U.S. Department of Transportation
Federal Highway Administration

MARYLAND DEPARTMENT OF TRANSPORTATION

SHA State Highway Administration

MD 478 (KNOXVILLE ROAD) AT SHA BRIDGE NO. 10089 OVER BRANCH OF THE POTOMAC RIVER

Draft Section 4(f) Evaluation

March 2017

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Prepared for:

U.S. Department of Transportation
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Federal Highway Administration

By

MARYLAND DEPARTMENT OF TRANSPORTATION

SHA State Highway Administration

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Introduction

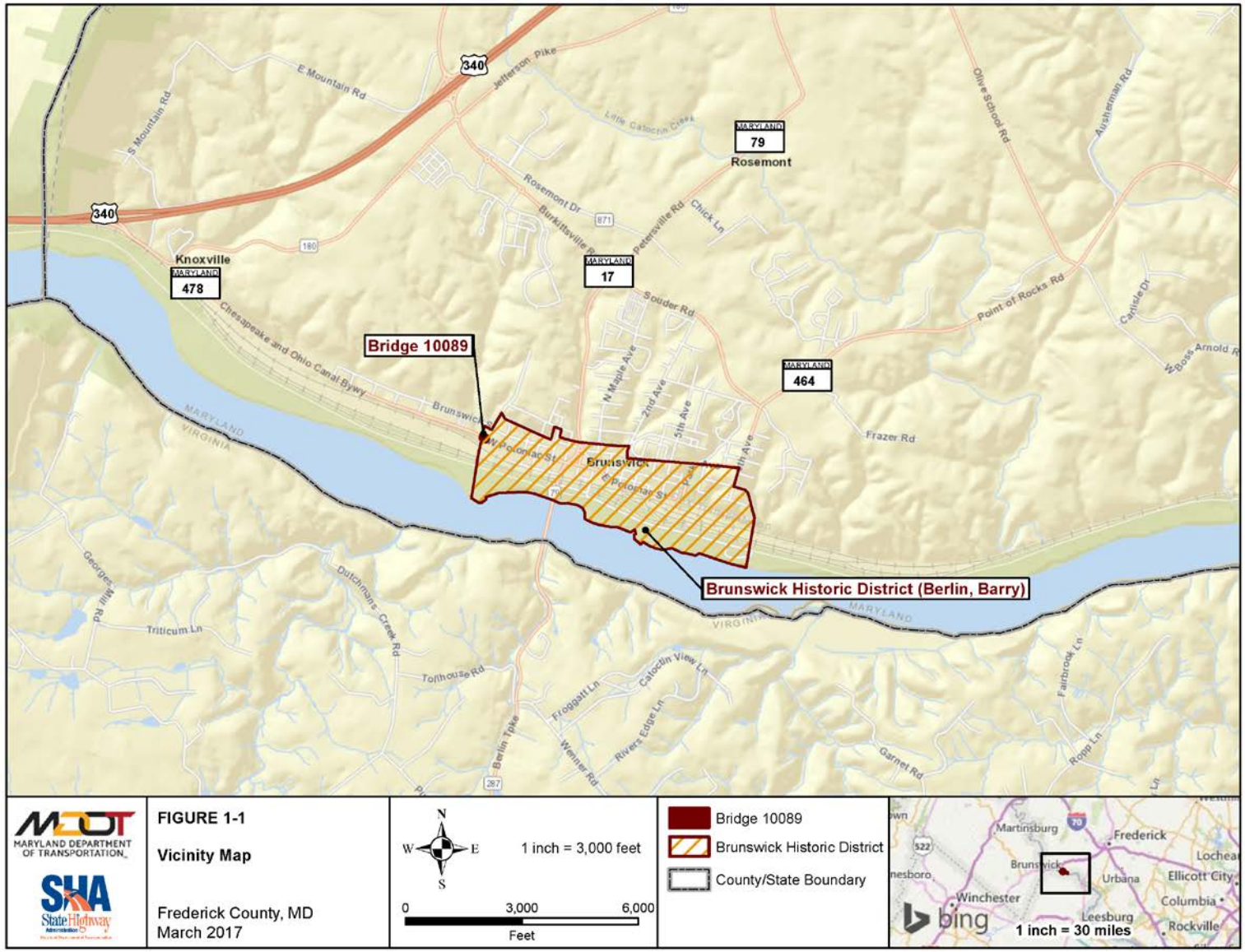
Section 4(f) as amended and codified in the U.S. Department of Transportation Act of 1966, 49 U.S.C. 303 (c), states that the Federal Highway Administration (FHWA) "may not approve the use of land from a significant publicly-owned public park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless a determination is made that: 1) there is no feasible and prudent alternative to the use of land from the property and 2) the action includes all possible planning to minimize harm to the property resulting from such use" [23 CFR 774.3(a)].

This Draft Section 4(f) Evaluation has been prepared in accordance with 23 CFR Part 774 and 49 U.S.C. 303 to assess the likely effects of the proposed action upon Section 4(f) resources and evaluate options that avoid or minimize impacts to those resources resulting from the project. After careful consideration of any comments received on the Draft Section 4(f) Evaluation, a Final Section 4(f) Evaluation will provide a final determination on whether feasible and prudent avoidance alternatives to the use exist, and whether the proposed action includes all possible planning to minimize harm to Section 4(f) resources.

I. Purpose and Need

The Maryland Department of Transportation's State Highway Administration (SHA) is proposing to replace SHA Bridge No. 10089, which carries MD 478 over a branch of the Potomac River in Brunswick, Frederick County (**Figure 1-1**). The purpose and need for the project is to protect public safety by addressing problems related to bridge hydraulics and structural and geometric deficiencies of the bridge. This project would also require stormwater quantity and quality treatment in accordance with the Maryland Department of the Environment's Maryland Stormwater Guidelines for State and Federal Projects. The need for this action is described in more detail below.

Figure 1-1. Vicinity Map



MD 478 is classified as an urban minor arterial within the limits of this project and is on the National Highway System (NHS) for public transit (SHA 2014). MD 478 extends 1.88 miles southeast from MD 180 (Knoxville, MD) to Florida Avenue (Brunswick, MD) and turns into West Potomac Street. Land use within the proposed project area is variable with residential and commercial uses to the north and forest and agriculture uses to the south. The Chesapeake and Ohio (C&O) Canal National Historical Park also borders MD 478 to the south, separated from MD 478 by the MARC rail system. As MD 478 transitions to West Potomac Street, the land use is primarily residential.

Bridge No. 10089 carries MD 478 over Crums Hollow Creek, a small tributary to the Potomac River, as MD 478 enters Brunswick from the west. MD 478 has one eastbound and one westbound lane approaching Bridge No. 10089 from both directions.

As part of the initial planning process, SHA evaluated the daily use of MD 478 within the design area. As of 2013, average daily traffic (ADT) on MD 478 was 3,000 vehicles per day (vpd), with a projected increase to 5,400 vpd in 2033. Approximately two percent of the ADT was estimated to be truck traffic in 2013, with no changes in that percentage anticipated by 2033. The overall purpose and need for this project is to protect public safety by addressing problems related to bridge hydraulics and structural and geometric deficiencies of Bridge No. 10089.

Bridge sufficiency ratings were developed by FHWA to serve as a tool to prioritize federal funding allocation. The ratings vary from 0 percent (poor) to 100 percent (very good). The formula for determining bridge sufficiency rating considers structural adequacy, whether the bridge is structurally obsolete, and level of service provided. This structurally deficient bridge is rated 64.5 out of 100. The existing bridge deck has extensive cracking and rebar is exposed throughout the underside of the bridge deck. In addition, the bridge is geometrically deficient and does not currently meet American Association of State Highway and Transportation Officials (AASHTO) standards. The existing bridge does not currently have shoulders and the parapets are located very close to the roadway.

The retaining wall adjacent to 703 West Potomac Street is unstable as a result of the eastward migration of Crums Hollow Creek. Hydraulic deficiencies are an issue that affects the existing bridge foundations. The existing foundations have experienced undermining as a result of being constructed on top of the native rock.

The existing roadway has a limited line of sight approaching the bridge limiting the visibility of oncoming traffic for motorists using MD 478. In addition, the project study area currently lacks bicycle and pedestrian accommodations and is therefore inconsistent with SHA bicycle and ADA policies. Additionally, providing bicycle and pedestrian accommodations between the commercial area west of the project area and the downtown business district of Brunswick will meet the future need of sidewalk continuity between those two areas.

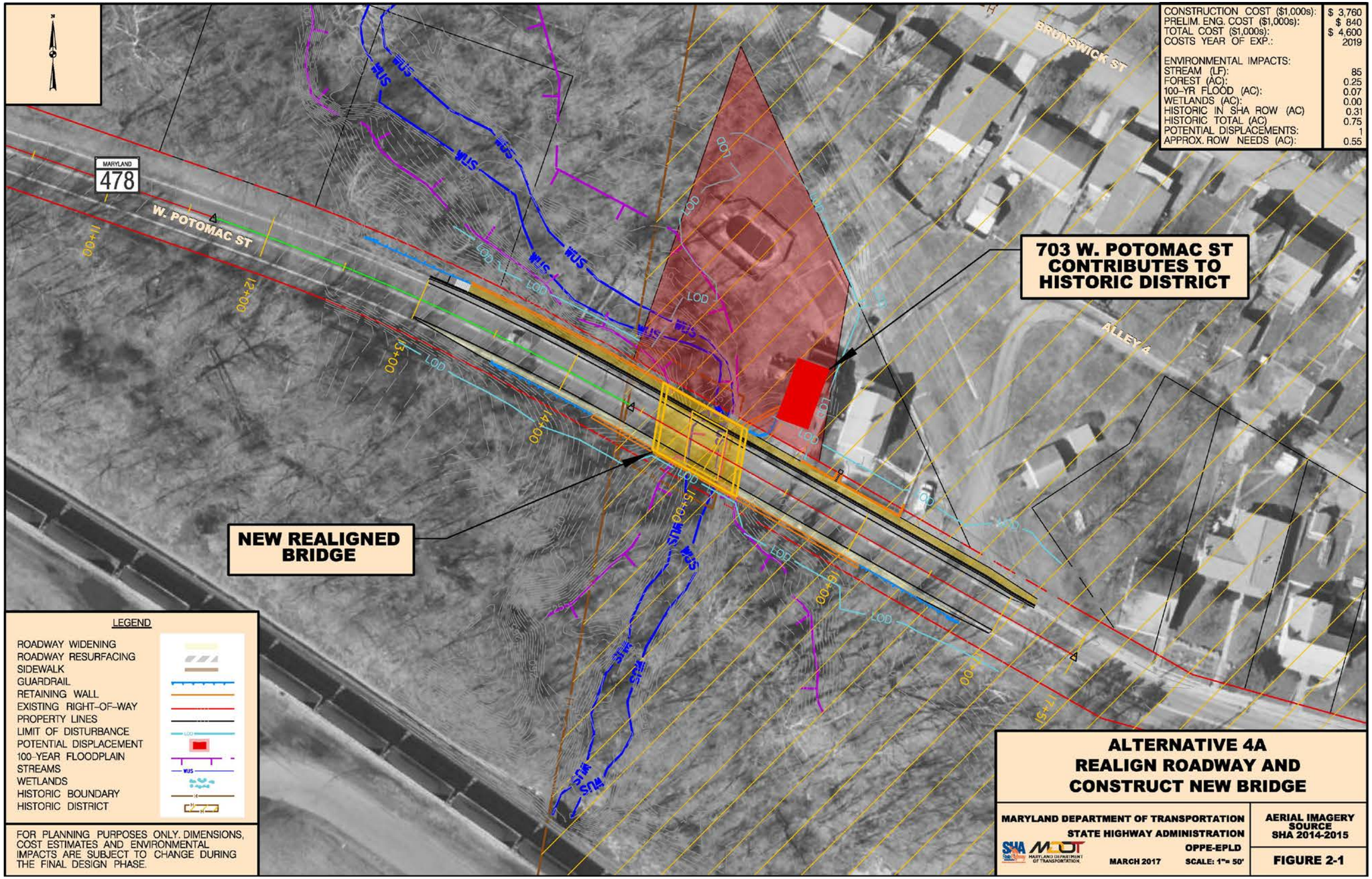
II. Description of Proposed Action

Preferred Alternative - Alternative 4A (Figure 2-1)

Alternative 4A, the Preferred Alternative, serves as the proposed action for the purpose of this evaluation. This alternative would involve removing the existing bridge, building a replacement bridge, constructing a new stormwater management (SWM) facility, and resurfacing the bridge approaches from both directions. This alternative would also include roadway improvements for both bridge approaches. Below is a detailed description of the improvements included in Alternative 4A. Preliminary Engineering plans for the Preferred Alternative are included as **Appendix 1**.

The Preferred Alternative would include the replacement of the existing bridge by slightly realigning MD 478 to the north and elevating the roadway to improve the line-of-sight of the travelling public. Along with the realignment, the roadway would be widened and a sidewalk would be constructed on both sides. The improvements associated with the Preferred Alternative would require the acquisition of additional right-of-way and easements. The Preferred Alternative would require the acquisition of the dwelling at 703 West Potomac Street, as the widening and realignment of the roadway would impact the residence. The acquisition of this dwelling would also eliminate the safety concern related to the parking area directly in front of the house, as the parking area is located in close proximity to the roadway and bridge and the line of sight for oncoming traffic is suboptimal. A retaining wall on the eastern streambank has been undermined by the eastward migration of the stream and any effort to repair the wall risks damaging the dwelling. The acquisition of the property would allow for the construction of the SWM facility. Construction of the SWM facility would include the construction of sidewalks and a standard Type A concrete curb and gutter system at both bridge approaches. The existing drainage pipe on the eastern bridge approach would be cleaned and modified and a retaining wall would be extended to the current location of the dwelling at 703 West Potomac Street. A bioretention facility would be constructed in the northeast quadrant of the parcel. An access road would be constructed at the current location of the dwelling leading from the roadway to the proposed bioretention facility. The proposed bioretention facility would be constructed at the current location of the swimming pool and garage foundation on the north end of the 703 West Potomac Street parcel (See **Figure 2-1**). Additionally, rip rap would be installed at the north side of the bridge along both stream banks to improve bank stability. This would avoid additional impacts to the town's sewer line, as well as to any other dwellings that contribute to the significance of the Brunswick Historic District. A retaining wall would be constructed in front of the dwelling at 701 West Potomac Street that would include a concrete base topped with eight inches of coping and a three-foot ornamental fence. A concrete staircase would be constructed at the location of the existing concrete walkway leading to the dwelling.

Figure 2-1. Alternative 4A: Preferred Alternative



III. Description of Section 4(f) Resources

Bridge No. 10089 [Maryland Inventory of Historic Properties (MIHP) # F-2-92] was constructed in 1925 by the State Roads Commission (Contract # F 83) as part of the Good Roads Movement, a statewide road improvement program developed to meet local transportation needs. In 1995, SHA identified 113 historic beam bridges throughout the state. This structure was accepted by the Maryland Historical Trust (MHT) as a historic bridge on April 3, 2001. The construction of Bridge No. 10089 was part of the general trend towards upgrading state roads and bridges to improve intrastate access and may contribute to the Brunswick Historic District. This section of MD 478 is a designated scenic route and Bridge No. 10089 is surrounded by residential land use. This structure is a SHA-owned concrete beam bridge with a clear roadway width of 24 feet and a span length of 25 feet that crosses over Crums Hollow Creek, a branch of the Potomac River (**Figure 3-1**). The bridge is constructed of five concrete girders, plain concrete wing walls and abutments, and solid paneled concrete parapets. Both approaches are flanked by modern metal guardrails that do not extend along the inside face of the parapets. This structure is not a significant example of its type, however, it does retain integrity of its character-defining elements: slab, longitudinal beams and parapet for the superstructure and abutments, piers, and wing walls for the substructure.

The Brunswick Historic District was listed on the National Register of Historic Places (NRHP) (NR # F-2-009) on August 29, 1979. The Brunswick Historic District includes the original town of Berlin, Maryland (currently Brunswick), along with the Baltimore and Ohio Railroad yards and the part of the "boom town" following along the rail yards (Connie and James 1978). The southern end of the Brunswick Historic District overlaps the C&O Canal National Historical Park (NRHP # F-2-011) along the Potomac River (Romigh 1979). Of the three sites in Maryland with large rail yards (Baltimore, Cumberland, and Brunswick), Brunswick is the only site containing a railroad community, adding to its historical significance. The American Legion Home, the John L. Jordan House, the Wenner farmhouse, and the Koenig House are the few buildings remaining from the first 100 years of the town: 1790-1890. These buildings are all considered structures of particular historic merit within the Brunswick Historic District. These buildings represent the early history of Berlin, as it existed as a small trade-oriented town prior to the construction of the Baltimore and Ohio Railroad in the 1890's. The remainder of the historic district is representative of the Brunswick railroad town following the establishment of the large rail yard. These buildings were constructed between 1890 and 1930 as a result of the railroad-induced building boom. Most of the houses built during this timeframe are closely spaced row-type houses, constructed for railroad workers and affiliates.

Several historically important structures are located within the Brunswick Historic District and surrounding area (**Figure 3-4**). The Brunswick Railway Station, also known as the Baltimore and Ohio Westbound Station, is located at the corner of South Maple Avenue, south of West Potomac Street (MIHP # F-2-106). This Queen Anne style station was constructed in 1881 as an incentive for potential buyers of other Real Estate and Improvement Company properties within the town. Another notable historic structure is the Brunswick Museum (MIHP # F-2-105), located at 40-45 West Potomac Street. The Brunswick Museum was originally founded as the Brunswick Railroad Museum in 1974. This museum originally focused on local railroad history, but has since expanded to include the general history of Brunswick.

Another nearby SHA bridge, Bridge No. 10024, was nominated but determined ineligible for induction to the NRHP (MHT # F-2-37) because it is not a contributing resource to the Brunswick Historic District and it was constructed after the town's period of significance. Bridge No. 10024 crosses the Potomac River approximately half of a mile from Bridge No. 10089. Constructed between 1953 and 1955, Bridge No. 10024 is a steel deck-girder and steel-beam bridge that carries MD 17 over the Potomac River and CSX Railroad (formerly the Baltimore and Ohio Railroad) between Maryland and Virginia (Streett 2007). The New Addition Survey District (MIHP # F-2-77), located to the west of Brunswick, is a 1906 suburb containing significant examples of architecture: vernacular middle-class dwelling houses (Davis 1991). MD 478 connects the southern edge of the New Addition Survey District with the Brunswick Historic District, crossing Bridge No. 10089 between the two.

The dwellings at 703 West Potomac Street, 701 West Potomac Street, and 615 West Potomac Street are not recognized by the NRHP as having particular historic merit. The residences do, however, fall under list three in the nomination form, which includes properties that are considered contributing elements to the Brunswick Historic District. The Brunswick Historic District, as a whole, falls under the district category of the NRHP nomination form. The dwelling at 703 West Potomac Street is the last property on the western edge of the Brunswick Historic District, located adjacent to Bridge No. 10089 on MD 478/West Potomac Street. The dwelling at 703 West Potomac Street and the adjacent dwelling (701 West Potomac Street) are separated from the rest of the housing on West Potomac Street by an alley and existing utility right-of-way. The residence at 615 West Potomac Street is located on the east side of this alley. Other examples of historic residences are located along West Potomac to the east of all three of the aforementioned residences. The dwelling at 703 West Potomac Street sits on a 0.464 acre lot on the north side of MD 478, is privately-owned, and is currently listed as a principal residence. The residence at 701 West Potomac Street sits on a 0.168 acre lot to the east of 703 West Potomac Street, is privately owned, and listed as a principal residence. The dwelling at 615 West Potomac Street is separated from the 701 and 703 West Potomac Street residences by an alley. It sits on a 0.235 acre lot, is privately-owned and listed as a primary residence as well.

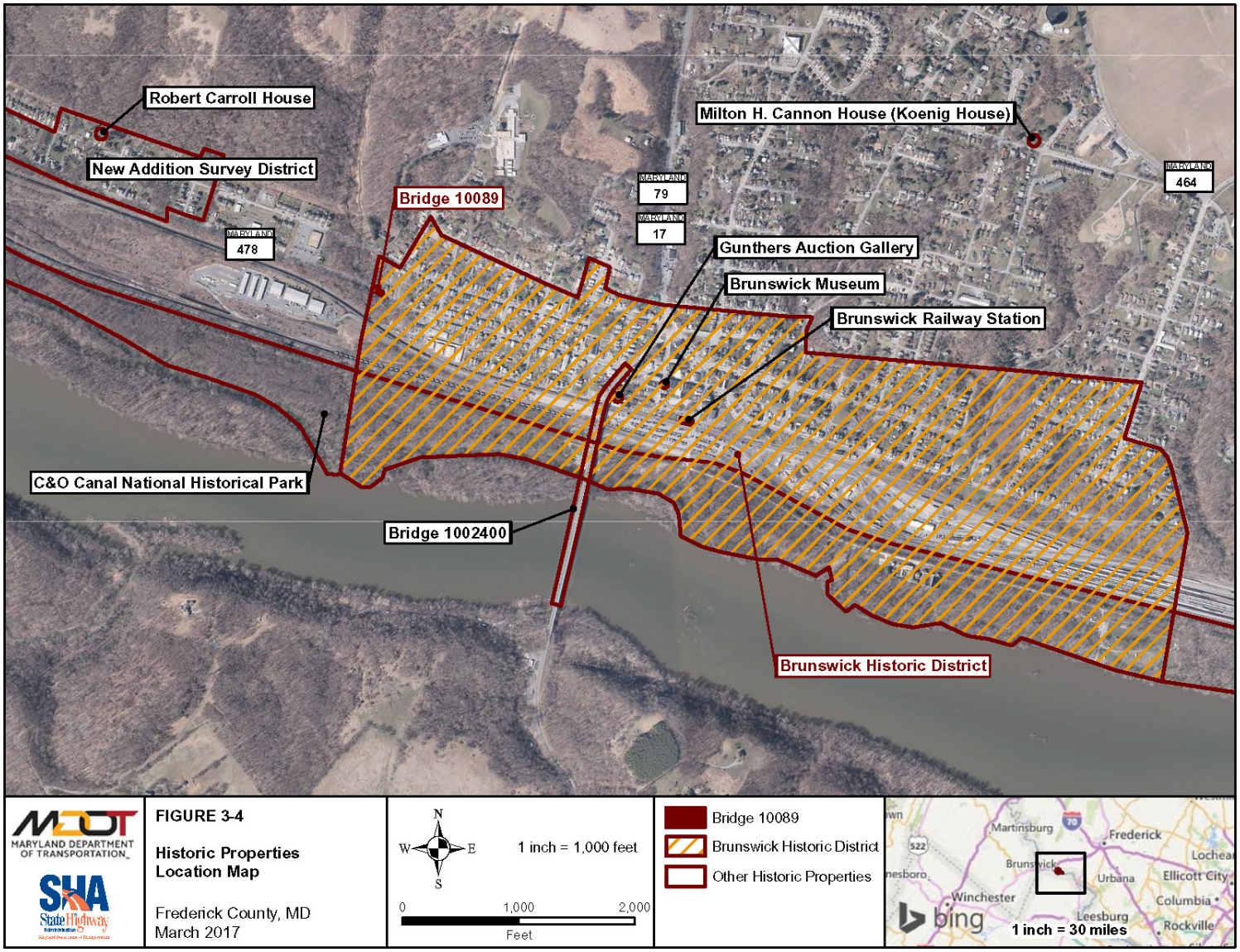
In general, the dwellings at 703 West Potomac Street, 701 West Potomac Street, and 615 West Potomac Street were initially recognized by MHT and are listed on the NRHP because of their location within the Brunswick Historic District, however, they are located at the far western edge of the district and were not identified as having particular historic merit (**Figure 3-3**).

