ESC FROM PRD** – Our Team understands the PRD review and approval process from our work on the US 113 Phase 4 and MD 404 design-build projects. Frequent meetings with PRD to discuss our design philosophy, submittal schedules, and PRD policies are key to a smooth review process.

**WETLANDS AND WATERWAYS FROM MDE/USACE** – MDOT SHA has received MDE and USACE permits for the project. Based on approved ATCs and other proposed design changes, we may require additional permit modifications. Myers/WM will present all design changes and potential reductions to MDOT SHA and the agencies for advanced feedback; this approach streamlines the permitting approval process. We will submit the H&H submittals and maintenance of stream plans for work in waterways or near wetlands for MDE's review simultaneously with the submittals to PRD.

**NEPA** – We will bring any modifications to the design to MDOT SHA for approval for possible changes to the NEPA documentation. Our environmental staff will review the design change's impact to the natural, social, or cultural environmental resources and then present these changes to the MDOT SHA Project and Environmental Managers in an environmental summary narrative.

### Partnering with Agencies

Our Team's partnering with agencies will include regularly scheduled meetings to discuss design approach, verify comments have been addressed, and expedite reviews.

#### 4.4.C. CUSTOMER OUTREACH PLAN

The Myers/WM Team is committed to minimizing inconvenience to the community and the traveling public throughout the design and construction of the Project. The public outreach strategy will provide a framework for stakeholders and special interests groups to receive information about this critically important capacity and safety improvement Project. Our approach to public outreach establishes and maintains open lines of communication with the impacted stakeholders.

We will partner with MDOT SHA to provide timely information, support, and assistance with community participation, and interaction activities during the development of the design and throughout construction of the Project. The Team will share the responsibility for the Public Outreach program by participating in interactive activities; providing a PR Coordinator; attending any meetings; documenting interactions; and addressing public inquiries. PR Manager Shannon Moody will oversee public outreach activities for the Project. Her experience includes public outreach services for numerous design-build projects including the US 113 Phase 3 Dualization, US 113 Phase 4 Dualization, the MD 404 Dualization projects.

#### **Minimizing Inconvenience to the Community and Traveling Public**

Our design and construction approach have minimized impacts by reducing the duration of the Triadelphia Road Bridge by 7 months, opening the dualized roadway south of Burntswood Road in 11/21, and expediting Substantial Completion of the fully dualized roadway in 7/22.

#### STAKEHOLDER OUTREACH

During the design phase, our Team will meet with the major stakeholders to share designs and associated impacts and hear concerns. We will address each stakeholder in a way most convenient for them. We will make a good faith effort to address any concerns the public may have if those suggestions are reasonable regarding cost, time, and construction effort. We will refer all comments to MDOT SHA within four business hours and our Team will maintain a log of all public comments with the person's contact information. We will work closely with MDOT SHA to develop a coordinated effort for addressing public information.

Our Team will use communication opportunities and venues to keep the roadway users, adjacent property owners, and the community informed on the progress and potential project impacts. We will coordinate communication with MDOT SHA to ensure a consistent message. We anticipate using various outreach tools to keep the public fully informed on how the project may affect them, including local newspapers; radio; TV stations; email blasts; website updates (hosted by MDOT SHA); social media; MDOT SHA chart; project mailers; stakeholder meetings; variable message signs; outreach meetings; and fixed signage.

#### **Project Stakeholders**

- Adjacent property owners and tenants within the roadway corridor including HOAs
- Howard County government and elected officials
- Businesses along the corridor including Howard County Fairgrounds, Howard County Living Farm Heritage Museum, and Nixon's Farm
- Business advocacy groups including the Central Maryland Chamber of Commerce
- Howard County Public Schools and Glenelg Country School
- Media representatives for Project updates and traffic impacts
- Public service providers and first responders such as West Friendship, Ellicott City, and Glenwood Volunteer Fire Companies, state and local police, and USPS
- Travelers (during construction)



Table 4.4.1 – Plan to Minimize Construction Impacts

<b>Traffic Management Plan and MOT</b>	Minimize traffic delays to five minutes or less
<b>Property and Business Owner and Stakeholder Coordination</b>	Early and frequent owner notification; temporary access or phased construction to maintain access
<b>Advance Notice for Traffic Pattern Changes</b>	Advance notice for all changes in access or traffic patterns using advanced signage, message signs
<b>Emergency Services</b>	Keep volunteer fire companies, first responders, State and local police informed on the progress
<b>Safety</b>	Our #1 priority and goal for our MOT plans

**MODES OF COMMUNICATION**

Our Team will implement the following tools to ensure transparent, two-way communications with major Project stakeholders:

- *Public notifications* – The Team will facilitate MDOT SHA's process of notifying the public and community about the construction progress and upcoming events. We will make notifications will be available in print and electronically on the Project website and through email. We will share this information with local media outlets.
- *Pardon Our Dust Meeting* – Before starting construction, our Team, in coordination with MDOT SHA, will host a “Pardon Our Dust” public meeting. This meeting provides an opportunity for all interested parties to review the final project design, and ask questions.
- *Stakeholder Meetings* – We will hold multiple stakeholder meetings through pre-construction to discuss access issues, lane closures, and other construction impacts.
- *Emergency response telephone tree* – We will include appropriate emergency response agencies on the telephone tree for immediate emergency response. The tree will be divided into areas of expertise to ensure the proper people are contacted in an emergency.
- *Signage* – We will provide signs at the start and end of the Project, at intersections with highways, and at the project office with pertinent Team contact information.

**COORDINATION WITH EMERGENCY SERVICES**

The Myers/WM Team prioritizes advanced and consistent coordination with local first responders and emergency service providers. During the design phase, our Team will meet with Howard County fire, police, and rescue representatives to coordinate construction activities and discuss impacts. We may also offer table top exercises with the local community, as well as opportunities to simulate an emergency in the Project area. We will implement an Emergency Services Response Tree to make lines of communication clear.

**COORDINATION WITH SCHOOLS**

Our Team will coordinate with the leadership of Howard County Schools and the Glenelg Country School during the design phase of the Project. Construction activities will impact on bus routes and student movement through the corridor and could cause traffic delays or necessitate using alternate routes. We will follow our protocol that we developed for working with the first responders and coordinate with the school systems well before we begin the construction phase. The Myers/WM Team will facilitate these meetings with MDOT SHA to ensure all necessary stakeholders are included in these critical coordination meetings. Once we have established a central contact with each school system, we will include this representative in the distribution of construction update information.