Figure 3-1. SHA Bridge No. 10089 (MIHP # F-2-92)

Figure 3-2. Dwelling at 703 West Potomac Street, Part of the Brunswick Historic District (NRHP # F-2-009)

Figure 3-3. Looking East on MD 478 at Bridge No. 10089 and 703 West Potomac Street

Figure 3-4. Location Map of Nearby Historic Structures



IV. Use of Section 4(f) Resources

The proposed improvements associated with the Preferred Alternative involve the replacement of Bridge No. 10089 and total take of the property and dwelling at 703 West Potomac Street, a 0.46 acre lot. The Preferred Alternative includes the addition of sidewalks, curbs and railings to the bridge. Additional bank stabilization (rip-rap) is proposed upstream of the bridge as well. The Preferred Alternative also includes the addition of sidewalks and curb and gutter to MD 478, as well as a retaining wall at the current location of the residence at 703 West Potomac Street. A SWM facility access road and bioretention pond are proposed within the boundaries of the 703 West Potomac Street property. The realignment of MD 478 would permanently impact 508 square feet (0.012 acre) of the 701 West Potomac Street residence between the roadway and front yard for the construction of an additional retaining wall and concrete steps. These alterations would add new visual elements to the area and alter the aesthetics in ways that do not match the surrounding historical properties. The proposed improvements also include widening of the roadway, which would result in additional impacts to the Brunswick Historic District on the south side of the roadway. The widening of MD 478 would result in additional impacts to an approximate 1,746 square foot (0.04 acre) strip along the south side of MD 478. Currently, 0.77 acre of the Brunswick Historic District is located within the proposed MD 478 limit of disturbance.

Alternative 4A would require the removal of approximately 0.18 acre of trees and would impact 268 linear feet of waters of the U.S. and 0.30 acre of the 100-year floodplain. This alternative would require a total of 0.57 acre of fee simple right-of-way acquisition from five properties located outside of SHA right-of-way. Alternative 4A would cost approximately $4,660,000 to design and construct. This alternative would result in 0.84 acre of permanent impacts to land within the boundaries of the Brunswick Historic District. Of that total, 0.27 acre of land is within SHA right-of-way and 0.57 acre of property is outside of existing SHA right-of-way. Therefore, this alternative would require the fee-simple acquisition of 0.57 acre of property outside of SHA right-of-way. Alternative 4A would also result in 0.002 acre of permanent impacts to properties not designated as Section 4(f) resources, outside of SHA right-of-way. Only one property not designated as a Section 4(f) resource, owned by CSX Transportation, would be impacted as a result of the Preferred Alternative.

While this alternative would result in adverse impacts to Bridge No. 10089 and the Brunswick Historic District, Alternative 4A meets the purpose and need by addressing the bridge hydraulics and structural and geometric deficiencies of the bridge, thus improving driver safety, prolonging the service life, and overall lowering the long-term costs at the project location. In addition, the Preferred Alternative would improve the line-of-sight along MD 478 along the western boundary of the Brunswick Historic District, address the safety issue caused by the residential parking area adjacent to the existing bridge, and provide bicycle and pedestrian accommodations.

V. Section 4(f) Avoidance Alternatives

In addition to the SHA Preferred Alternative (Alternative 4A), four alternatives were considered to avoid impacting Section 4(f) resources.

Alternative 1 - No Build Alternative

The No Build Alternative would involve no alterations to the existing roadway and would not impact any historic properties. It would also involve no permanent or temporary impacts to the adjacent residential properties. Since no improvements are proposed under this alternative, nothing would be done to address the problems related to bridge hydraulics and structural and geometric deficiencies of the bridge. The No Build Alternative was found not to be prudent as it does not address the purpose and need of this project, which is to address problems related to bridge hydraulics and structural and geometric deficiencies of the bridge.

Impacts and Costs

Alternative 1 would result in no impacts to natural resources or historic resources and no displacements. In addition, this alternative would not result in any right-of-way impacts. Initially, it would appear that the only costs associated with Alternative 1 would be the cost of general maintenance, as no activities would occur. However, the bridge has an anticipated life expectancy of 10 years if no actions are taken to address the issues with the existing bridge. At that time, the bridge would need to be rehabilitated in order to prevent the closure of the bridge. Due to the problems with the bridge hydraulics, as well as structural and geometric deficiencies, leaving the existing bridge in place is not a prudent or feasible alternative.

Conclusion

Alternative 1 is not considered to be prudent because it compromises the project to a degree that it is unreasonable to proceed in light of the project's stated purpose and need and it results in unacceptable safety or operational problems. It would not meet the purpose and need of the project because it does not replace the structurally and geometrically deficient bridge. In addition, Alternative 1 would not stop or remediate the undermining of the retaining wall adjacent to 703 West Potomac Street, resulting in further destabilization of the retaining wall. This alternative would not address the issues with line-of-sight and it would not provide bicycle and pedestrian accommodations.

Alternative 5A – Bypass North Alternative

Alternative 5A would include the construction of a new roadway approximately 1.14 miles to the north of the existing bridge, avoiding all impacts to the Brunswick Historic District, as well as the bridge (see **Figure 5-1**). The roadway would begin to the northwest of the MD 79/MD 17 intersection and traverse toward the southwest before turning nearly due south, where it would cross a new bridge over Crums Hollow Creek to the northwest of the existing bridge before connecting to MD 478 to the west of the existing bridge. This alternative would require a substantial amount of additional right-of-way, extensive tree clearing, and it would be much costlier than other alternatives evaluated. Leaving the existing bridge in place would add inspection and maintenance costs to continue to address undermining issues and the retaining wall adjacent to the dwelling at 703 West Potomac Street. While Alternative 5A may meet some aspects of the purpose and need, it is not a practical solution.

Impacts and Costs

Alternative 5A would require the removal of approximately 4.15 acres of trees and it would impact 0.92 acre of the 100-year floodplain of Crums Hollow Creek and 85 linear feet of waters of the U.S. This alternative would require a total of over nine acres of fee simple right-of-way from four separate properties. No residences or businesses would be relocated. Alternative 5A would require substantial detours around the Brunswick Historic District, increasing travel times. The existing bridge would continue to require maintenance in order to prevent further deterioration of the bridge and retaining wall. If the existing bridge is not replaced or rehabilitated, it would continue to deteriorate. In addition, Crums Hollow Creek would continue to undermine the retaining wall, resulting in further instability of the wall and jeopardizing the residence at 703 West Potomac Street. Alternative 5A would cost approximately $20,730,000 for the design and construction of a new roadway and bridge.

Conclusion

In light of the project's stated purpose and need, Alternative 5A is not considered to be prudent because it compromises the project to a degree that it is unreasonable to proceed and results in unacceptable safety and operational problems and it causes severe social, economic, and environmental impacts. This alternative would not address the safety issue caused by the residential parking area. It would not meet the purpose and need of the project because it does not provide bicycle or pedestrian accommodations. Alternative 5A would not stop or remediate the undermining of the retaining wall adjacent to 703 West Potomac Street, resulting in further destabilization of the retaining wall. In addition, this alternative would not meet the purpose and need, as it would require ongoing maintenance of the existing structurally deficient bridge. While impacts to historic resources would be avoided temporarily, the bridge and the residence at 703 West Potomac Street would be in jeopardy, as this alternative would not address the structural issues plaguing the retaining wall and the bridge.

This alternative would require substantial detours around the Brunswick Historic District, increasing travel times. Alternative 5A would result in a total of over nine acres of fee-simple right-of-way from four properties. This alternative would result in additional tree impacts and has a significantly higher cost in comparison to the preferred alternative.

Alternative 5B – Bypass Loop Alternative

Alternative 5B would include constructing a new roadway approximately 0.81 mile to the north of MD 478, avoiding all impacts to the Brunswick Historic District, as well as the bridge (see **Figure 5-1**). The roadway would begin to the west of the MD 17/Center Street intersection, travel west before turning south, where it would cross a new bridge over Crums Hollow Creek to the northwest of the existing bridge before connecting to MD 478 to the west of the existing bridge. This alternative would require a substantial amount of additional right-of-way, extensive tree clearing, and it would be much costlier than other alternatives evaluated. Leaving the existing bridge in place would add inspection and maintenance costs to continue to address undermining issues. While Alternative 5B may meet some aspects of the purpose and need, it is not a prudent solution.

Impacts and Costs

Alternative 5B would require the removal of approximately 2.95 acres of trees and it would impact 0.92 acre of the 100-year floodplain of Crums Hollow Creek and 85 linear feet of waters of the U.S. This alternative would require a total of over six acres of fee simple right-of-way from three separate property owners. No residences or businesses would be relocated. Alternative 5B would require substantial detours around the Brunswick Historic District, increasing travel times. The existing bridge would continue to require maintenance in order to prevent further deterioration of the bridge and retaining wall. If the existing bridge is not replaced or rehabilitated, it would continue to deteriorate. In addition, Crums Hollow Creek would continue to undermine the retaining wall, resulting in further instability of the wall and jeopardizing the residence at 703 West Potomac Street. Alternative 5B would cost approximately $15,840,000 for the design and construction of a new roadway and bridge.

Conclusion

In light of the project's stated purpose and need, Alternative 5B is not considered to be prudent because it compromises the project to a degree that it is unreasonable to proceed and results in unacceptable safety and operational problems and it causes severe social, economic, and environmental impacts. This alternative would not address the safety issue caused by the residential parking area. It would not meet the purpose and need of the project because it does not provide bicycle or pedestrian accommodations. Alternative 5B would not stop or remediate the undermining of the retaining wall adjacent to 703 West Potomac Street, resulting in further destabilization of the retaining wall.

In addition, this alternative would not meet the purpose and need, as it would require ongoing maintenance of the existing structurally deficient bridge. While impacts to historic resources would be avoided temporarily, the bridge and the residence at 703 West Potomac Street would be in jeopardy, as this alternative would not address the structural issues plaguing the retaining wall and the bridge. This alternative would require substantial detours around the Brunswick Historic District, increasing travel times. Alternative 5B would result in a total of over six acres of fee-simple right-of-way from three separate properties. This alternative would result in additional tree impacts and has a significantly higher cost in comparison to the preferred alternative.

Alternative 5C – Local Bypass Alternative

Alternative 5C would include the construction of a new roadway approximately 0.65 miles to the north of the existing bridge, avoiding all impacts to the Brunswick Historic District, as well as the bridge (see **Figure 5-1**). The roadway would begin to the north of the MD 17/West C Street intersection, traverse toward the west before turning toward the south, where it would cross a new bridge over Crums Hollow Creek to the northwest of the existing bridge before connecting to MD 478 to the west of the existing bridge. This alternative would require a substantial amount of additional right-of-way, extensive tree clearing, and it would be much costlier than the Preferred Alternative and minimization alternatives evaluated. Leaving the existing bridge in place would add inspection and maintenance costs to continue to address undermining issues. While Alternative 5C may meet some aspects of the purpose and need, it is not a practical solution.

Impacts and Costs

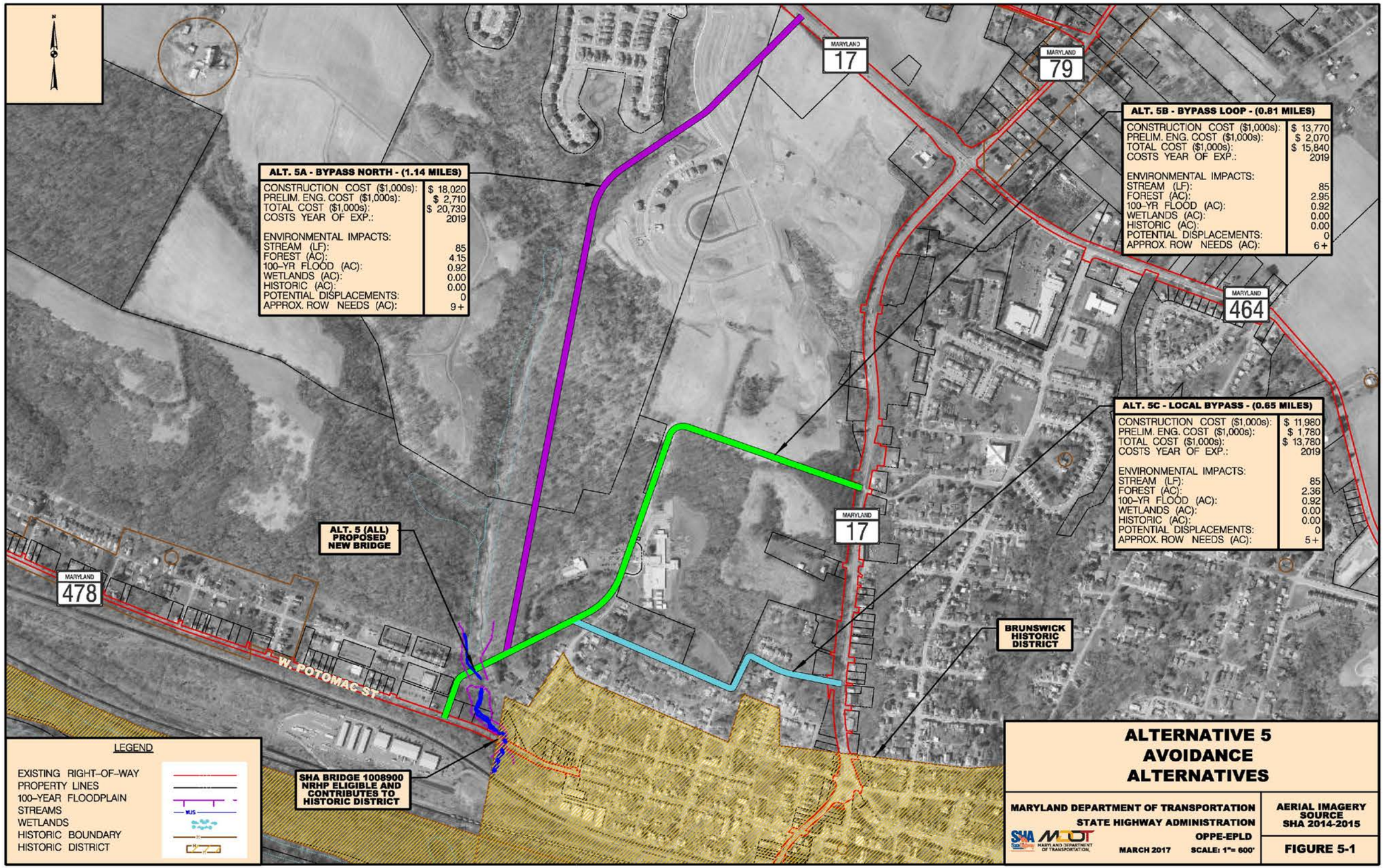
Alternative 5C would require the removal of approximately 2.36 acres of trees and it would impact 0.92 acre of the 100-year floodplain of Crums Hollow Creek and 85 linear feet of waters of the U.S. This alternative would require a total of over five acres of fee simple right-of-way from four separate property owners. No residences or businesses would be relocated. Alternative 5C would require substantial detours around the Brunswick Historic District, increasing travel times. The existing bridge would continue to require maintenance in order to prevent further deterioration of the bridge and retaining wall. If the existing bridge is not replaced or rehabilitated, it would continue to deteriorate. In addition, Crums Hollow Creek would continue to undermine the retaining wall, resulting in further instability of the wall and jeopardizing the residence at 703 West Potomac Street. Alternative 5C would cost approximately $13,780,000 for the design and construction of the new roadway and bridge.

Conclusion

In light of the project's stated purpose and need, Alternative 5C is not considered to be prudent because it compromises the project to a degree that it is unreasonable to proceed and results in unacceptable safety and operational problems and it causes severe social, economic, and environmental impacts. This alternative would not address the safety issue caused by the residential parking area. It would not meet the purpose and need of the project because it does not provide bicycle or pedestrian accommodations. In addition, it would not meet the purpose and need of the project because it would not replace the structurally and geometrically deficient bridge. Alternative 5C would not stop or remediate the undermining of the retaining wall adjacent to 703 West Potomac Street, resulting in further destabilization of the retaining wall.

In addition, this alternative would not meet the purpose and need, as it would require ongoing maintenance of the existing structurally deficient bridge. While impacts to historic resources would be avoided temporarily, the bridge and the residence at 703 West Potomac Street would be in jeopardy, as this alternative would not address the structural issues plaguing the retaining wall and the bridge. This alternative would require substantial detours around the Brunswick Historic District, increasing travel times. While impacts to historic resources would be avoided, Alternative 5C would result in a total of over five acres of fee-simple right-of-way from four separate properties. This alternative would result in additional tree impacts and has a significantly higher cost in comparison to the preferred alternative.

Figure 5-1. Alternative 5 – Avoidance Alternatives



VI. Least Overall Harm Analysis

Pursuant to 23 CFR 774.3(c)(1), if the avoidance analysis determines that there is no feasible and prudent avoidance alternative, then only the alternative that causes the least overall harm may be approved. The following 10 alternatives include reductions in various components of the project in an effort to minimize impacts to the bridge and the Brunswick Historic District. Table 3 summarizes each alternative, including quantities of Section 4(f) property ROW acquisition and cost. Table 4 presents the Least Overall Harm Analysis, using the evaluation of seven factors identified in 23 CFR 774.3(c)(1).

Alternative 2 – Rehabilitate Existing Bridge

Alternative 2 would include the rehabilitation of the existing structure, retaining its historic integrity (see **Figure 6-1**). The concrete has deteriorated to the point that it is cracked through to the reinforcing steel. In addition, the footings for the bridge have been undermined by the stream bed, which is lower than the base of the footings. Alternative 2 would require the replacement of the entire deck and concrete beam superstructure, including the existing parapet walls. At a minimum, the undermined footings would need to be rehabilitated. While rehabilitation would extend the serviceable life of the bridge by 10 to 15 years, the alternative would not address the functional obsolescence of the bridge nor its geometric and hydraulic deficiencies.

This alternative would not prevent Crums Hollow Creek from continuing its eastward migration, which currently threatens to destabilize the foundation of the dwelling at 703 West Potomac Street, nor would it address the safety issue of having a residential parking area within SHA right-of-way at the northeast corner of the bridge. The existing bridge does not meet current AASHTO criteria and it does not meet SHA Bicycle Compatibility Criteria. Design exceptions for the AASHTO criteria and a waiver of the SHA Bicycle Compatibility Criteria are required. For these reasons, Alternative 2 does not meet the purpose and need for the project.

Impacts and Costs

Alternative 2 would require the removal of 0.03 acre of trees and it would impact 50 linear feet of waters of the U.S. and 0.03 acre of the 100-year floodplain of Crums Hollow Creek. Alternative 2 would not require any additional right-of-way, as it would only include the rehabilitation of the existing structure. Alternative 2 would cost approximately $2,030,000 to design and construct. Right-of-way costs have not been included, but would need to be considered. This alternative would result in 0.14 acre of permanent impacts to land within the boundaries of the Brunswick Historic District, all of which is located within SHA right-of-way.

Conclusion

The rehabilitation of the bridge would cost nearly half as much as the replacement of the bridge. While this alternative would extend the life of the bridge to 10-15 years, the life expectancy of a new bridge would be 75 to 100 years. The concrete of the existing bridge has deteriorated to the point that it is cracked through to the reinforcing steel. In addition, the footings for the bridge have been undermined by the stream bed, which is lower than the base of the footings. These conditions make any rehabilitation of the bridge through sound engineering practices difficult. The rehabilitation of the existing bridge is not a feasible alternative due to the poor condition of the bridge. In light of the project's stated purpose and need, Alternative 2 is not considered to be prudent because it compromises the project to a degree that it is unreasonable to proceed and results in unacceptable safety and operational problems. It would not meet the purpose and need of the project because it would not replace the structurally and geometrically deficient bridge. In addition, Alternative 2 would not stop or remediate the undermining of the retaining wall adjacent to 703 West Potomac Street, resulting in further destabilization of the retaining wall. This alternative would not address the issues with line of sight and it would not provide bicycle and pedestrian accommodations.

Alternative 2A – Rehabilitate and Widen Existing Bridge

Alternative 2A would include the rehabilitation and widening of the existing bridge (see **Figure 6-2**). This alternative would include the replacement of the deck and concrete beam superstructure, including the existing parapet walls. The retaining wall located at the northeast corner of the bridge would need to be removed and rebuilt and the roadway would be widened, resulting in the demolition of 703 West Potomac Street. While this resource is not an individually significant historic resource, it is listed as a in the NRHP as a structure that contributes to the significance of the Brunswick Historic District. The wing wall on the northwest corner of the bridge would need to be replaced. Widening the bridge and roadway to the north would push the roadway closer to the stream channel on the north side, requiring the construction of a retaining wall. In addition, the existing abutments would need to be widened to the north. The footings would need to be stabilized.

This alternative would not address structural deficiencies described above nor would it address the existing hydraulic deficiencies. This alternative would not meet the project's purpose and need. As described earlier, the concrete has deteriorated to the point that it is cracked through to the reinforcing steel. Additionally, the footings for the bridge have been undermined by the stream bed, which is lower than the base of the footings. These conditions make any rehabilitation of the bridge through sound engineering practices difficult. In addition, this alternative would not prevent the eastward migration Crums Hollow Creek, which currently threatens to destabilize the foundation of the dwelling at 703 West Potomac Street. The existing bridge does not meet current AASHTO criteria and it does not meet SHA Bicycle Compatibility Criteria. Design exceptions for the AASHTO criteria and a waiver of the SHA Bicycle

Compatibility Criteria are required. For these reasons, Alternative 2 would not meet the purpose and need for the project.

Impacts and Costs

Alternative 2A would require the removal of approximately 0.23 acre of trees and it would impact 85 linear feet of waters of the U.S. and 0.03 acre of the 100-year floodplain of Crums Hollow Creek. This alternative would require the fee-simple right-of-way acquisition of 0.53 acre from three properties, including one residential displacement, located to the north of MD 478. Alternative 2A would permanently impact approximately 0.83 acre of the Brunswick Historic District, including 0.30 acre within and 0.53 acre outside of SHA right-of-way. Alternative 2A would cost approximately $3,710,000 to design and construct. Right-of-way costs have not been included, but would need to be considered. Coordination with MHT would be required to adequately minimize impacts to the historic integrity of the bridge.

Conclusion

The rehabilitation and widening of the bridge would cost slightly less than the replacement of the bridge, but would only extend the life of the bridge to 10-15 years, whereas the life expectancy of a new bridge would be 75 to 100 years. In light of the project's stated purpose and need, Alternative 2A is not considered to be prudent because it compromises the project to a degree that it is unreasonable to proceed and results in unacceptable safety and operational problems and it causes severe social, economic, and environmental impacts. It would not meet the purpose and need of the project as it would not replace the structurally and geometrically deficient bridge. The retaining wall located at the northeast corner of the bridge would need to be removed and rebuilt and the roadway would be widened, resulting in the demolition of 703 West Potomac Street. This alternative would not address the issues with line of sight. In addition, this alternative would result in significant impacts to trees and waters of the U.S.

Alternative 3 – Construct New Bridge Parallel and to the South

Alternative 3 would include the construction of a new bridge on a parallel alignment to the south of the existing structure (see **Figure 6-3**). Alternative 3 would require significant additional right-of-way from CSX Transportation; impact a large sewer line owned by the Town of Brunswick; require the relocation of overhead utility lines; and cause impacts to waters of the U.S. and trees. Significant grading and paving would be required, which would result in increased stormwater management requirements. Leaving the existing bridge in place would add inspection and maintenance costs to continue to address undermining issues. In addition, this alternative would not prevent the eastward migration Crums Hollow Creek, which currently threatens to destabilize the foundation of the dwelling at 703 West Potomac Street. The existing bridge does not meet current AASHTO criteria and it does not meet SHA Bicycle Compatibility Criteria. Design exceptions for the AASHTO criteria and a waiver of the SHA Bicycle Compatibility Criteria are required. While Alternative 3 may meet the purpose and need, it is not considered a prudent solution.

Impacts/Costs

Alternative 3 would require the removal of approximately 0.71 acre of trees and would impact 121 linear feet of waters of the U.S. and 0.15 acre of the 100-year floodplain of Crums Hollow Creek. This alternative would require a total of 1.08 acres of fee simple right-of-way acquisition from one property, CSX Transportation.

Alternative 3 would cost approximately $7,770,000 to design and construct. Right-of-way costs have not been included, but would need to be considered. This alternative would result in one acre of permanent impacts to land within the boundaries of the Brunswick Historic District, including 0.60 acre outside of and 0.40 acre within SHA right-of-way.

Conclusion

While Alternative 3 would meet the project purpose and need, it is not considered to be prudent since it would cause severe social, economic, and environmental impacts. This alternative would require a significant amount of right-of-way acquisition and would impact a large sewer line owned by the Town of Brunswick. In addition, this alternative would result in significant impacts to trees and waters of the U.S. The existing bridge would continue to require maintenance in order to prevent further deterioration of the bridge and retaining wall. If the existing bridge is not replaced or rehabilitated, it would continue to deteriorate. In addition, Crums Hollow Creek would continue to undermine the retaining wall, resulting in further instability of the wall and jeopardizing the residence at 703 West Potomac Street. Alternative 3 would cost almost twice as much to construct as the Preferred Alternative. Due to the unacceptable safety issues and impacts anticipated, Alternative 3 would not be considered prudent.

Alternative 3A – Construct New Bridge Parallel and to the North

Alternative 3A would include the construction of a new bridge on a parallel alignment to the north of the existing structure (see **Figure 6-4**). Alternative 3A would impact a large sewer line and water lines, both owned by the Town of Brunswick, an overhead utility line, and would result in impacts to waters of the U.S. and trees. In addition, this alternative would require the acquisition of three residences; 703 West Potomac Street, 701 West Potomac Street, and 615 West Potomac Street, all of which contribute to the Brunswick Historic District. Leaving the existing bridge in place would add inspection and maintenance costs to continue to address undermining issues. In addition, this alternative would not prevent the eastward migration Crums Hollow Creek, which currently threatens to destabilize the foundation of the dwelling at 703 West Potomac Street. The existing bridge does not meet current AASHTO criteria and it does not meet SHA Bicycle Compatibility Criteria. Design exceptions for the AASHTO criteria and a waiver of the SHA Bicycle Compatibility Criteria are required. While Alternative 3A may meet the purpose and need, it is not considered a prudent solution.

Impacts/Costs

Alternative 3A would require the removal of 0.15 acre of trees and would impact 0.36 acre of the 100-year floodplain of Crums Hollow Creek and 187 linear feet of waters of the U.S. This alternative would require a total of 1.12 acres of fee simple right-of-way acquisition from eight separate properties, three of which would require residential relocation. All three of the affected residences that would be displaced are considered contributing elements to the Brunswick Historic District.

Alternative 3A would cost approximately $7,560,000 to design and construct. Right-of-way costs have not been included, but would need to be considered. This alternative would result in one acre of permanent impacts to land within the Brunswick Historic District boundary, including 0.56 acre outside of and 0.44 acre within SHA right-of-way.

Conclusion

While Alternative 3A would meet the project purpose and need, it is not considered to be prudent because it causes severe social, economic, and environmental impacts. This alternative would require a significant amount of right-of-way acquisition and would impact a large sewer line owned by the Town of Brunswick. Alternative 3A would require the right-of-way acquisition of 703 West Potomac Street, 701 West Potomac Street, and 615 West Potomac Street, all of which contribute to the Brunswick Historic District. In addition, this alternative would result in significant impacts to trees and waters of the U.S. The existing bridge would continue to require maintenance in order to prevent further deterioration of the bridge and retaining wall. If the existing bridge is not replaced or rehabilitated, it would continue to deteriorate. In addition, Crums Hollow Creek would continue to undermine the retaining wall, resulting in further instability of the wall and jeopardizing the residence at 703 West Potomac Street. Furthermore, Alternative 3A would cost nearly twice as much to construct as the Preferred Alternative. Due to the unacceptable safety issues and impacts anticipated, Alternative 3A would not be considered prudent.

Alternative 4 – Replace Existing Bridge In-Kind

Alternative 4 would include the in-kind replacement of the existing bridge along the current alignment (see **Figure 6-5**). This solution would involve costly grading and stabilization, extensive design and engineering efforts, and considerable impacts to waters of the U.S. and trees. The retaining wall adjacent to 703 West Potomac Street would be reconstructed, resulting in the demolition of the residence. Relocating the SWM facility to another quadrant may not prevent the eastward migration of the stream, which currently threatens to destabilize the foundation of the dwelling at 703 West Potomac Street. The existing bridge does not meet current AASHTO criteria and it does not meet SHA Bicycle Compatibility Criteria. Design exceptions for the AASHTO criteria and a waiver of the SHA Bicycle Compatibility Criteria are required. Given that a new bridge would be constructed and the future ADT would be 5,400, there is no justification for not meeting these criteria, which would require a wider bridge. Additionally, Alternative 4 would not address the safety issue caused by the residential parking area. This alternative would not address the issues with line of sight and it would not provide bicycle and pedestrian accommodations. For these reasons, Alternative 4 would not meet the purpose and need of the project.

Impacts and Costs

Alternative 4 would require the removal of 0.03 acre of trees and would impact 0.03 acre of the 100-year floodplain of Crums Hollow Creek and 50 linear feet of waters of the U.S. This alternative would require the acquisition and demolition of 703 West Potomac Street, since the replacement of the bridge would require the replacement of the retaining wall adjacent to the dwelling. Alternative 4 would cost approximately $2,830,000 for the design and construction of a new bridge. This alternative would result in 0.14 acre of permanent impacts to land within the boundaries of the Brunswick Historic District, all of which is located within SHA right-of-way. In addition, Alternative 4 would require the removal of the existing bridge.

Conclusion

In light of the light of the project's stated purpose and need, Alternative 4 is not considered to be prudent because it compromises the project to a degree that it is unreasonable to proceed and results in unacceptable safety and operational problems. It would not meet the purpose and need of the project because it would not address the geometric deficiencies of the bridge. In addition, Alternative 4 would not stop or remediate the undermining of the retaining wall adjacent to 703 West Potomac Street, resulting in further destabilization of the retaining wall. This alternative would not address the issues with line of sight or the safety issue caused by the residential parking area and it would not provide bicycle and pedestrian accommodations.

Alternative 4A – Realign and Replace Existing Bridge – Preferred Alternative

As described under **Section II, Description of the Proposed Action**, the Preferred Alternative would include the replacement of the existing bridge by slightly realigning MD 478 to improve the line-of-sight of the travelling public. Along with the realignment, the roadway would be widened and a sidewalk would be constructed on both sides. The improvements associated with the Preferred Alternative would require the acquisition of additional right-of-way and easements.

Alternatives 2 and 2A include the rehabilitation of the exiting bridge. Alternatives 3 and 3A propose a new roadway and bridge alignments. Alternative 4 would include the in-kind replacement of the bridge along the existing alignment. Alternatives 2, 2A, 3, 3A and 4 would not meet current AASHTO criteria or SHA Bicycle Compatibility Criteria. Alternative 4A includes the replacement and realignment of the bridge and roadway. This alternative would include the widening of the roadway and sidewalk construction, which would enable the alternative to meet current AASHTO criteria, as well as SHA Bicycle Compatibility Criteria. Alternative 4A is the only alternative that would meet AASHTO design criteria, as well as SHA Bicycle Compatibility Criteria. Alternative 4A would address the geometric deficiencies of the bridge and address the issues surrounding the existing retaining wall. This alternative would minimize impacts to natural resources to the maximum extent practicable, while meeting the necessary criteria mentioned.

The Preferred Alternative would require the acquisition of the dwelling at 703 West Potomac Street to eliminate the safety concern related to the parking area directly in front of the house, as the parking area is located in close proximity to the roadway and bridge and the line of sight for oncoming traffic is suboptimal. This wall has been undermined by the eastward migration of Crums Hollow Creek, which has resulted in the instability of the wall and currently jeopardizes the residence at 703 West Potomac Street. Any effort to repair the wall risks damaging the dwelling. The acquisition of the property would allow for the construction of the SWM facility. Construction of the SWM facility would include the construction of sidewalks and a standard Type A concrete curb and gutter system at both bridge approaches. The existing drainage pipe on the eastern bridge approach would be cleaned and modified and a retaining wall would be extended to the current location of the dwelling at 703 West Potomac Street.

A bioretention facility would be constructed in the northeast quadrant of the parcel. An access road would be constructed at the current location of the dwelling leading from the roadway to the proposed bioretention facility. The proposed bioretention facility would be constructed at the current location of the swimming pool and garage foundation on the north end of the 703 West Potomac Street parcel (refer back to **Figure 2-1**). Additionally, rip rap would be installed at the north side of the bridge along both stream banks to improve bank stability. This would avoid additional impacts the town's sewer line, as well as to dwellings that contribute to the significance of the Brunswick Historic District. A retaining wall would be constructed in front of the dwelling at 701 West Potomac Street that would include a concrete base topped with eight inches of coping and a three-foot ornamental fence. A concrete staircase would be constructed at the location of the existing concrete walkway leading to the dwelling.

Impacts and Costs

Alternative 4A would require the removal of approximately 0.18 acre of trees and would impact 268 linear feet of waters of the U.S. and 0.30 acre of the 100-year floodplain of Crums Hollow Creek. This alternative would require a total of 0.57 acre of fee simple right-of-way acquisition from five properties. Alternative 4A would cost approximately $4,660,000 to design and construct. This alternative would result in 0.84 acre of permanent impacts to land within the boundaries of the Brunswick Historic District, including 0.57 acre of property outside of existing SHA right-of-way. Alternative 4A would also result in 0.17 acre of permanent impacts to properties not designated as Section 4(f) resources, outside of SHA right-of-way. Only one property not designated as a Section 4(f) resource, owned by CSX Transportation, would be impacted as a result of the Preferred Alternative.

Conclusion

While this alternative would result in an adverse impact to Bridge No. 10089 and the Brunswick Historic District, Alternative 4A best meets the purpose and need by addressing the bridge hydraulics and structural and geometric deficiencies of the bridge, thus improving driver safety, prolonging the service life, and overall lowering the long-term costs at the project location. In addition, the Preferred Alternative would improve the line-of-sight along MD 478 along the western boundary of the Brunswick Historic District, address the safety issue caused by the residential parking area adjacent to the existing bridge, and provide bicycle and pedestrian accommodations.

Temporary Impacts to Natural Resources

Since the avoidance and minimization alternatives were developed, the Preferred Alternative has been further refined and mitigation measures have been developed. The Preferred Alternative would result in temporary impacts to approximately 130 linear feet of Crums Hollow Creek and 0.17 acre of the 100-year floodplain of Crums Hollow Creek.

These impacts would be a result of the temporary stream diversion required for the construction of the bridge and retaining wall, as well as stream stabilization measures both upstream and downstream from the existing bridge. In addition, the Proposed Alternative may impact approximately 0.33 acre of forest, primarily to the south of MD 478, as a result of utility relocations. It is reasonable to expect that Alternatives 2A and 3A would result in similar impacts, as they would require a temporary stream diversion, stream stabilization, and utility relocations, similar in nature to those expected as part of the Preferred Alternative.

Figure 6-1. Alternative 2: Rehabilitate Existing Bridge

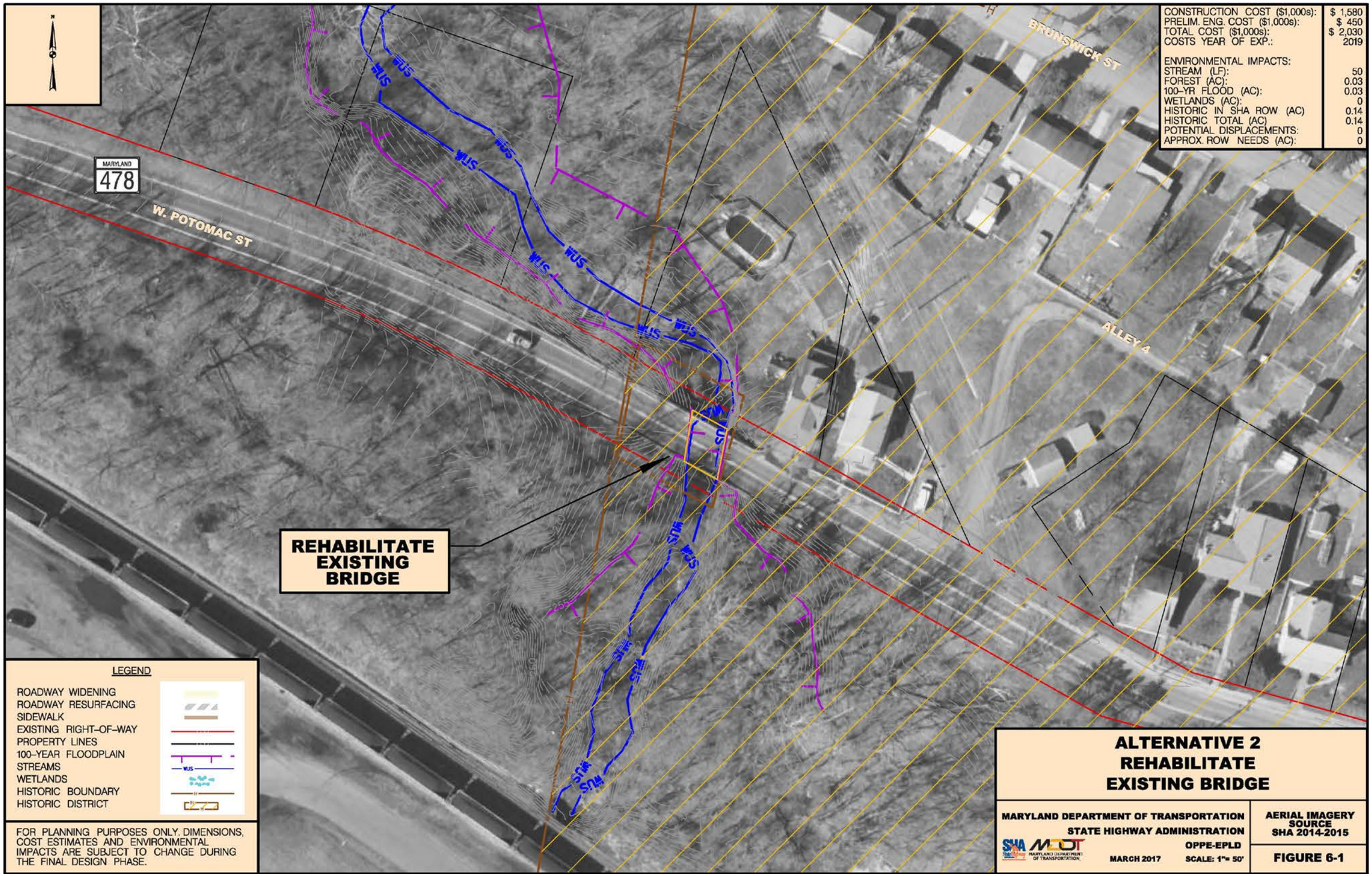


Figure 6-2. Alternative 2A: Rehabilitate and Widen Existing Bridge

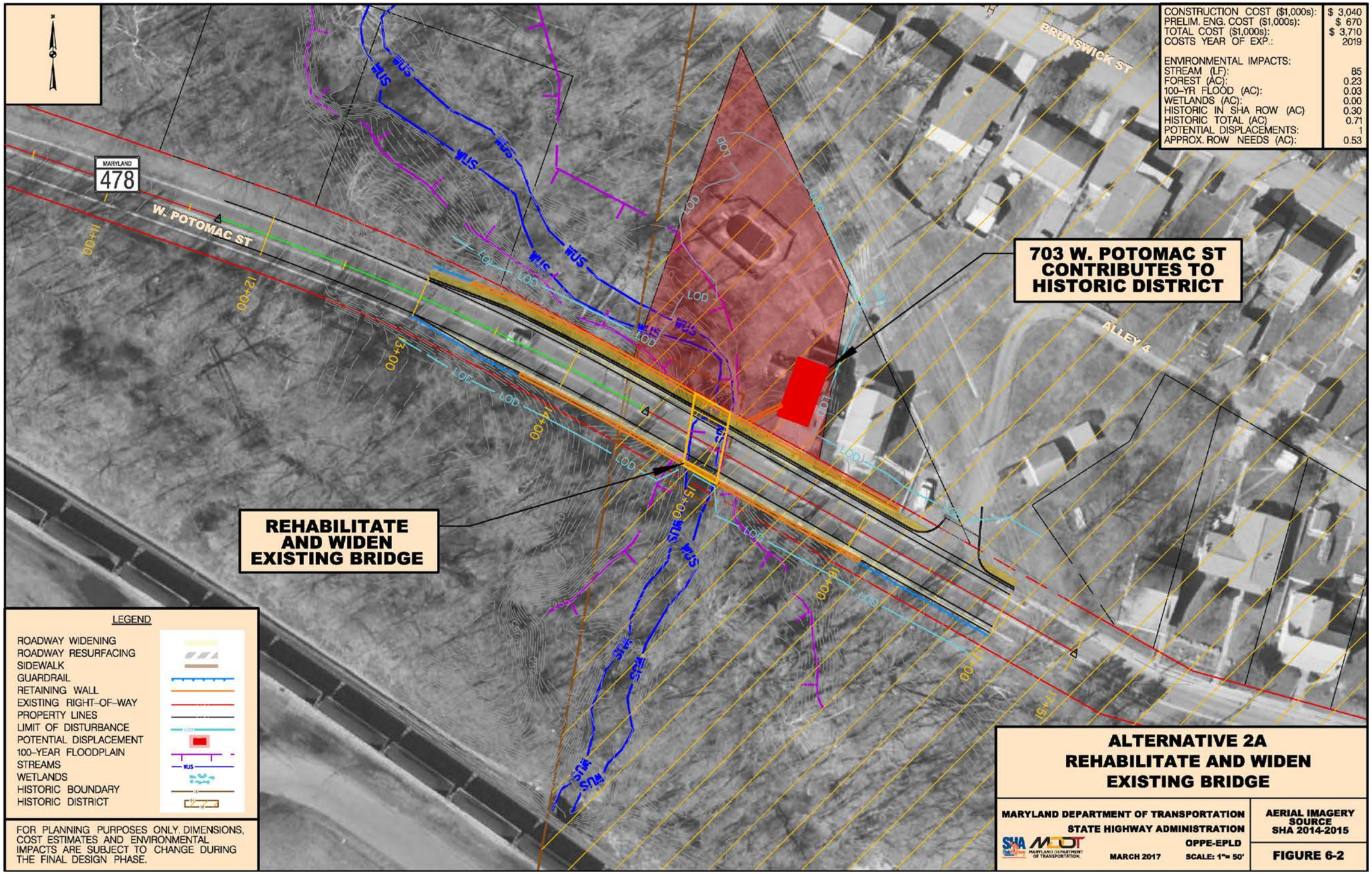


Figure 6-3. Alternative 3: Construct New Bridge to the South, Retain Existing Bridge

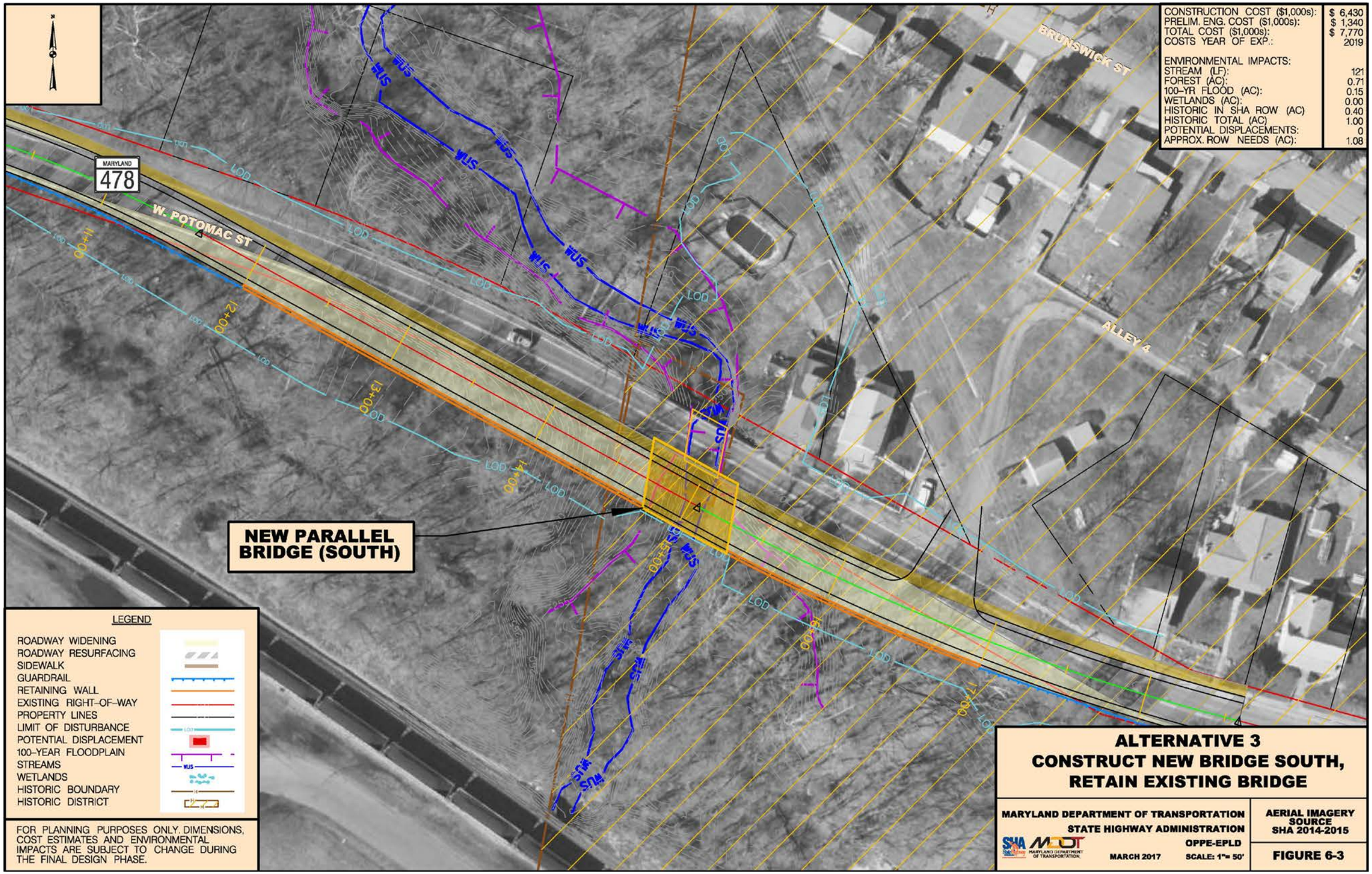


Figure 6-4. Alternative 3A: Construct New Bridge to the North, Retain Existing Bridge

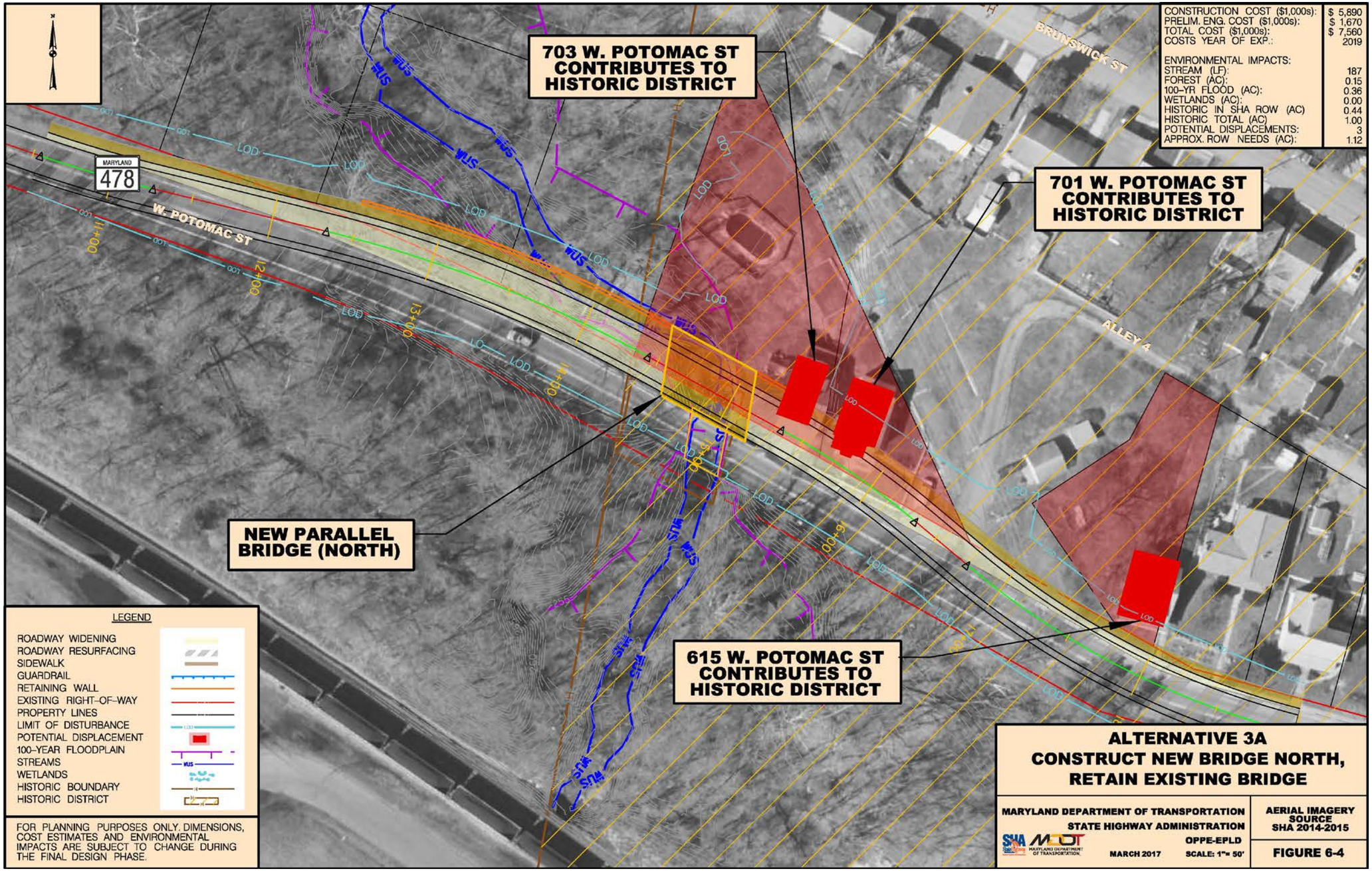


Figure 6-5. Alternative 4: Replace Existing Bridge In-Kind

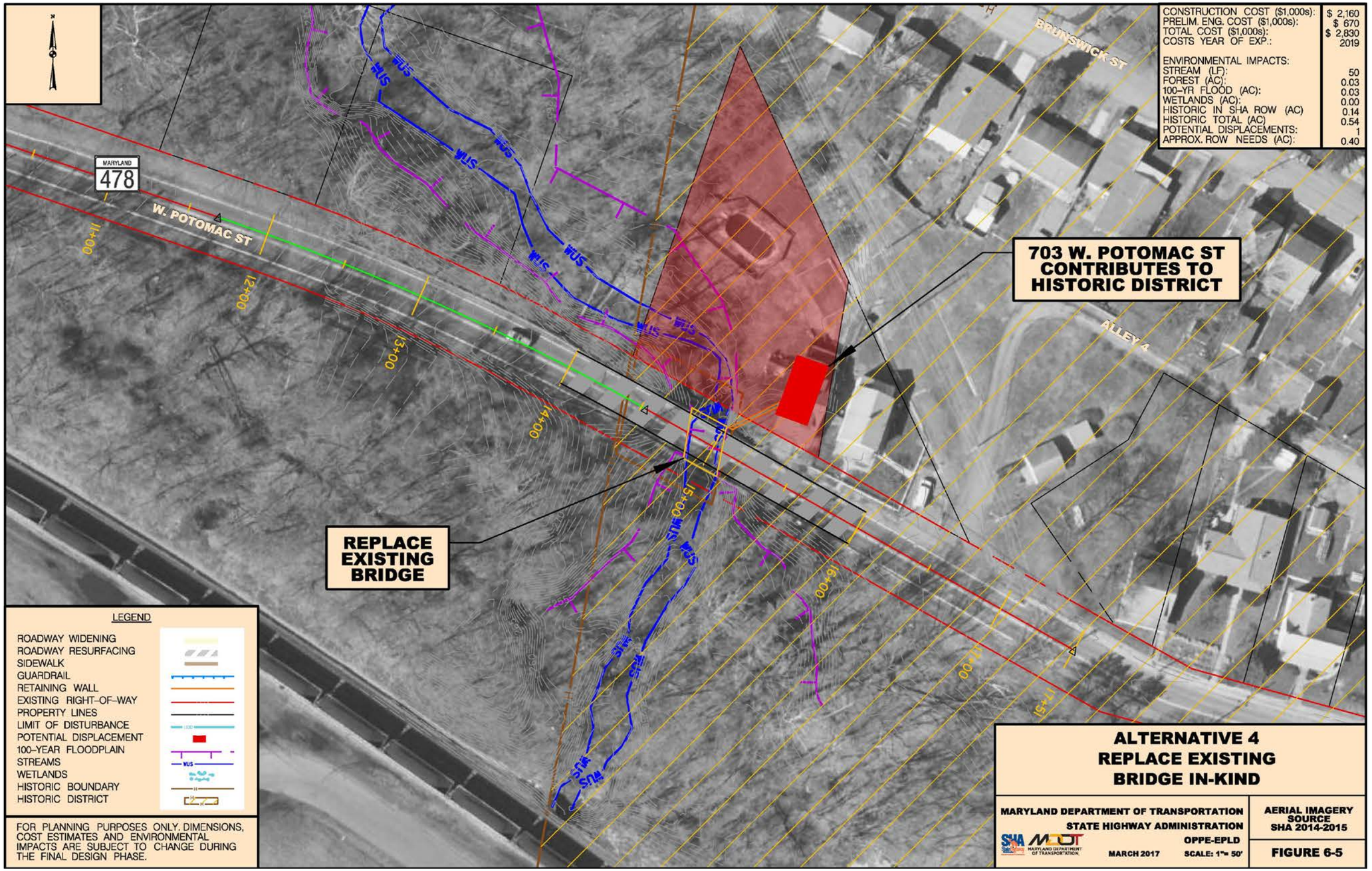


Table 1: Impact Summary of Project Alternatives

Alternative/Option	Section 4(f) Resource Avoidance?	Meets Purpose and Need?*	4(f) Property Impacts [perm/temp (ac)]**	Forest Impacts (ac)	Impacts to Water Resources (Floodplain/ Waters of the U.S.)	Non- 4(f) Property Impacts [(# of properties) perm/temp ac]	Likely Effect Determination to Brunswick Historic District	Approximate Cost (Design and Construction)
Alternative 4A: Realign and Replace Existing Bridge - Preferred Alternative	No	Yes	(3) 0.84/0	0.18	0.30 ac./268 LF	(1) 0.17/0	Adverse Effect	$4,660,000
Avoidance								
Alternative 1: No Build	Yes	No	0	0	0 ac./0 LF	0	No Effect	$570,000
Alternative 5A: Bypass to the North Avoidance Alternative	Yes	No – B, D	0	4.15	0.92 ac./85 LF	(4) 9+/0	No Adverse Effect	$20,730,000
Alternative 5B: Bypass Loop Avoidance Alternative	Yes	No – B, D	0	2.95	0.92 ac./85 LF	(3) 6+/0	No Adverse Effect	$15,840,000
Alternative 5C: Local Bypass Avoidance Alternatives	Yes	No – B, D	0	2.36	0.92 ac./85 LF	(4) 5+/0	No Adverse Effect	$13,780,000
Minimization								
Alternative 2: Rehabilitate Existing Bridge	No	No – A, B, C, D	(2) 0 /0.14	0.03	0.03 ac./50 LF	0	No Adverse Effect	$2,030,000
Alternative 2A: Rehabilitate and Widen Existing Bridge	No-	No – A, B, C, D	(3) 0.83/0	0.23	0.03 ac./85 LF	0	Adverse Effect	$3,710,000

Alternative/Option	Section 4(f) Resource Avoidance?	Meets Purpose and Need?*	4(f) Property Impacts [perm/temp (ac)]**	Forest Impacts (ac)	Impacts to Water Resources (Floodplain/ Waters of the U.S.)	Non- 4(f) Property Impacts [(# of properties) perm/temp ac]	Likely Effect Determination to Brunswick Historic District	Approximate Cost (Design and Construction)
Alternative 3: Construct New Bridge to the South, Retain Existing Bridge	No	No- B	(1) 1.00/0	0.71	0.15 ac./121 LF	(1) 1.08/0	No Adverse Effect	$7,770,000
Alternative 3A: Construct New Bridge to the North, Retain Existing Bridge	No	No- B	(5) 1.00/0	0.15	0.36 ac./187 LF	(5) 0.12/0	Adverse Effect	$7,560,000
Alternative 4: Replace Existing Bridge	No	No- B, C, D	(2) 0.14/0	0.03	0.03 ac./50 LF	0.40	Adverse Effect	$2,830,000

* (A) - Structural and Geometric Deficiencies; (B) –Hydraulic Deficiencies; (C) – Line of Sight Improvement; (D) – ADA Compliant Sidewalks
** The total acreage does not include impacts within existing SHA right-of-way

Table 2: Least Overall Harm Analysis

23 CFR 774.3(c)(1) Factor	Alternative 2: Rehabilitate Existing Bridge	Alternative 2A: Rehabilitate and Widen Existing Bridge	Alternative 3: Construct New Bridge to the South, Retain Existing Bridge	Alternative 3A: Construct New Bridge to the North, Retain Existing Bridge	Alternative 4: Replace Existing Bridge	Alternative 4A: Realign and Replace Existing Bridge - Preferred Alternative	Conclusions
i. the ability to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property)	• No mitigation required.	• Mitigation measures include updating NRHP form, developing historic context report, or developing Historic American Buildings Survey (HABS) documentation • SWM facility would be constructed on 703 W. Potomac Street	• No mitigation required.	• Mitigation measures include updating NRHP form, developing historic context report, or developing Historic American Buildings Survey (HABS) documentation • SWM facility would be constructed on 703 W. Potomac Street • Parapets of new bridge would feature recessed paneling on the exterior to match design of existing structure	• Mitigation measures include updating NRHP form, developing historic context report, or developing Historic American Buildings Survey (HABS) documentation • Parapets of new bridge would feature recessed paneling on the exterior to match design of existing structure	• Mitigation measures include updating NRHP form, developing historic context report, or developing Historic American Buildings Survey (HABS) documentation • SWM facility would be constructed on 703 W. Potomac Street • Parapets of new bridge will feature recessed paneling on the exterior to match design of existing structure	• Alternatives 2 and 3- no mitigation • Remaining build alternatives have equal ability to mitigate • Mitigation measures include updating the NRHP form, developing a historic context report, or developing HABS documentation • The SWM facility would be constructed on 703 W. Potomac Street • Parapets of new bridge would feature recessed paneling on the exterior to match design of the existing structure
ii. The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection	• Bridge would remain in place • 0.14 acre temporary impacts within the Brunswick Historic District	• While the bridge would remain in place, it would include a significant rehabilitation that would affect the historic integrity of the bridge • 703 W. Potomac Street would be demolished • Would require 0.53 acre of fee simple acquisition and 0.30 acre of impacts within SHA ROW are within the Brunswick Historic District	• Bridge would remain in place • Would impact 1.00 acre of the Brunswick Historic District, including 0.40 acre within SHA ROW and 0.60 acre within property owned by CSXT	• Bridge would remain in place • 703 W. Potomac Street, 701 W. Potomac Street, and 615 W. Potomac Street would be demolished • Would impact 1.00 acre of the Brunswick Historic District, including 0.44 acre within SHA ROW and 0.56 acre on private property	• Bridge would be replaced • Would impact 0.54 acre of the Brunswick Historic District, including 0.14 acre within SHA ROW and 0.40 acre on private property	• Bridge and 703 W. Potomac Street would be demolished • Impacts to 701 W. Potomac Street would be minimal • Would impact 0.84 acre of the Brunswick Historic District, including 0.30 acre within SHA ROW and 0.57 acre on private property	• Alternatives 2 and 3- no adverse effect to bridge and the Brunswick Historic District. • Alternatives 2A and 3A- would preserve the existing bridge, but would adverse effect to the Brunswick Historic District due to the displacement of residences • Alternatives 4 and 4A- removes existing bridge and requires the demolition of 703 W. Potomac Street, resulting in an adverse effect to the Brunswick Historic District • Alternative 4 Alternative 3A- greatest amount of impact to Section 4(f) resources
iii. The relative significance of each Section 4(f) property.	• Bridge No. 1008900 and the Brunswick Historic District are considered significant Section 4(f) Resources	• Bridge No. 1008900 and the Brunswick Historic District are considered significant Section 4(f) Resources • 703 W. Potomac Street contributes to the historic district	• The Brunswick Historic District is considered a significant Section 4(f) Resource.	• Bridge No. 1008900 and the Brunswick Historic District are considered significant Section 4(f) Resources. • 703 W. Potomac Street, 701 W. Potomac Street, and 615 W. Potomac Street are contributing elements to the historic district.	• Bridge No. 1008900 and the Brunswick Historic District are considered significant Section 4(f) Resources.	• Bridge No. 1008900 and the Brunswick Historic District are considered significant Section 4(f) Resources. • 703 W. Potomac Street and 701 W. Potomac Street are contributing elements to the historic district.	• Bridge No. 1008900 and the Brunswick Historic District are considered significant Section 4(f) resources. • Residences at 703 W. Potomac Street, 701 W. Potomac Street, and 615 W. Potomac Street are contributing elements to the historic district.

23 CFR 774.3(c)(1) Factor	Alternative 2: Rehabilitate Existing Bridge	Alternative 2A: Rehabilitate and Widen Existing Bridge	Alternative 3: Construct New Bridge to the South, Retain Existing Bridge	Alternative 3A: Construct New Bridge to the North, Retain Existing Bridge	Alternative 4: Replace Existing Bridge	Alternative 4A: Realign and Replace Existing Bridge - Preferred Alternative	Conclusions
iv. The views of the officials with jurisdiction over each Section 4(f) property	This alternative would likely result in an adverse effect to historic resources		This alternative would likely result in *de minimis* impacts to historic resources	This alternative would likely result in an adverse effect to historic resources			Alternatives 2, 2A, 3A, 4, and 4A would all likely result in an adverse effect to historic resources. Alternative 3 would likely result in *de minimis* impacts to historic resources.
v. The degree to which each alternative meets the purpose and need for the project.	Does not meet purpose and need		Meets most components of the purpose and need.		Does not meet purpose and need	Meets all components of the purpose and need.	Only Alternative 4A meets all components of the project purpose and need.
vi. After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f)	• 0.03 acre of the 100-year floodplain of Crums Hollow Creek • 50 linear feet of stream • 0.03 acre of trees	• 0.03 acre of the 100-year floodplain of Crums Hollow Creek • 85 linear feet of stream • 0.23 acre of trees	• 1.08 acre of property owned by CSXT • 0.15 acre of the 100-year floodplain of Crums Hollow Creek • 121 linear feet of stream • 0.71 acre of trees	• 0.12 acre of land from five properties outside of historic district • 0.36 acre of the 100-year floodplain of Crums Hollow Creek • 187 linear feet of stream • 0.15 acre of trees	• 0.03 acre of the 100-year floodplain of Crums Hollow Creek • 50 linear feet of stream • 0.03 acre of trees	• 0.002 acre of property owned by CSXT • 0.30 acre of the 100-year floodplain of Crums Hollow Creek • 268 linear feet of stream • 0.18 acre of trees.	• Alternative 2, 2A, and 4 - least amount of impacts • Alternative 4A- moderate amount of impacts • Alternatives 3 and 3A- increased amount of impacts when compared to Alternative 4A.
vii. Substantial differences in cost among the alternatives	$2,030,000	$3,710,000	$7,770,000	$7,560,000	$2,830,000	$4,660,000	The costs of alternatives are comparable; the preferred alternative is less expensive than Alternatives 3 and 3A, but slightly more expensive than the remaining alternatives.

VII. All Possible Planning to Minimize Harm

"All possible planning" includes all reasonable measures taken to minimize harm and mitigate for adverse impacts and effects. For this Draft Section 4(f) Evaluation, SHA has taken several steps to minimize the impacts of the Preferred Alternative, and it is documented in this section. However, the final determination of whether all possible planning has occurred has been reserved for the Final Section 4(f) Evaluation, after consideration of comments on the Draft Section 4(f) Evaluation. The Preferred Alternative includes the following measures to minimize adverse impacts on the 4(f) properties:

1. **Reduction in Proposed Travel Lane Width**. Lane width would be reduced from 12 feet, as originally proposed, to 11 feet, to minimize the amount of roadway widening required while still meeting AASHTO standards.

2. **Reduction in Proposed Shoulder Width.** Shoulder width would be reduced to 5 feet - 3 ½ inches in order to minimize the amount of roadway widening required. This is less than the minimum for bicycle compatibility (6 feet) and AASHTO requirements (8 feet).

3. **Minimizing Alterations to Current Profile.** The current profile does not meet AASHTO requirements. To correct this, the roadway would need to be elevated several feet, which would increase the overall impact on the surrounding properties. SHA is pursuing a design exception in order to maintain the current profile as much as possible.

4. **Avoiding Total Take of Additional House.** There are two houses located within the historic district adjacent to the bridge. The house closest to the bridge, 703 West Potomac Street, is too close to avoid the total take and eventual demolition of the dwelling. For the house at 701 West Potomac Street, current plans involve placing a small retaining wall along the front of the property to minimize the impacts to the front yard.

5. **Maintaining Current Alignment of Roadway.** The current alignment of the roadway will be maintained due to the location of a sewer main that parallels the MD 478 roadway to the South. Any shift of the road would require the acquisition of additional right-of-way and extensive tree impacts on the north side of the road.

6. **Parapets with Recessed Paneling.** The parapets of the new bridge will feature recessed paneling on the exterior to match the design of the existing structure and minimize changes to bridge aesthetics.

VIII. Coordination

On August 19, 2016, coordination was initiated with MHT to determine the effect that the proposed project would have on historic resources (see **Appendix A**). It was determined that the proposed project would result in an adverse effect to historic resources. On January 17, 2017, MHT concurred with this determination. SHA will continue to coordinate with MHT and FHWA regarding mitigation for adverse impacts to historic resources and will continue to develop the Draft Memorandum of Agreement.

On January 23, 2017, SHA requested that FHWA notify the Advisory Council on Historic Preservation (ACHP) that the proposed project would result in an adverse effect to historic properties (see **Appendix A**). On February 9, 2017, the ACHP declined to participate, however, a Memorandum of Agreement (MOA) is required to be submitted with the ACHP upon completion of the consultation process.

IX. References

Davis, Janet L. 1991. Maryland Historical Trust State Historic Sites Inventory Form: New Addition Survey District.

Koenig, Connie and Pamela James. 1778. National Register of Historic Places Inventory Nomination Form: Brunswick Historic District.

Maryland State Highway Administration (SHA). 2014. Highway Location Reference All Intersections: Frederick County.

Streett, Stacey. 2007. Maryland Historical Trust Determination of Eligibility Form: Bridge No. 1002400.

Romigh, Philip S. and Barry Mackintosh. 1979. National Register of Historic Places Inventory Nomination Form: Chesapeake and Ohio Canal National Historical Park.

APPENDIX 1:

Agency Coordination

MHT Coordination

Reid 8/22/16

20160384 6

F
SHA
TJT/EJR

Concurrence with the MD State Highway Administration's Determination(s) of Eligibility and/or Effects

Project Number: FR102A21 **MHT Log No.** 20160384 6
Project Name: Replacement of MDOT/SHA Structure 1008900
County: Frederick
Letter Date: August 19, 2016

The Maryland Historical Trust has reviewed the documentation attached to the referenced letter and concurs with the MD State Highway Administration's determinations as follows:

Eligibility (as noted in the Effects Table [Attachment N/A]):

[ ] Concur
[ ] Do Not Concur

Effect (as noted in the Effects Table [Attachment 4]):

[ ] No Properties Affected
[ ] No Adverse Effect
[ ] Conditioned upon the following action(s) (see comments below)
[X] Adverse Effect

Comments:

COMMENTS ON DRAFT MOA ARE FORTHCOMING.

By: Elizabeth Hughes
MD State Historic Preservation Office/
Maryland Historical Trust

1.17.17
Date

Return by U.S. Mail or Facsimile to:
Dr. Julie M. Schablitsky, Assistant Division Chief, Environmental Planning Division,
MD State Highway Administration, P.O. Box 717, Baltimore, MD 21203-0717
Telephone: 410-545-8870 and Facsimile: 410-209-5046
AProj_10711

cc Ms. Sarah Groesbeck
Dr. Lisa Kraus

ADDENDUM AND RED LINE REVISIONS:

SHA

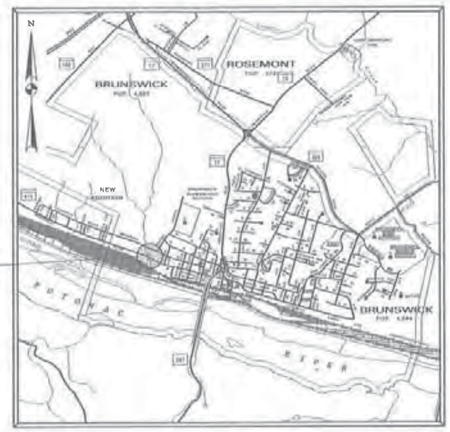
Maryland Department of Transportation

State Highway Administration

PLANS FOR BRIDGE REPLACEMENT
PRESTRESSED CONCRETE SLAB BRIDGE NO. 10089
ON MARYLAND ROUTE 478 (KNOXVILLE ROAD)
OVER BRANCH OF POTOMAC RIVER

CONTRACT NO. FR1025180
F.A.P. NO.

BRIDGE NO. 10089 ON MARYLAND ROUTE 478
OVER BRANCH OF POTOMAC RIVER



FREDERICK COUNTY
LOCATION MAP
SCALE: 1" = 2000'
PROJECT LENGTH = X XX MILES

SURVEY BOOK NO 19778, 25367

HORIZONTAL DATUM: NAD 83/91
VERTICAL DATUM: NAVD 88

STANDARD SPECIFICATIONS BOOK, BOOK OF STANDARDS AND MUTCD
ALL WORK ON THIS PROJECT SHALL CONFORM TO: THE MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATIONS SPECIFICATIONS ENTITLED STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS DATED JULY 2008, REVISIONS THEREOF OR ADDITIONS THERETO; THE SPECIAL PROVISIONS INCLUDED IN THE INVITATION FOR BIDS BOOK; THE ADMINISTRATIONS BOOK OF STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES AND THE LATEST MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)

UTILITIES
THE LOCATION OF UTILITIES SHOWN ON THE PLANS ARE FOR INFORMATION AND GUIDANCE ONLY, NO GUARANTEE IS MADE AS TO THE ACCURACY OF SAID LOCATIONS

ENVIRONMENTAL INFORMATION:
MARYLAND DEPARTMENT OF THE ENVIRONMENT NO.

SEDIMENT AND EROSION CONTROL REGULATIONS WILL BE STRICTLY ENFORCED DURING CONSTRUCTION.

ALL STORMWATER MANAGEMENT FACILITIES CONSTRUCTED FOR CONTRACT NO: FR1025180 SHALL BE INSPECTED AND MAINTAINED IN ACCORDANCE WITH THE STATE HIGHWAY ADMINISTRATIONS BEST MANAGEMENT PRACTICES (BMP) INSPECTION AND REMEDIATION PROGRAM.

OWNERS / DEVELOPERS CERTIFICATION :
I/WE HEREBY CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION AND/OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS PLAN, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I HEREBY AUTHORIZE THE RIGHT OF ENTRY FOR PERIODIC ON-SITE EVALUATION BY STATE OF MARYLAND, DEPARTMENT OF THE ENVIRONMENT, COMPLIANCE INSPECTORS.

STANDARD STABILIZATION NOTE:
FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN THREE (3) CALENDER DAYS AS TO THE SURFACE OF ALL PERIMETER CONTROLS, DIKES, SWALES, DITCHES, PERIMETER SLOPES, AND ALL SLOPES GREATER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1) AND SEVEN (7) DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.

COMPLETENESS OF DOCUMENTS:
THE STATE HIGHWAY ADMINISTRATION SHALL ONLY BE RESPONSIBLE FOR THE COMPLETENESS OF DOCUMENTS OBTAINED DIRECTLY FROM THE STATE HIGHWAY ADMINISTRATION CASHIER'S OFFICE FAILURE TO ATTACH ADDENDA MAY CAUSE THE BID TO BE IRREGULAR

ADA COMPLIANCE:
THE DESIGN OF THIS PROJECT HAS INCORPORATED FACILITIES FOR THE ELDERLY AND HANDICAPPED IN COMPLIANCE WITH THE STATE AND FEDERAL LEGISLATION.

RIGHT OF WAY:
RIGHT OF WAY AND EASEMENT LINES SHOWN ON THESE PLANS ARE FOR ASSISTANCE IN INTERPRETING THE PLANS THESE LINES DO NOT REPRESENT THE OFFICIAL PROPERTY ACQUISITION LINES FOR OFFICIAL FEE RIGHT OF WAY AND EASEMENT INFORMATION, SEE APPROPRIATE RIGHT OF WAY PLAT

FOR THE CONVENIENCE AND INFORMATION OF BIDDERS PRINTS OF PLANS OF EXISTING PERTINENT STRUCTURE(S) ARE INCLUDED WITH THIS CONTRACT NO RESPONSIBILITY FOR THEIR ACCURACY OR COMPLETENESS IS ASSUMED BY THE STATE HIGHWAY ADMINISTRATION DIMENSIONS, DETAILS, ETC., AS SHOWN THEREON MAY NOT BE AS BUILT.

INCLUDED FOR YOUR USE ARE:
CONTRACT NO F-83 SHEET NO. 1 OF 1

CONVENTIONAL SIGNS

STATE, COUNTY OR CITY LINES
PROPOSED TRAFFIC BARRIER
EXISTING TRAFFIC BARRIER
FENCE LINE
RIGHT OF WAY LINE
EXISTING ROADWAY
RAILROAD
BASE OR SURVEY LINE
FIRE HYDRANT
PROPOSED CULVERT
EXISTING CULVERT
EXISTING DROP INLET
UTILITY POLE
MARSH
HEDGE
INLET PROTECTION
GROUND ELEVATION
GRADE ELEVATION
INTERCEPTOR BERM
TEMPORARY BERM
TEMPORARY SLOPE DRAIN
SILT FENCE
STRAW BALE STRUCTURE
PLACED RIPRAP DITCH
TEMPORARY STONE OUTLET STRUCTURE
GABIONS
TEMPORARY SEDIMENT TRAP WITH SILT FENCE
TEMPORARY SEDIMENT TRAP WITH STRAW BALES
TEMPORARY SEDIMENT TRAP WITH STONE OUTLET STRUCTURE
TEMPORARY SEDIMENT TRAP WITH RIPRAP OUTLET STRUCTURE

DESIGN TRAFFIC DATA

	MD 478 2013	MD 478 2033 (EST.)
A.D.T.	3,000	5,400
D.H.V.	12%	12%
DIRECTIONAL DISTRIBUTION	79%	79%
PERCENT TRUCKS-A.D.T.	2%	2%
PERCENT TRUCKS-D.H.V.	1%	1%
DESIGN SPEED	35 MPH	35 MPH
FUNCTIONAL CLASSIFICATION	URBAN MINOR ARTERIAL	

RIGHT-OF-WAY PLAT NOS.

REVIEWED AND APPROVAL RECOMMENDED

APPROVAL RECOMMENDED

APPROVED

OTHER CONTRACTS FOR THIS STRUCTURE F-83

STRUCTURE INVENTORY NO 1008900 | SURVEY BOOK NO 19778, 25367 | $$DESIGN$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$ | INDEXED

ABBREVIATIONS

AASHTO ..... American Association of State Highway Transportation Officials
ADT ..... Average Daily Traffic
AHD ..... Ahead
APPROX. ..... Approximate
℄ or BL ..... Baseline
BK ..... Back /Book
BIO ..... Bio-Swale
BIT. ..... Bituminous
B.C. ..... Bituminous Concrete
B.M ..... Bench Mark
BOT. ..... Bottom
C.C. ..... Center of Curve
CAP. ..... Corrugated Aluminum Pipe
CAPA ..... Corrugated Aluminum Pipe Arch
CATV ..... Cable Television
C.B.R. ..... California Bearing Ratio
℄ or CL ..... Centerline
Cl. ..... Class
CLF ..... Chainlink Fence
CMP ..... Corrugated Metal Pipe
C.O. ..... Cleanout
COMB. ..... Combination
CONC ..... Concrete
CONSTR. ..... Construction
COR. ..... Corner
CORR. ..... Correction
CPP-S ..... Corrugated Steel Pipe – Type 'S'
CSP ..... Corrugated Steel Pipe – Aluminized Type 2
CSPA ..... Corrugated Steel Pipe Arch – Aluminized Type 2
DC ..... Degree of Curve
D.H.V. ..... Design Hourly Volume
D.I. ..... Drop Inlet
DIA. ..... Diameter
D.O. ..... Double Opening
E ..... East
E ..... Electric
E ..... External Distance
EA ..... Each
EB ..... Eastbound
ELEV ..... Elevation
ES ..... End Section
ESD ..... Environmental Site Design
EX. or EXIST. Existing
FT ..... Feet
F or FL ..... Flowline
F.B.D. ..... Flat Bottom Ditch
F.H. ..... Fire Hydrant
FWD. ..... Forward
G ..... Gas
G.V. ..... Gas Valve
H.B. ..... Handbox
HDPE ..... High Density Polyethylene
HDWL ..... Headwall
HERCP ..... Horizontal Elliptical Reinforced Concrete Pipe
HP ..... High Point
IN ..... Inch
I.S.T. ..... Inlet Sediment Trap
INV. ..... Invert
J.B. ..... Junction Box
K ..... K Inlet
L ..... Length
LF ..... Linear Feet
L.L. ..... Liquid Limit
LP ..... Low Point
L.P. ..... Light Pole
LT ..... Left
MAC. ..... Macadam
M.C. ..... Moisture Content
MAX. ..... Maximum
M.D.D. ..... Maximum Dry Content
MOD. ..... Modified
MIN. ..... Minimum
N ..... North
NB ..... Northbound
NE ..... Northeast
N.P. ..... Non-Plastic
O.C. ..... On Center
OHE ..... Overhead Electric
O.M. ..... Optimum Moisture
PAV'T. ..... Pavement
PC ..... Point of Curvature
PCC ..... Point of Compound Curvature
PC ..... Point of Crown
PGE ..... Profile Grade Elevation
P.G.E. ..... Profile Ground Elevation
P.G.L. ..... Profile Grade Line
PGL ..... Profile Ground Line
PR ..... Point of Rotation
P.I. ..... Plasticity Index
PI ..... Point of Intersection
POC ..... Point On Curve
POT ..... Point On Tangent
PPWP ..... Polyvinyl Chloride Profile Wall Pipe
PROP. ..... Proposed
PRC ..... Point of Reverse Curve
PT ..... Point
PT ..... Point of Tangency
PVC ..... Point of Vertical Curve
PVC ..... Polyvinyl Chloride
PVI ..... Point of Vertical Intersection
PVRC ..... Point of Vertical Reverse Curve
PVT ..... Point of Vertical Tangency
R ..... Radius
R.F. ..... Rock Fragments
RT ..... Right
RW or R/W ... Right of Way
RCP ..... Reinforced Concrete Pipe
RCPP ..... Reinforced Concrete Pressure Pipe
R.Q.D. ..... Rock Quality Designation
R.M. ..... Rootmat
S ..... South
SAN. ..... Sanitary Sewer
SB or S/B .... Southbound
S.D. ..... Storm Drain
S.D.D. ..... Surface Drain Ditch
SE ..... Super Elevation
SF ..... Silt Fence
SF ..... Square Feet
SHT. ..... Sheet
SPP ..... Structural Steel Plate Pipe
SPPA ..... Structural Steel Plate Pipe Arch
S.P.T. ..... Standard Penetration Testing
SRP ..... Steel Spiral Rib Pipe – Aluminized Type 2
SRPA ..... Steel Spiral Rib Pipe Arch – Aluminized Type 2
SSD ..... Stopping Sight Distance
SSF ..... Super Silt Fence
STD. ..... Standard
STA. ..... Station
SO. ..... Single Opening
SY ..... Square Yards
SWM ..... Stormwater Management
T ..... Tangent
T ..... Telephone
T.C. ..... Top of Cover
T.G ..... Top of Grate
T or TL ..... Traverse Line
T.M. ..... Top of Manhole
TRAV. ..... Traverse
TS ..... Temporary Swale
T.S. ..... Top of Slab
T.S. ..... Topsoil
TYP. ..... Typical
U.D. ..... Under Drain
U.G. ..... Underground
U.P. ..... Utility Pole
USDA ..... United States Department of Agriculture
VCL ..... Vertical Clearance
V.C.L. ..... Vertical Curve Length
W ..... Water
W ..... West
WB ..... Westbound
WB ..... Wetland Buffer
W.M. ..... Water Meter
W.S. ..... Wrapped Steel
WUS ..... Waters of the United States
W.V. ..... Water Valve

CONVENTIONAL SIGNS
(SAMPLES)

PROPOSED MEDIAN BARRIER
ELECTRICAL HAND BOX – SIGNALS — H.B.
FLOW LINE
STATE, COUNTY OR CITY LINES
PROPOSED TRAFFIC BARRIER
EXISTING TRAFFIC BARRIER
PROPOSED FENCE LINE
EXISTING FENCE LINE
RIGHT OF WAY LINE
EXISTING ROADWAY
RAILROAD
BASE LINE OR SURVEY LINE
FIRE HYDRANT
HISTORIC BOUNDARY
WATERS OF THE U.S.
PAVEMENT TYPICAL BORING
SWM BORING
TEST PIT

PROPOSED PIPE / CULVERT
EXISTING PIPE / CULVERT
EXISTING DROP INLET
UTILITY POLE
WETLAND
WETLAND BUFFER
WATERS OF THE U.S. — WUS
HEDGE /TREE LINE
BUSH /TREE
CONIFEROUS TREE
GROUND ELEVATION — EXISTING GRADE
GRADE ELEVATION — PROPOSED GRADE

SOILS LEGEND

A-3 SAND
A-2-7 CLAYEY SAND
A-7-4 SILTY CLAY
A-2 SAND & FINES
A-7-2 SANDY CLAY
A-7 CLAY
A-2-4 SILTY SAND
A-4 SILT
A-6 COLLOIDAL CLAY
A-4-2 SANDY SILT
A-4-7 CLAYEY SILT
A-5 MICA, DIATOMS

PLAN LOCATION OF SOIL BORINGS

BORING TARGETS AND PROFILES SCALE:
HORIZONTAL - NONE
VERTICAL - SEE PROFILE SHEETS

AO-ABOVE OPTIMUM
SAT-SATURATED
LIQ-LIQUEFIED

TS-TOPSOIL
RM-ROOT MAT
BC-BITUMINOUS CONCRETE
SB-STONE BASE
PCC-PORTLAND CEMENT CONCRETE

LL-LIQUID LIMIT (%)
PI-PLASTICITY INDEX (%)
NP-NON-PLASTIC
OMC-OPTIMUM MOISTURE CONTENT (%)
USC-UNIFIED SOIL CLASSIFICATION
USDA-UNITED STATES DEPARTMENT OF AGRICULTURE CLASSIFICATION

W/GR-WITH GRAVEL
W/RF-WITH ROCK FRAGMENTS

NOTES: SOIL SYMBOLS DENOTE MSMT CLASSIFICATIONS

ALL DIMENSIONS, DEPTHS AND ELEVATIONS ARE NOTED IN FEET

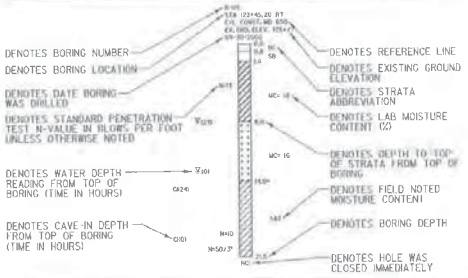
AN ASTERISK AT THE TOP DEPTH OF STRATA INDICATES THAT STRATA WAS VISUALLY CLASSIFIED BY DRILLER

MOD & OMC PER A.A.S.H.T.O. DESIGNATION T-180

N PER A.A.S.H.T.O. DESIGNATION T-206

UNLESS OTHERWISE NOTED ON PLANS, ALL SOIL SURVEY BORINGS FOR ROADWAY CONSTRUCTION WERE LEFT OPEN FOR 24 HOURS WITH NO EXCESS MOISTURE OR FREE WATER ENCOUNTERED DURING TIME OF SOIL SURVEY (09/2000 TO 06/2002)

SOIL BORING PROFILE EXAMPLE



SOILS TEST DATA

BORING NUMBER	SAMPLE DEPTH	LL	PI	USDA	USC	MOD	OMC	REMARKS
B-09	5.0 – 8.0	18	NP	Sandy Loam	--	--	--	with Gravel
B-09	8.0 14.0	41	22	Silty Clay Loam	CL	101	12	--

THE WILSON T. BALLARD CO.
CONSULTING ENGINEERS
OWINGS MILLS, MARYLAND

BY: JJW

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
HIGHWAY DESIGN DIVISION
BRIDGE REPLACEMENT
PRESTRESSED CONCRETE SLAB BRIDGE NO. 1008900
ON MD RTE. 478 (KNOXVILLE ROAD)
OVER BRANCH OF POTOMAC RIVER

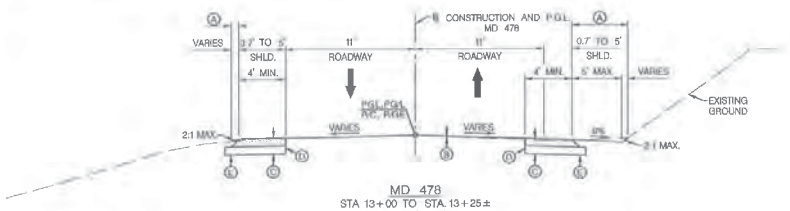
NOTES AND ABBREVIATIONS SHEET

SCALE _____ ADVERTISED DATE _____ CONTRACT NO. _ _ FR0958180

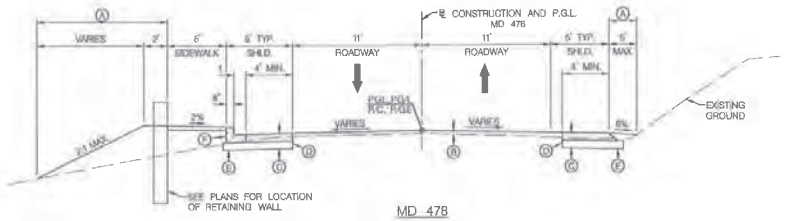
DESIGNED BY JJW
DRAWN BY DAW
CHECKED BY
F.A.P. NO. SEE TITLE SHEET
COUNTY FREDERICK
LOCMILE
HORIZONTAL SCALE
VERTICAL SCALE

DRAWING NO. AB-1 OF 1 SHEET NO. 2 OF

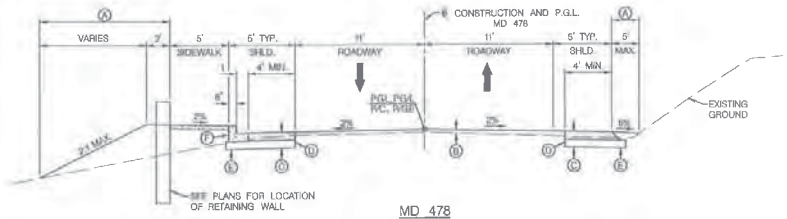
PLOTTED: Monday, August 17, 2015 AT 11:08 AM



MD 478
STA. 13+00 TO STA. 13+25±
SCALE: 1" = 5'



MD 478
STA. 13+25 TO STA. 13+50±
SCALE: 1" = 5'



MD 478
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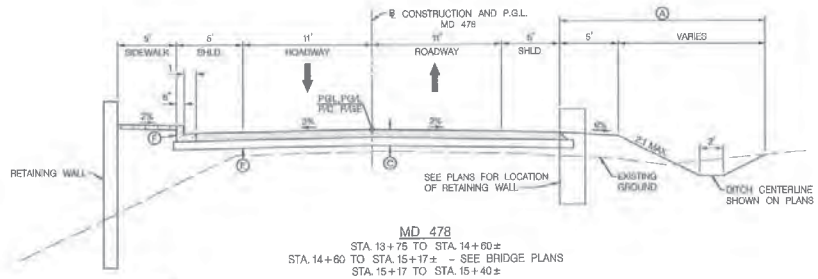
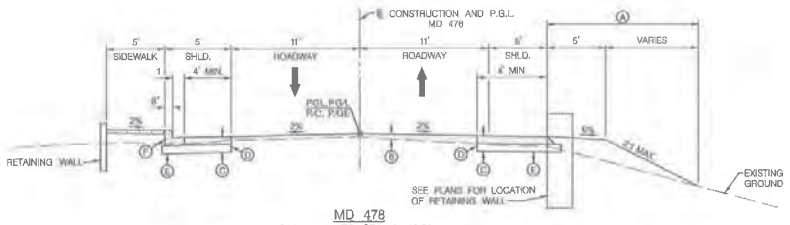
SCALE: 1" = 5'



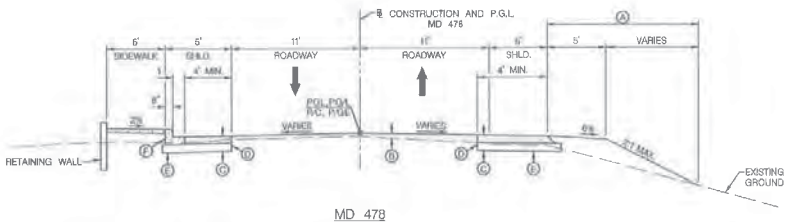
MD 478
STA. 13+75 TO STA. 14+60±
STA. 14+60 TO STA. 15+17± – SEE BRIDGE PLANS
STA. 15+17 TO STA. 15+40±
SCALE: 1" = 5'

TYPICAL SECTION LEGEND

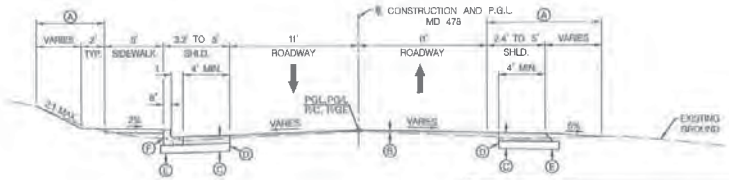
- (A) PLACE 4" TOPSOIL FOR SIDE SLOPES 3:1 OR FLATTER, FOR 2:1 SIDE SLOPES, PLACE 2" TOPSOIL.
- (B) ROADWAY RESURFACING PAVING SECTION – SEE DETAIL SHEET NO.
- (C) ROADWAY FULL DEPTH PAVING SECTION – SEE DETAIL SHEET NO.
- (D) SAW CUT FULL DEPTH EXISTING PAVEMENT – SEE DETAIL ON SHEET NO.
- (E) LIMIT OF CLASS 1 EXCAVATION AND TOP OF SUBGRADE
- (F) TYPE A COMBINATION CONCRETE CURB AND GUTTER 12" GUTTER PAN, 8" DEPTH – SHA STANDARD NO. MD-620.02.



MD 478
STA. 15+40 TO STA. 16+12.50±
SCALE: 1" = 5'



MD 478
STA. 16+12.50 TO STA. 16+15±
SCALE: 1" = 5'



MD 478
STA. 16+15 TO STA. 17+15±
SCALE: 1" = 5'

THE WILSON T. BALLARD CO.
CONSULTING ENGINEERS
OWINGS MILLS, MARYLAND

BY: JJW

SHA
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
HIGHWAY DESIGN DIVISION

BRIDGE REPLACEMENT
PRESTRESSED CONCRETE SLAB BRIDGE NO. 1008900
ON MD RTE. 478 (KNOXVILLE ROAD)
OVER BRANCH OF POTOMAC RIVER

REVISIONS

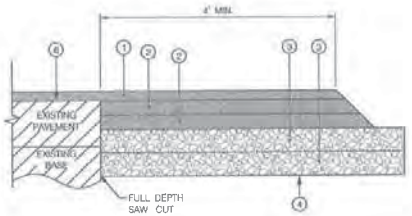
TYPICAL SECTIONS

SCALE 1" = 5' ADVERTISED DATE _____ CONTRACT NO FR025180

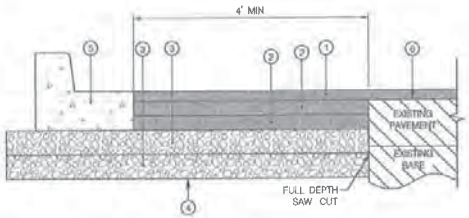
DESIGNED BY JJW COUNTY FREDERICK
DRAWN BY DAW LOG/MILE
CHECKED BY
F.A.P. NO. SEE TITLE SHEET

DRAWING NO. TS-1 OF 1 SHEET NO. 3 OF

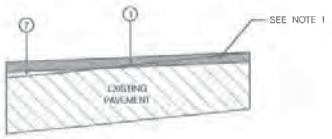
PLOTTED: Monday, July 09, 2018 AT 11:17 AM
FILE: U:\MD 478 over Branch of Potomac River\Design Files\pw2177-0001_MD478.dgn



MD 478
NEW PAVEMENT SECTION AND RESURFACING
OPEN SECTION
SCALE: 1" = 1'



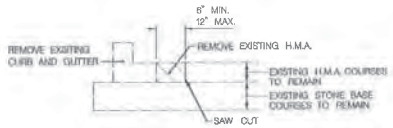
MD 478
NEW PAVEMENT SECTION AND RESURFACING
CLOSED SECTION
SCALE: 1" = 1'



NOTES:

1. GRINDING TO BE DONE ONLY IN AREAS WHERE NECESSARY TO PROVIDE FOR FULL 2" HMA SURFACE COURSE.

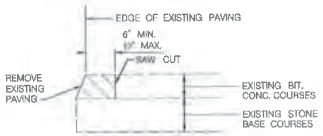
RESURFACING DETAIL
SCALE: 1" = 1'



NOTES:

1. SAW CUT EXISTING PAVING (FULL-DEPTH) AT ROADWAY WIDENINGS AND CURB REMOVALS PRIOR TO PLACEMENT OF ANY PAVING COURSES.
2. SAW CUT SHALL BE INCIDENTAL TO HMA SUPERPAVE ITEMS.
3. REMOVAL OF EXISTING CURB AND GUTTER WITHIN PROPOSED ROADWAY AREAS SHALL BE INCIDENTAL TO CLASS 1 EXCAVATION

SAW CUT DETAIL
CLOSED SECTION
SCALE: 1" = 1/2'



NOTE:

SAW CUT EXISTING PAVING ALONG OUTSIDE EDGE PRIOR TO PLACEMENT OF ANY PAVING COURSES. SAW CUT SHALL BE INCIDENTAL TO HMA SUPERPAVE ITEMS.

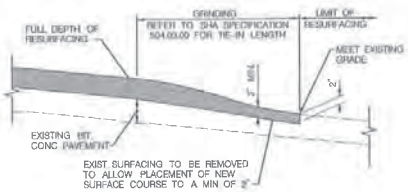
SAW CUT DETAIL
OPEN SECTION
SCALE: 1" = 1/2'

PAVEMENT LEGEND

(1) 2" HOT MIX ASPHALT SUPERPAVE 12.5 MM FOR SURFACE, PG 64-22, LEVEL 2
(2) 3" HOT MIX ASPHALT SUPERPAVE 19.0 MM FOR BASE, PG 64-22, LEVEL 2
(3) 5" BASE COURSE USING GRADED AGGREGATE
(4) TOP OF SUBGRADE AND LIMIT OF EXCAVATION
(5) STANDARD TYPE "A" COMBINATION CURB AND GUTTER 12" GUTTER PAN 8" DEPTH
(6) EXISTING PAVEMENT SURFACE AFTER 2" NOMINAL GRINDING – SEE NOTE 1 BELOW
(7) VARIABLE DEPTH HOT MIX ASPHALT SUPERPAVE 9.5 MM FOR WEDGE /LEVEL – PG 64-22, LEVEL 2 (1" MINIMUM LIFT, 2" MAXIMUM LIFT)

NOTES:

1. GRINDING TO BE DONE ONLY IN AREAS WHERE NECESSARY TO PROVIDE FOR FULL 2" SURFACE COURSE. IN AREAS WHERE THE PROPOSED BOTTOM OF THE 2" SURFACE COURSE IS ABOVE THE EXISTING PAVEMENT, NO GRINDING OF EXISTING PAVEMENT IS REQUIRED.
2. ALL ITEMS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST VERSION OF THE REFERENCED STANDARD AT THE TIME OF CONSTRUCTION. THE LATEST VERSION CAN BE DOWNLOADED FROM SHA'S WEBSITE: http://apps.roads.maryland.gov/businesswithsha/bizStdsSpecs/desManualStdPubs/publicationsonlinebhdbooksIdIndex.asp



HOT MIX ASPHALT PAVEMENT RESURFACING TIE – IN DETAIL
SCALE: 1" = 1'

DATUM: NAD 83\91 Horizontal
NAVD 88 Vertical

THE WILSON T. BALLARD CO.
CONSULTING ENGINEERS
OWINGS MILLS, MARYLAND

BY: JJW

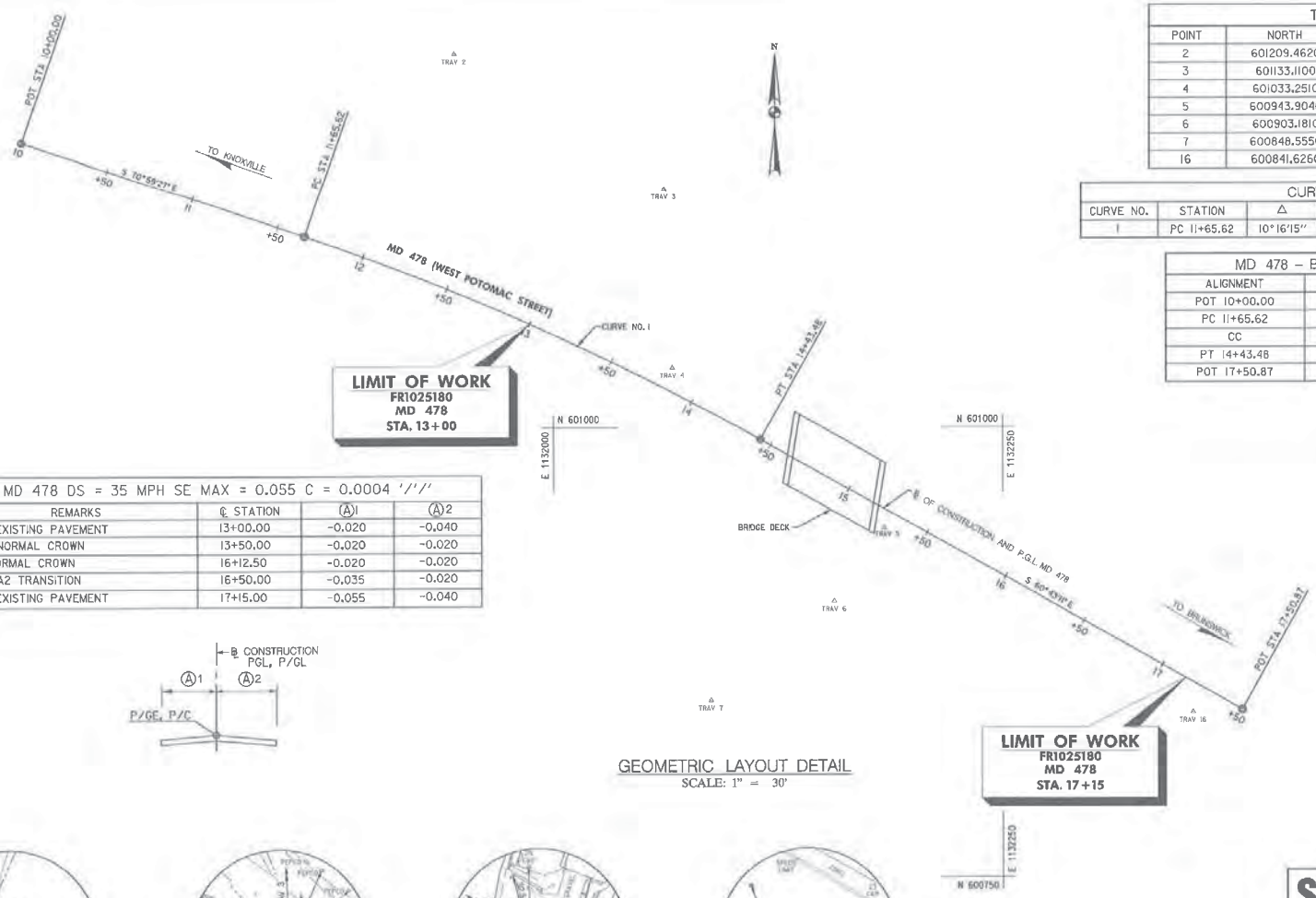
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
HIGHWAY DESIGN DIVISION
BRIDGE REPLACEMENT
PRESTRESSED CONCRETE SLAB BRIDGE NO. 1006900
ON MD RTE. 478 (KNOXVILLE ROAD)
OVER BRANCH OF POTOMAC RIVER

PAVEMENT DETAILS

SCALE 1" = 1' ADVERTISED DATE ____ CONTRACT NO FR025180
DESIGNED BY JJW COUNTY FREDERICK
DRAWN BY DAW LOGMILE
CHECKED BY
F.A.P. NO SEE TITLE SHEET

DRAWING NO. TD - 1 OF 1 SHEET NO. 4 OF

PLOTTED: Monday, July 08, 2013 AT 11:10 AM
FILE: U:\MD 478 over Branch of Potomac River\Design Files\pHT-0001_M478.dgn



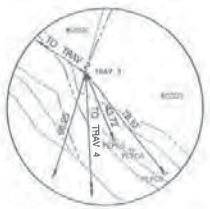
GEOMETRIC LAYOUT DETAIL
SCALE: 1" = 30'

TRAVERSE TABLE			
POINT	NORTH	EAST	ELEVATION
2	601209.4620	1131945.0160	260.60
3	601133.1100	1132061.6690	263.78
4	601033.2510	1132066.2760	273.93
5	600943.9040	1132183.7560	269.67
6	600903.1810	1132156.3340	250.18
7	600848.5550	1132087.5400	253.30
16	600841.6260	1132355.7810	277.98

CURVE DATA							
CURVE NO.	STATION	Δ	Dc	R	T	L	E
1	PC 11+65.62	10°16'15"	3°41'47"	1550.00'	139.30'	277.86'	6.25'

MD 478 – BASELINE OF CONSTRUCTION		
ALIGNMENT	NORTHING	EASTING
POT 10+00.00	601160.9023	1131705.1789
PC 11+65.62	601106.9560	1131861.7680
CC	599641.4837	1131356.9009
PT 14+43.48	600993.4533	1132114.9762
POT 17+50.87	600843.1147	1132383.0936

MD 478 DS = 35 MPH SE MAX = 0.055 C = 0.0004 '/'/'			
REMARKS	℄ STATION	Ⓐ1	Ⓐ2
MEET EXISTING PAVEMENT	13+00.00	-0.020	-0.040
BEGIN NORMAL CROWN	13+50.00	-0.020	-0.020
END NORMAL CROWN	16+12.50	-0.020	-0.020
BEGIN A2 TRANSITION	16+50.00	-0.035	-0.020
MEET EXISTING PAVEMENT	17+15.00	-0.055	-0.040



TRAV 3
1132061.6690
601133.1100

TRAV 4
1132066.2760
601033.2510

TRAV 5
1132183.7560
600943.9040

TRAV 16
1132355.7810
600841.6260

DATUM: NAD 8391 Horizontal
NAVD 88 Vertical

CROSS REFERENCE	
ITEM	SHEET NO.
TYPICAL SECTIONS	3
TYPICAL DETAILS	4
GEOMETRIC LAYOUT & SUPERELEVATION SHEETS	5
ROADWAY PLAN SHEETS	6
ROADWAY PROFILE SHEETS	7
PIPE & DRAINAGE SCHEDULE	8 – 9
TRAFFIC CONTROL SHEETS	11 – 12
EROSION & SEDIMENT CONTROL	13 – 15
SIGNING & MARKING PLANS	
LANDSCAPE PLAN SHEETS	
UTILITIES	

REVISIONS

SHA
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
HIGHWAY DESIGN DIVISION
BRIDGE REPLACEMENT
PRESTRESSED CONCRETE SLAB BRIDGE NO. 1008900
ON MD RTE. 478 (KNOXVILLE ROAD)
OVER BRANCH OF POTOMAC RIVER

GEOMETRY SHEET

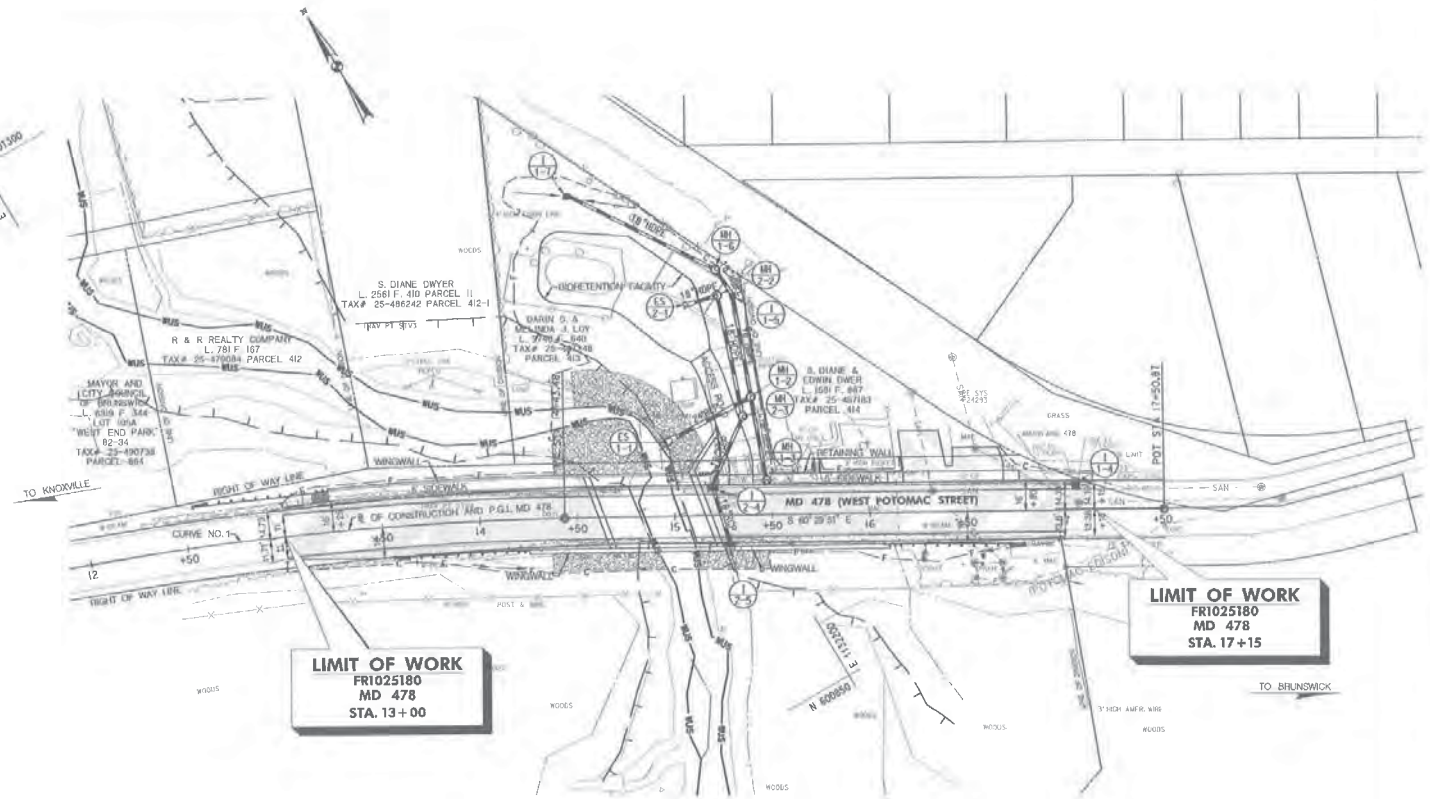
SCALE 1" = 30' ADVERTISED DATE _____ CONTRACT NO. FR1025180

DESIGNED BY JJW COUNTY FREDERICK
DRAWN BY DAW LOCMILE
CHECKED BY
F.A.P. NO. SEE TITLE SHEET

DRAWING NO. GS-1 OF 1 SHEET NO. 5 OF

PLOTTED: Monday, July 09, 2018 AT 10:11 AM
PLT: U:\MD 478 over Branch of Potomac River\Design Files\Design Files\gs05-0001_fr0478.dgn

BY: JJW



ROADWAY PLAN
SCALE: 1" = 30'

DATUM: NAD 8391 Horizontal
NAVD 88 Vertical

QUANTITY NOTES

5" CONCRETE SIDEWALK

725 SF	LT. STA. 13+10 TO LT. STA. 14+55
50 SF	LT. STA. 15+08 TO LT. STA. 15+22
320 SF	LT. STA. 15+46 TO LT. STA. 16+98
177 SF	LT. STA. 16+76 TO LT. STA. 17+15

STD. TYPE A CONCRETE CURB AND GUTTER (MD 620.02)

131 LF	LT. STA. 13+25 TO LT. STA. 14+55
202 LF	LT. STA. 15+08 TO LT. STA. 17+15

COMMERCIAL CONCRETE APRON

14 SY	LT. STA. 15+22 TO LT. STA. 15+46

RESIDENTIAL CONCRETE APRON

38 SY	LT. STA. 16+09 TO LT. STA. 16+76

STANDARD CONCRETE STAIRWAY

1 EA	STA. 15+73 - LT. 21.7

HMA DRIVEWAY

760 SF	LT. STA. 16+15 TO LT. STA. 16+68

CLEAN EXISTING PIPE

155 LF	LT. STA. 15+48 TO LT. STA. 17+05

REMOVE EXISTING PIPE

37 LF	LT. STA. 15+16 TO LT. STA. 15+48

PARALLEL SIDEWALK RAMP

1 EA	STA. 13+18 - LT. 18.1

TRAFFIC BARRIER TRANSITION

25 LF	LT. STA. 13+00 TO LT. STA. 13+24
25 LF	LT. STA. 15+08 TO LT. STA. 15+24
25 LF	RT. STA. 14+00 TO RT. STA. 14+25
25 LF	LT. STA. 16+10 TO LT. STA. 16+34

TRAFFIC BARRIER END TREATMENT

TYPE 'C'	LT. STA. 12+55 TO LT. STA. 13+00
TYPE 'C'	RT. STA. 13+55 TO RT. STA. 14+00
TYPE 'C'	RT. STA. 16+34 TO RT. STA. 16+80
TYPE 'K'	LT. STA. 15+22

SOIL STABILIZATION MATTING

1185 SY	BIO RETENTION FACILITY AND ACCESS ROAD LT. STA. 14+30 TO LT. STA. 15+50

THE WILSON T. BALLARD CO.
CONSULTING ENGINEERS
OWINGS MILLS, MARYLAND

ROADWAY LEGEND
- FULL DEPTH RECONSTRUCTION
- STAMPED CONCRETE (SEE LANDSCAPE DETAIL SHEET)
- EXISTING SIDEWALK/PAVEMENT TO REMAIN
- ACCESS ROAD WITH CUTTER ASR CONTAINMENT LOAD SYSTEM

R / W PLAT NUMBER

CROSS REFERENCE

ITEM	SHEET NO.
TYPICAL SECTIONS	2
TYPICAL DETAILS	3
GEOMETRIC LAYOUT & SUPERELEVATION SHEETS	4
ROADWAY PLAN SHEETS	5
ROADWAY PROFILE SHEETS	7
PIPE & DRAINAGE SCHEDULE	8 - 9
TRAFFIC CONTROL SHEETS	11 - 12
EROSION & SEDIMENT CONTROL	13 - 15
SIGNING & PAVEMENT MARKING	
LANDSCAPE PLAN SHEETS	
UTILITIES	

REVISIONS

PLOTTED: Monday, August 17, 2015 AT 08:49 AM
FILE: U:\MD 478 over Branch of Potomac River\Design Files\pl01-FR01_MD478.dgn

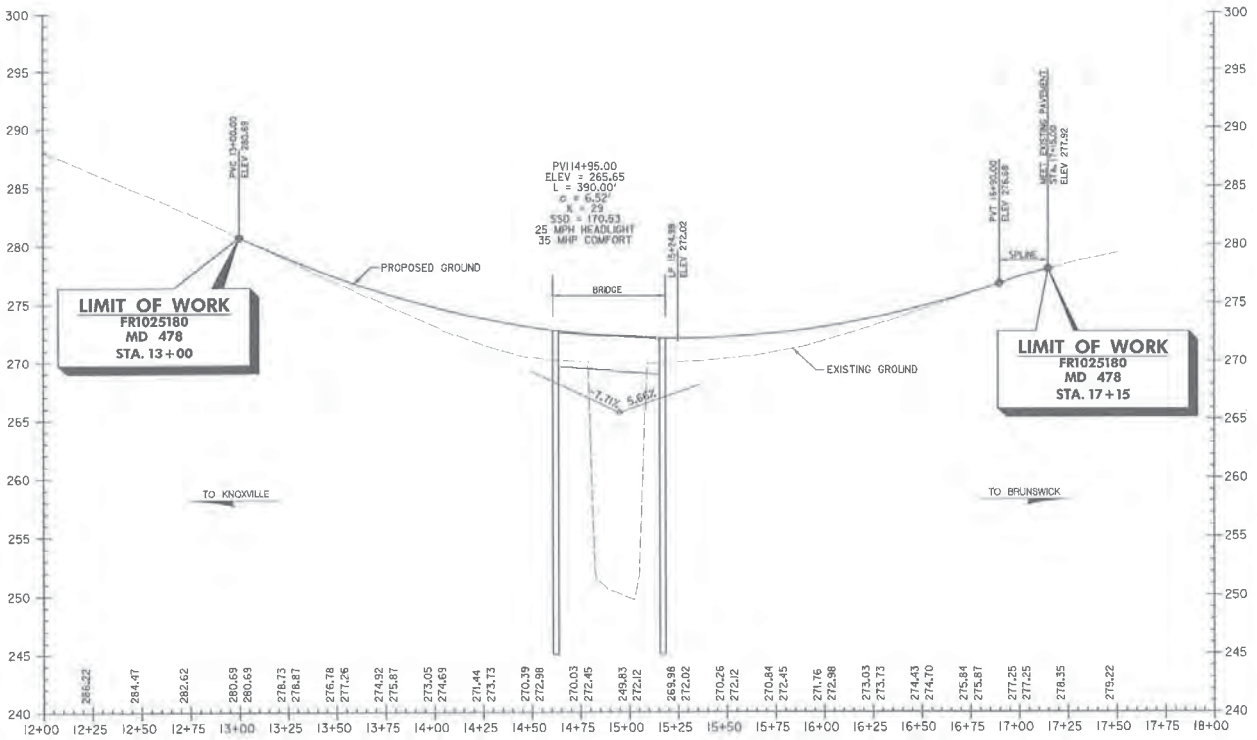
SHA
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
HIGHWAY DESIGN DIVISION
BRIDGE REPLACEMENT
PRESTRESSED CONCRETE SLAB BRIDGE NO. 1008900
ON MD RTE. 478 (KNOXVILLE ROAD)
OVER BRANCH OF POTOMAC RIVER

ROADWAY PLAN

SCALE: 1" = 30' ADVERTISED DATE _____ CONTRACT NO. FR1025180

DESIGNED BY JMV COUNTY FREDERICK
DRAWN BY DMV LOGMILE
CHECKED BY
F.A.P. NO. SEE TITLE SHEET

DRAWING NO. PS-1 OF 1 SHEET NO. 6 OF



MD 478 (WEST POTOMAC STREET)

SCALE: HORZ. 1" = 30'
VERT. 1" = 5'

DATUM: NAD 8391 Horizontal
NAVD 88 Vertical

THE WILSON T. BALLARD CO.
CONSULTING ENGINEERS
OWINGS MILLS, MARYLAND

BY: JJW

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
HIGHWAY DESIGN DIVISION

BRIDGE REPLACEMENT
PRESTRESSED CONCRETE SLAB BRIDGE NO. 1008900
ON MD RTE. 478 (KNOXVILLE ROAD)
OVER BRANCH OF POTOMAC RIVER

ROADWAY PROFILE

SCALE _____ ADVERTISED DATE _____ CONTRACT NO. FR1025180

DESIGNED BY JJW
DRAWN BY DNW
CHECKED BY
F.A.P. NO. ALL TITLE SHEET

COUNTY FREDERICK
LOG/MILE
HORIZONTAL SCALE 1" = 30'
VERTICAL SCALE 1" = 5'

DRAWING NO. PR - 1 OF 1
SHEET NO. 7 OF

PLOTTED: Monday, July 09, 2018 AT 11:19 AM
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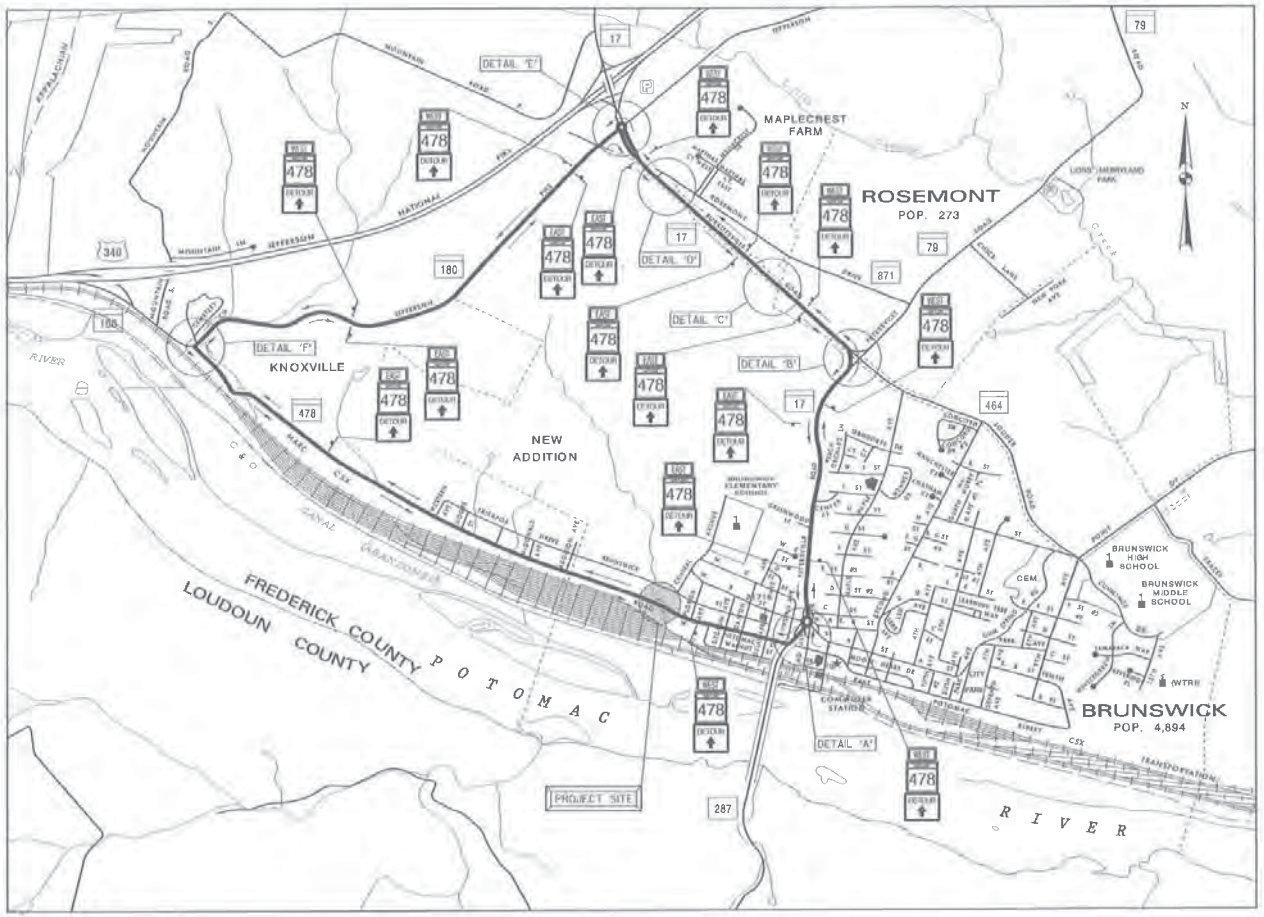

DETOUR PLAN
SCALE: 1 = 1000'-0"

LEGEND:

= DENOTES DETOUR ROUTE

= DENOTES PROJECT SITE

THE SIGNS DEPICTED ALONG THE DETOUR ROUTE HAVE BEEN PLACED IN APPROXIMATE LOCATIONS FOR BIDDING PURPOSES. PRIOR TO PLACING SIGNS IN THE FIELD, THE CONTRACTOR SHALL MEET WITH THE ENGINEER AND DETERMINE THE EXACT LOCATION FOR SIGN PLACEMENT.

NOTE:
FOR ADDITIONAL DETOUR SIGNING, SEE SHEET NOS.
FOR SIGNING LEGEND, SEE SHEET NO.

SHEET NO. 51

REVISIONS

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES
BRIDGE REPLACEMENT
PRESTRESSED CONCRETE SLAB BRIDGE NO. 1008900
ON MD RTE. 478 (KNOXVILLE ROAD)
OVER BRANCH OF POTOMAC RIVER
DETOUR PLAN

SCALE AS SHOWN DATE CONTRACT FR1025180

DESIGNED BY J.W.N., R.S.K. AND J.A.M.
DRAWN BY J.W.N., R.S.K. AND J.A.M.
CHECKED BY

SHEET NO. 8 OF

OTHER CONTRACTS FOR THIS STRUCTURE

STRUCTURE INVENTORY NO. 1008900

SURVEY BOOK NO. 10000

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PRINT DATE: Monday, August 17, 2015 at 2:49:20 PM

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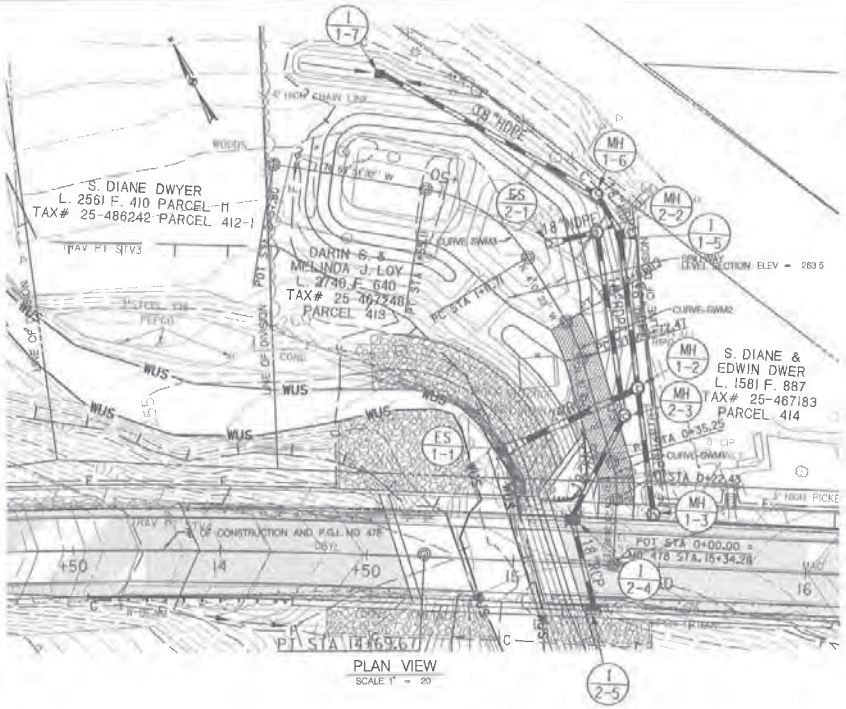


CURVE DATA							
CURVE NO.	STATION	Δ	Dc	R	T	L	E
1	PC 0+22.43	19°34'35"	152°47'19"	37.50'	6.47'	12.81'	0.55'
2	PC 0+71.62	14°02'00"	102°18'50"	56.00'	6.89'	13.72'	0.42'
3	PC 1+10.86	49°44'09"	114°35'30"	50.00'	23.18'	43.40'	4.64'

MD 478 – BASELINE OF CONSTRUCTION		
ALIGNMENT	NORTHING	EASTING
POT 0+00.00	600949.0432	1132194.1783
PC 0+22.43	600968.5681	1132205.2261
CC	600987.3400	1132172.7628
PT 0+35.25	600980.5305	1132209.6393
PC 0+72.47	601017.1388	1132216.3993
CC	601027.3077	1132161.3303
PT 0+86.19	301030.7958	1132217.2216
PC 1+11.71	601056.3079	1132215.3852
CC	601052.7129	1132165.5146
PT 1+55.11	601093.0913	1132195.0033
POT 2+07.80	601124.1663	1132152.4530

As-Built Inspection Tabulations/Checklist for BMP Number:
MDE No.:

Accepted by MDE:

Name Date

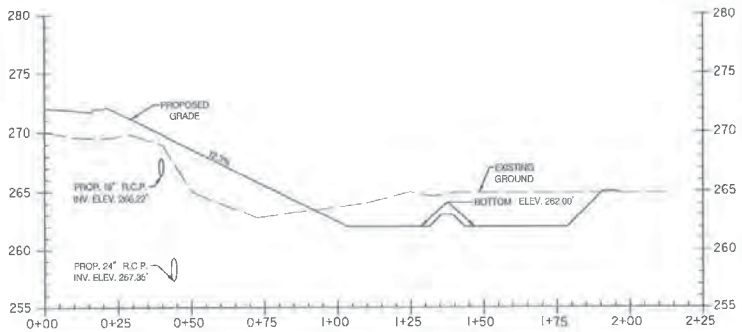
BIORETENTION MDE TABULATIONS

As-Built Survey	N/A				
Filter Bed Area (L x W)					
Filter Bed Surface Elevation					
Filter Inlet Pipe Size					
Filter Inlet Pipe Elevation					
Outlet Pipe (Underdrain) Size					
Outlet Pipe (Underdrain) Elevation					

BIORETENTION CONSTRUCTION CHECKLIST

Runoff Diverted			
Drainage area stabilized prior to installation			
Facility area cleared			
Facility location staked out			
Excavated to proper size and location*			
Stable side slopes			
Lateral slopes finished according to plans			
Subsoils not compacted during construction			
Underdrain system and observation well installed according to plans*			
Planting soil tested and approved according to specifications			
Planting soil placed according to plans			
Placement of geotextiles and filter fabric according to plans*			
Placement of sand filter layer (if applicable)			
Placement of gravel diaphragm*			
Appurtenant conveyance systems (diversion structures, pre-filters, filters, inlet, outlets, orifices and flow distribution structures) installed according to plan*			
A drop of at least 6 inches at the inlet			
Pretreatment facilities in place			
Planting installed according to plans (see checklist on SWM planting plan)*			
Mulch Layer installed according to details			
Maintenance access installed according to plan and details			
Final grading and permanent stabilization completed			

* All inspector required to perform inspection on site for these steps as required by COMAR 26.17.02.10



DATUM: NAD 8391 Horizontal
NAVD 88 Vertical

THE WILSON T. BALLARD CO.
CONSULTING ENGINEERS
OWINGS MILLS, MARYLAND

BY: JJW

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
HIGHWAY DESIGN DIVISION
BRIDGE REPLACEMENT
PRESTRESSED CONCRETE SLAB BRIDGE NO. 1008900
ON MD RTE. 478 (KNOXVILLE ROAD)
OVER BRANCH OF POTOMAC RIVER

STORM WATER MANAGEMENT PLAN

SCALE SEE SHEET ADVERTISED DATE _____ CONTRACT NO. ___FR005190___

DESIGNED BY JJW COUNTY FREDERICK
DRAWN BY DAW LOGMILE _____
CHECKED BY _____ HORIZONTAL SCALE _____
F.A.P. NO. SEE TITLE SHEET VERTICAL SCALE _____

DRAWING NO. SWM - 1 OF 1 SHEET NO. 11 OF

PLOTTED: Monday July 06, 2015 AT 11:20 AM
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EROSION AND SEDIMENT CONTROL – GENERAL NOTES

1. NOTIFICATION

NOTIFY THE REGIONAL ENVIRONMENTAL COORDINATOR IN WRITING AND/OR BY TELEPHONE AT (410) 365-0164 PRIOR TO THE FOLLOWING POINTS:

- PRE-CONSTRUCTION MEETING
- EROSION AND SEDIMENT CONTROL MEETING (MINIMUM 7 WORKING DAYS PRIOR TO COMMENCING EARTH DISTURBING ACTIVITIES)
- FOLLOWING INSTALLATION OF INITIAL SEDIMENT CONTROL MEASURES
- DURING INSTALLATION OF MAJOR SEDIMENT CONTROL BASINS/TRAPS
- REMOVAL OR MODIFICATION OF ANY SEDIMENT CONTROL STRUCTURE(S)
- REMOVAL OF ALL SEDIMENT CONTROL DEVICES
- FINAL ACCEPTANCE BY SHA

2. STANDARDS AND SPECIFICATIONS

CONSTRUCT THIS PLAN IN ACCORDANCE TO THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, THE 2000 MARYLAND STORMWATER DESIGN MANUAL, VOLUMES I & II AND THE MARYLAND DEPARTMENT OF ENVIRONMENT EROSION AND SEDIMENT CONTROL AND STORMWATER MANAGEMENT REGULATIONS, AND ALL REVISIONS THERE OF, AND AS SPECIFIED. KEEP A COPY OF THE 2011 'MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL' ON THE SITE AT ALL TIMES.

3. INGRESS / EGRESS CONTROLS

PROTECT ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS TO PREVENT THE DEPOSITION OF MATERIALS ON PUBLIC ROADS. MECHANICALLY REMOVE ALL MATERIALS DEPOSITED ON PUBLIC ROADS IMMEDIATELY. THE FLUSHING OF ROAD SURFACES IS PROHIBITED.

TYPICALLY, CONTROL ALL INGRESS AND EGRESS POINTS THROUGH THE USE OF A 'STABILIZED CONSTRUCTION ENTRANCE' WHICH ARE APPROXIMATELY SHOWN. LOCATE AND SUBMIT ACTUAL LOCATIONS FOR APPROVAL.

4. INSPECTION

INSPECT DAILY ALL EROSION AND SEDIMENT CONTROL MEASURES AND MAINTAIN CONTINUOUSLY IN AN EFFECTIVE OPERATING CONDITION.

5. SHUTDOWNS AND OR PENALTIES

TOTAL COMPLIANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN IS EXPECTED AT ALL TIMES. IN CASES WHERE THE CONTRACTOR IS FOUND TO BE IN NON-COMPLIANCE SHA MAY TAKE STEPS TO IMPOSE SELECTED OR TOTAL SHUTDOWNS AND IMPOSE LIQUIDATED DAMAGES FOR NON-COMPLIANCE.

THE DISTRICT ENGINEER CAN IMPOSE A TOTAL OR PARTIAL SHUTDOWN IF THE PROJECT MAY ADVERSELY IMPACT THE WATERS OF THE STATE.

6. RECORD KEEPING

THE PROJECT'S APPROVAL LETTER, APPROVED EROSION AND SEDIMENT CONTROL PLANS, APPROVED CHANGE REQUESTS, DAILY LOG BOOKS AND TEST REPORTS WILL BE AVAILABLE AT THE SITE FOR INSPECTION BY DULY AUTHORIZED OFFICIALS OF MDE.

7. DEWATERING PRACTICES

DEWATERING PRACTICES ARE CONSIDERED TO BE ELECTIVE IN NATURE. PRACTICES SHOWN ARE APPROXIMATE IN LOCATION AND SIZING. LOCATE, SIZE AND SUBMIT DEWATERING PRACTICES FOR APPROVAL. OPERATE DEWATERING PRACTICES IN A MANNER THAT DOES NOT DISCHARGE SEDIMENT INTO ANY WATERWAY. NO VISIBLE CHANGES TO STREAM CLARITY ARE PERMITTED.

8. EROSION AND SEDIMENT CONTROL EXCAVATION

PLACE SILT REMOVED FROM CONTROL DEVICES IN AN APPROVED WASTE SITE EITHER ON OR OFF THE PROJECT. MATERIAL STORED ON SITE MAY BE REUSED ONCE IT IS DRIED AND IF IT MEETS SHA REQUIREMENTS FOR EMBANKMENT OR ANY UNSPECIFIED NEED.

9. OFF-SITE UTILITY WORK

FOLLOW THESE ADDITIONAL BEST MANAGEMENT SEDIMENT CONTROL PRACTICES FOR UTILITY CONSTRUCTION IN AREAS OUTSIDE OF DESIGNED CONTROLS:

(a) CALL 'MISS UTILITY' AT 1-800-257-7777 48 HOURS PRIOR TO THE START OF WORK.
(b) PLACE EXCAVATED MATERIAL ON THE HIGH SIDE OF THE TRENCH.
(c) BACKFILL, COMPACT AND STABILIZE TRENCHES FOR UTILITY INSTALLATIONS AT THE END OF EACH WORKING DAY. WHEN THIS IS NOT POSSIBLE, CONFORM TO (d).
(d) PLACE TEMPORARY SILT FENCES IMMEDIATELY DOWNSTREAM OF ANY DISTURBED AREA INTENDED TO REMAIN DISTURBED FOR MORE THAN ONE DAY.

10. SENSITIVE AREAS

OBTAIN APPROVAL FROM THE ENGINEER AND COORDINATE WITH THE PERMIT HOLDERS WHO WILL COORDINATE WITH THE APPROPRIATE REGULATORY AGENCIES TO ENSURE THAT ALL PERMIT CONDITIONS ARE MET PRIOR TO COMMENCING ANY CONSTRUCTION ACTIVITY WITHIN SPECIFIED SENSITIVE AREAS OF THE PROJECT. DESIGNATE A RESPONSIBLE PARTY TO MONITOR ALL WORK IN THESE AREAS TO ASSURE THAT REASONABLE CARE IS TAKEN IN OR ADJACENT TO THESE AREAS. SENSITIVE AREAS ARE DEFINED AS: FLOODPLAINS, WETLANDS (TIDAL, NONTIDAL AND ASSOCIATED BUFFERS) CRITICAL AREAS, FORESTED AREAS, ARCHEOLOGICAL SITES, HISTORIC SITES, PARKLAND AND OPEN WATER.

11. STANDARD STABILIZATION NOTE

FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE, COMPLETE PERMANENT OR TEMPORARY STABILIZATION WITHIN THREE (3) CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER CONTROLS, DIKES, SWALES, DITCHES, PERIMETER SLOPES, AND ALL SLOPES GREATER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1); AND SEVEN DAYS (7) AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.

12. SITE INFORMATION

• (NOT FOR BIDDING PURPOSES)

TOTAL AREA OF SITE	0.83	ACRES
AREA DISTURBED	0.69	ACRES
AREA TO BE ROOFED OR PAVED	0.27	ACRES
TOTAL CUT	605	CU. YDS.
TOTAL FILL	440	CU. YDS.
OFFSITE WASTE/BORROW AREA LOCATION (IF KNOWN)		

13. INCREMENTAL STABILIZATION

REFER TO THE CURRENT MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR THE INCREMENTAL STABILIZATION OF CUT AND FILLS.

14. MODIFICATIONS

SUBMIT MODIFICATIONS TO THE EROSION AND SEDIMENT CONTROLS FOR APPROVAL. OBTAIN ALL APPROVALS FROM SHA PRIOR TO IMPLEMENTING ANY MODIFICATION.

STANDARD SYMBOLS

AT-GRADE INLET PROTECTION	REMOVABLE PUMPING STATION
BAFFLE BOARDS	RIPRAP INFLOW PROTECTION
BENCHING	RIPRAP OUTLET SEDIMENT TRAP ST III
CATCH BASIN INSERT	ROCK OUTLET PROTECTION I
CLEAR WATER DIVERSION PIPE	ROCK OUTLET PROTECTION II
CLEAR WATER PIPE	ROCK OUTLET PROTECTION III
COMBINATION INLET PROTECTION	SILT FENCE
CONCRETE WASHOUT STRUCTURE	SILT FENCE ON PAVEMENT
CURB INLET PROTECTION	SOD
DIVERSION FENCE	STABILIZED CONSTRUCTION ENTRANCE
EARTH DIKE	STANDARD INLET PROTECTION
EMERGENCY SPILLWAY	STOCKPILE AREA
FILTER BAG	STONE CHECK DAM
FILTER BERM	STONE/RIPRAP OUTLET SEDIMENT TRAP ST II
FILTER LOG	SUBSURFACE DRAINS
GABION INFLOW PROTECTION	SUMP PIT
GABION INLET PROTECTION	SUPER SILT FENCE
HORIZONTAL DRAW-DOWN DEVICE	TEMPORARY ACCESS BRIDGE
LIMIT OF DISTURBANCE	TEMPORARY ACCESS CULVERT
MEDIAN INLET PROTECTION	TEMPORARY ASPHALT BERM
MEDIAN SUMP INLET PROTECTION	TEMPORARY BARRIER DIVERSION
MOUNTABLE BERM	TEMPORARY GABION OUTLET STRUCTURE
PERIMETER DIKE/SWALE	TEMPORARY SOIL STABILIZATION MATTING-TYPE A
PERMANENT SOIL STABILIZATION MATTING-TYPE B	TEMPORARY SOIL STABILIZATION MATTING-TYPE E
PERMANENT SOIL STABILIZATION MATTING-TYPE C	TEMPORARY SOIL STABILIZATION MATTING-TYPE D
PIPE OUTLET SEDIMENT TRAP ST I	TEMPORARY STONE OUTLET STRUCTURE
PIPE SLOPE DRAIN	TEMPORARY SWALE
PLUNGE POOL	WASH RACK OPTION
PORTABLE SEDIMENT TANK	CHESAPEAKE BAY CRITICAL AREA
	DRAINAGE BOUNDARY
	EXISTING CONTOURS
	PROPOSED CONTOURS
	TREE PROTECTION FENCE
	WETLAND
	WETLAND BUFFER
	100-YEAR FLOODPLAIN

DESIGN CERTIFICATION

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH THE MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, THE 2000 MARYLAND STORMWATER DESIGN MANUAL, VOLUMES I & II INCLUDING SUPPLEMENTS, THE ENVIRONMENT ARTICLE SECTIONS 4-101 THROUGH 116 AND SECTIONS 4-201 AND 215, AND THE CODE OF MARYLAND REGULATIONS (COMAR) 26.17.01 AND COMAR 26.17.02 FOR EROSION AND SEDIMENT CONTROL AND STORMWATER MANAGEMENT, RESPECTIVELY.

DATE ______ DESIGNER'S SIGNATURE ______

MD REGISTRATION NO.______
P.E., R.L.S., R.L.A., OR R.A. (CIRCLE ONE)

PRINTED NAME ______

P.E. CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND LICENSE NO.______, EXPIRATION DATE:______.

THE WILSON T. BALLARD CO.
CONSULTING ENGINEERS
OWINGS MILLS, MARYLAND

SHA
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
HIGHWAY DESIGN DIVISION
BRIDGE REPLACEMENT
PRESTRESSED CONCRETE SLAB BRIDGE NO. 1008900
ON MD RTE. 478 (KNOXVILLE ROAD)
OVER BRANCH OF POTOMAC RIVER

EROSION AND SEDIMENT CONTROL GENERAL NOTES

SCALE NTS ADVERTISED DATE ______ CONTRACT NO. FR1025180

DESIGNED BY	JJW	COUNTY	FREDERICK
DRAWN BY	DAW	LOGMILE	
CHECKED BY		HORIZONTAL SCALE	
F.A.P. NO.	SEE TITLE SHEET	VERTICAL SCALE	

DRAWING NO. ES-1 OF 3 SHEET NO. 12 OF

BY: JJW -

SEQUENCE OF CONSTRUCTION

GENERAL

1. Stake out the project for pre-construction and notify the Regional Environmental Coordinator 5 days in advance at (410) 365-0164.

PHASE 1

1. Initiate road closure and Install Stabilized Construction Entrances at Sta. 13+75 and Sta. 16+00
2. Clear and grub as necessary to install Super Silt Fence (Lt. Sta. 13+00 to Lt. Sta. 14+40, Lt. Sta. 14+15 to Lt. Sta. 14+75, Lt. Sta. 14+85 to Lt. Sta. 15+15, and Rt. Sta. 15+50 to Rt. Sta. 17+00).
3. Clear and grub as necessary to construct the bio-retention facility. Construct the bio-retention facility.
4. Construct Storm Drain System ES-1-1 to I-1-7 and ES-2-1 to I-2-5, working from downstream to upstream saving the final connection to the existing storm drain system at MH-1-3 for last.
5. Installing Inlet Protection at inlets I-1-7 and I-1-6. Construct ditches directing runoff to inlets I-1-7 and I-1-6 beginning at the downstream and working upstream, only constructing what can be stabilized by the end of each day.
6. Install stream diversion and clear and grub as needed to construct bridge abutments and stream bank armoring. Construct bridge abutments, stream bank armoring.
7. Once the stream bank armoring and bridge abutments are complete, remove the stream diversion with the written approval of the Regional Environmental Coordinator.
8. Clear and grub the remaining areas.
7. Construct the roadway, bridge superstructure and sidewalks as shown on the plans.
8. Once all grading and construction is completed and stabilized, remove all Sediment Control Devices that are in place with the written approval of the Regional Environmental Coordinator.
9. Stabilize any areas disturbed by the removal of the Sediment Control Devices.
10. Flush all strom drains.
11. Once all contributing areas to the bioretention facility are stabilized, and with the written approval of the Regional Environmental Coordinator. Install the bioretention facility materials and plantings.

BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS AND 100-YEAR FLOODPLAINS

1. No excess fill, construction material, or debris shall be stockpiled or stored in nontidal wetlands, nontidal wetland buffers, waterways, or the 100-year floodplain.
2. Place materials in a location and manner which does not adversely impact surface or subsurface water flow into or out of nontidal wetlands, nontidal wetland buffers, waterways, or the 100-year floodplain.
3. Do not use the excavated material as backfill if it contains waste metal products, unsightly debris, toxic material, or any other deleterious substance. If additional backfill is required, use clean material free of waste metal products, unsightly debris, toxic material, or any other deleterious substance.
4. Place heavy equipment on mats or suitably operate the equipment to prevent damage to nontidal wetlands, nontidal wetland buffers, waterways, or the 100-year floodplain.
5. Repair and maintain any serviceable structure or fill so there is no permanent loss of nontidal wetlands, nontidal wetland buffers, waterways, or permanent modification of the 100-year floodplain in excess of that loss under the originally authorized structure or fill.
6. Rectify any nontidal wetlands, wetland buffers, waterways, or the 100-year floodplain temporarily impacted by any construction.
7. All stabilization in the nontidal wetlands and nontidal wetland buffer shall consist of the following species: Annual Ryegrass (Lolium multiflorum), Millet (Setaria italica), Barley (Hordeum sp.), Oats (Uniola sp.), and/or revegetation of natural wetland species. Other non-persistent vegetation may be applicable, but must be approved by the Nontidal Wetlands and Waterways Division. Kentucky 31 fescue shall not be utilized in wetland or wetland buffer areas. The area should be seeded and mulched to reduce erosion after construction activities have been completed.
8. After installation has been completed, make post-construction grades and elevations the same as the original grades and elevations in temporarily impacted areas.
8. To protect aquatic species, in-stream work is prohibited as determined by the classification of the stream.
   Use I waters: In-stream work shall not be conducted during the period March 1 through June 15, inclusive, during any year.
   Use III waters: In-stream work shall not be conducted during the period October 1 through April 30, inclusive, during any year.
   Use IV waters: In-stream work shall not be conducted during the period March 1 through May 31, inclusive, during any year.
10. Stormwater runoff from impervious surfaces shall be controlled to prevent the washing of debris into the waterway.
11. Culverts shall be constructed and any riprap placed so as not to obstruct the movement of aquatic species, unless the purpose of the activity is to impound water.

THE WILSON T. BALLARD CO.
CONSULTING ENGINEERS
OWINGS MILLS, MARYLAND

BY: JJW

SHA
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
HIGHWAY DESIGN DIVISION

BRIDGE REPLACEMENT
PRESTRESSED CONCRETE SLAB BRIDGE NO. 1006900
ON MD RTE. 478 (KNOXVILLE ROAD)
OVER BRANCH OF POTOMAC RIVER

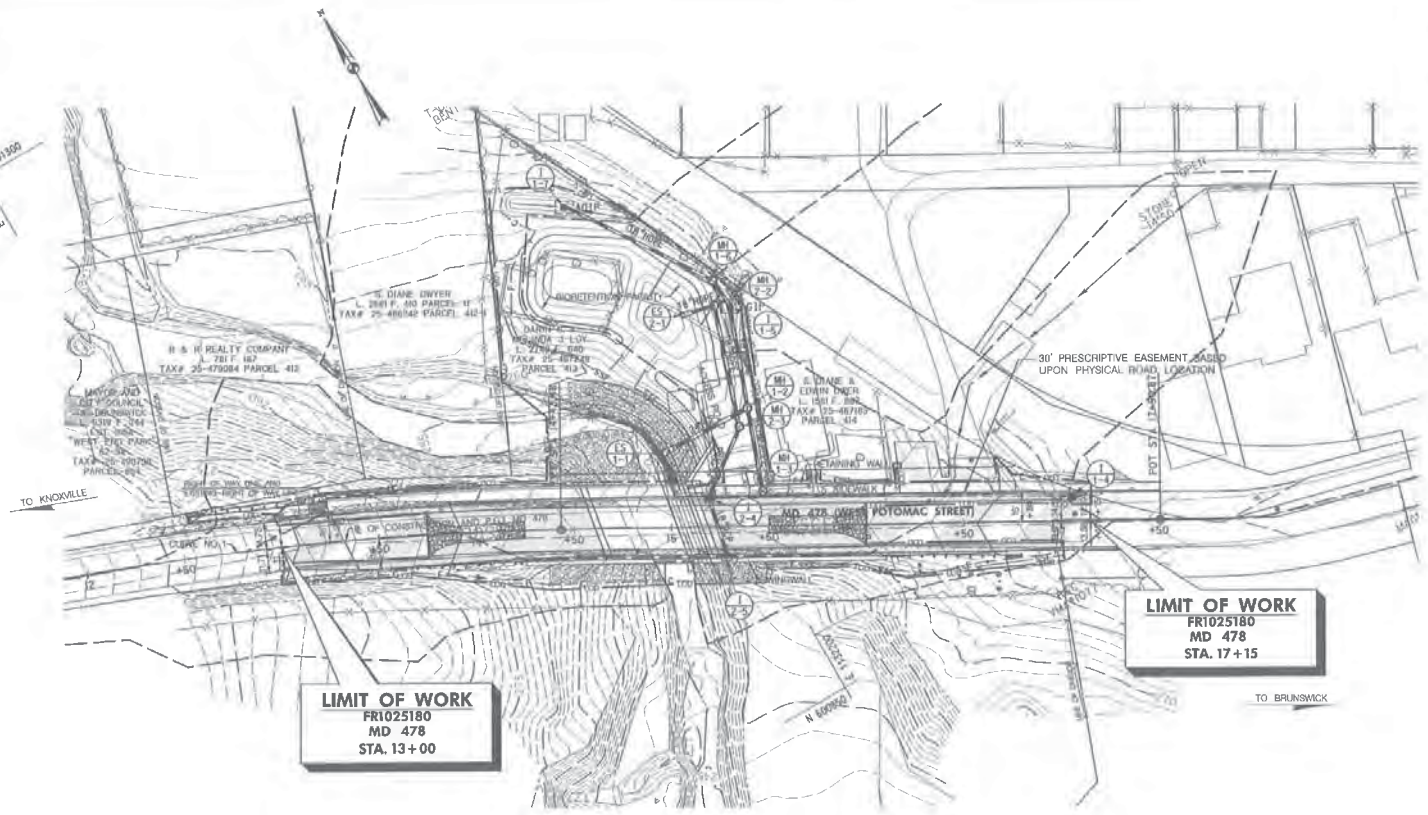
EROSION AND SEDIMENT CONTROL SEQUENCE OF CONSTRUCTION

SCALE NTS ADVERTISED DATE _____ CONTRACT NO FR1006900

DESIGNED BY JJW	COUNTY FREDERICK
DRAWN BY DAW	LOGMILE
CHECKED BY	HORIZONTAL SCALE
F.A.P. NO SEE TITLE SHEET	VERTICAL SCALE

DRAWING NO. ES-2 OF 3 | SHEET NO. 13 OF

PLOTTED: Monday, July 06, 2015 AT 10:30 AM



EROSION AND SEDIMENT CONTROL PLAN
SCALE: 1" = 30'

STABILIZED CONSTRUCTION ENTRANCE	
1 EA	STA. 13+75
1 EA	STA. 16+00

SUPER SILT FENCE	
145 LF	LT. STA. 13+00 TO LT. STA. 14+40
75 LF	LT. STA. 14+15 TO LT. STA. 14+75
60 LF	LT. STA. 14+85 TO LT. STA. 15+15
155 LF	RT. STA. 15+50 TO RT. STA. 17+00

INLET PROTECTION	
AGIP	STA. 14+47, LT. 166
AGIP	STA. 15+32, LT. 113

DATUM: NAD 8391 Horizontal
NAVD 88 Vertical

THE WILSON T. BALLARD CO.
CONSULTING ENGINEERS
OWINGS MILLS, MARYLAND

BY: JJW

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
HIGHWAY DESIGN DIVISION
BRIDGE REPLACEMENT
PRESTRESSED CONCRETE SLAB BRIDGE NO. 1008900
ON MD RTE. 478 (KNOXVILLE ROAD)
OVER BRANCH OF POTOMAC RIVER

EROSION AND SEDIMENT CONTROL PLAN

SCALE 1" = 30' ADVERTISED DATE _____ CONTRACT NO. FR1025180

DESIGNED BY JJW COUNTY FREDERICK
DRAWN BY _____ LOG/MILE _____
CHECKED BY _____ HORIZONTAL SCALE _____
F.A.P NO. ___ SEE TITLE SHEET VERTICAL SCALE _____

DRAWING NO. ES-3 OF 3 SHEET NO. 14 OF

PLOTTED: Monday, July 09, 2018 AT 01:08 PM
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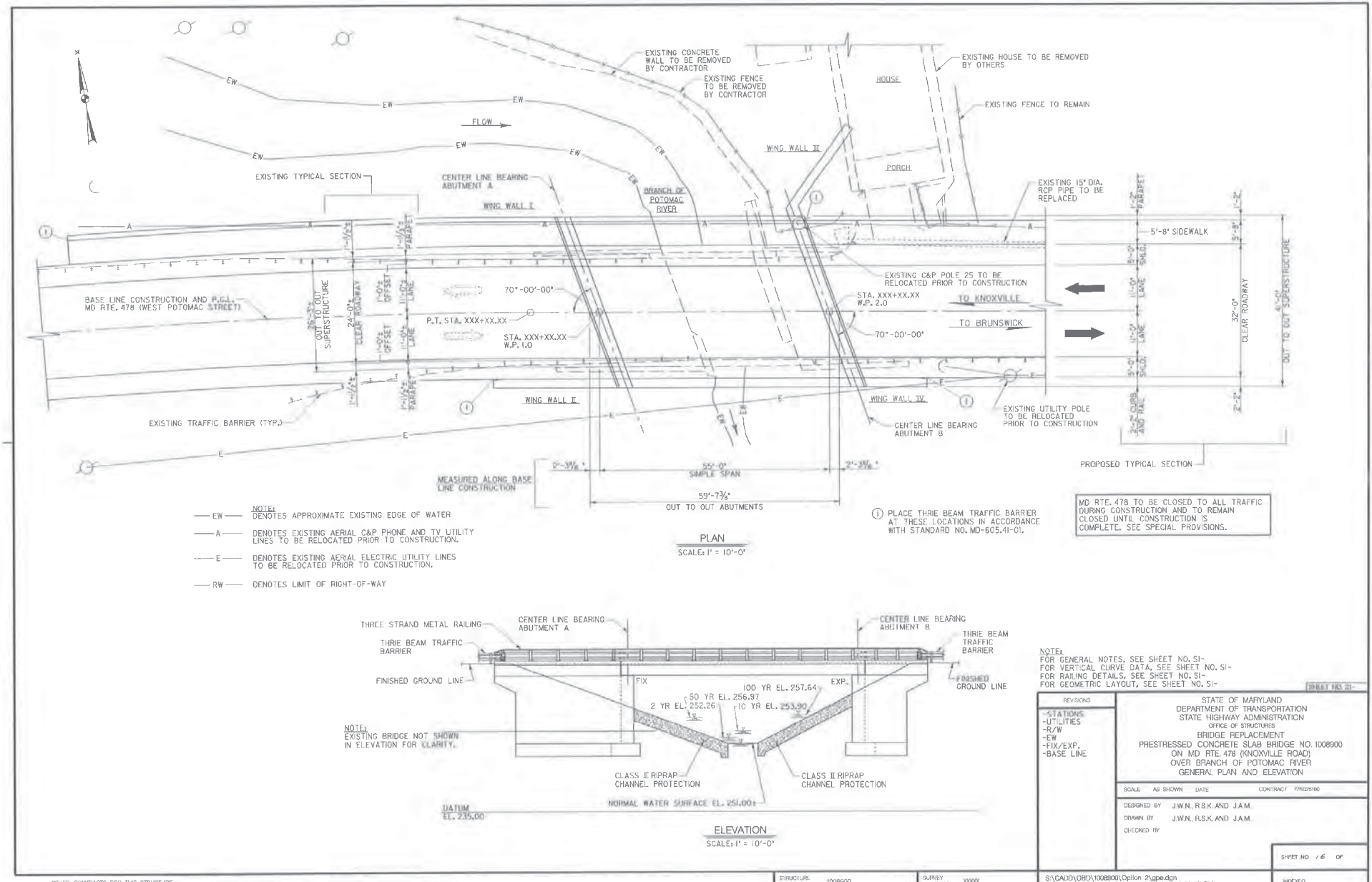
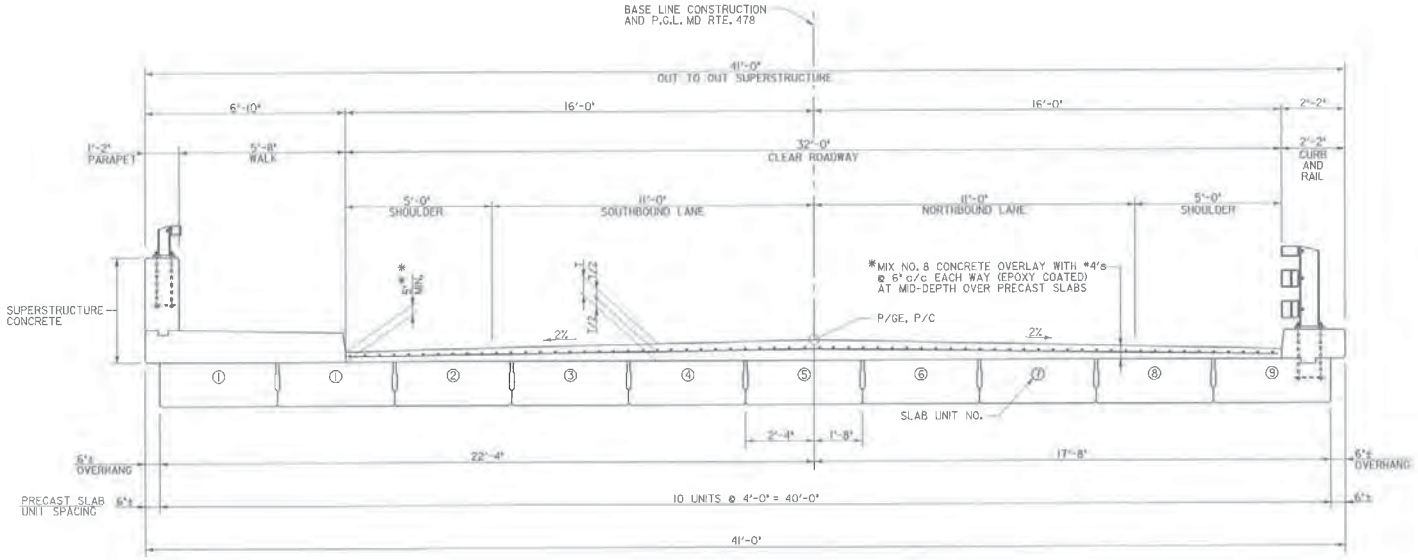

EXISTING CONCRETE WALL TO BE REMOVED BY CONTRACTOR
EXISTING FENCE TO BE REMOVED BY CONTRACTOR
EXISTING HOUSE TO BE REMOVED BY OTHERS
EXISTING FENCE TO REMAIN
HOUSE
PORCH
WING WALL III
FLOW
EW
EXISTING TYPICAL SECTION
CENTER LINE BEARING ABUTMENT A
WING WALL I
BRANCH OF POTOMAC RIVER
EXISTING 15" DIA. RCP PIPE TO BE REPLACED
5'-8" SIDEWALK
EXISTING C&P POLE 25 TO BE RELOCATED PRIOR TO CONSTRUCTION
STA. XXX+XX.XX W.P. 2.0
TO KNOXVILLE
TO BRUNSWICK
70°-00'-00"
P.T. STA. XXX+XX.XX
STA. XXX+XX.XX W.P. 1.0
BASE LINE CONSTRUCTION AND P.G.L. MD RTE. 478 (WEST POTOMAC STREET)
26'-3" OUT TO OUT SUPERSTRUCTURE
24'-0" CLEAR ROADWAY
1'-0" OFFSET
11'-0" LANE
1'-1½" PARAPET
32'-0" CLEAR ROADWAY
41'-0" OUT TO OUT SUPERSTRUCTURE
EXISTING TRAFFIC BARRIER (TYP.)
WING WALL II
WING WALL IV
CENTER LINE BEARING ABUTMENT B
EXISTING UTILITY POLE TO BE RELOCATED PRIOR TO CONSTRUCTION
PROPOSED TYPICAL SECTION
2'-3⅜"
55'-0" SIMPLE SPAN
59'-7⅜" OUT TO OUT ABUTMENTS
MEASURED ALONG BASE LINE CONSTRUCTION
NOTE:
EW DENOTES APPROXIMATE EXISTING EDGE OF WATER
A DENOTES EXISTING AERIAL C&P PHONE AND TV UTILITY LINES TO BE RELOCATED PRIOR TO CONSTRUCTION.
E DENOTES EXISTING AERIAL ELECTRIC UTILITY LINES TO BE RELOCATED PRIOR TO CONSTRUCTION.
RW DENOTES LIMIT OF RIGHT-OF-WAY
① PLACE THRIE BEAM TRAFFIC BARRIER AT THESE LOCATIONS IN ACCORDANCE WITH STANDARD NO. MD-605.41-01.
MD RTE. 478 TO BE CLOSED TO ALL TRAFFIC DURING CONSTRUCTION AND TO REMAIN CLOSED UNTIL CONSTRUCTION IS COMPLETE. SEE SPECIAL PROVISIONS.
PLAN
SCALE: 1" = 10'-0"
THREE STRAND METAL RAILING
THRIE BEAM TRAFFIC BARRIER
CENTER LINE BEARING ABUTMENT A
CENTER LINE BEARING ABUTMENT B
FINISHED GROUND LINE
FIX
EXP.
100 YR EL. 257.64
50 YR EL. 256.97
10 YR EL. 253.90
2 YR EL. 252.26
NOTE:
EXISTING BRIDGE NOT SHOWN IN ELEVATION FOR CLARITY.
CLASS II RIPRAP CHANNEL PROTECTION
NORMAL WATER SURFACE EL. 251.00±
DATUM EL. 235.00
ELEVATION
SCALE: 1" = 10'-0"
NOTE:
FOR GENERAL NOTES, SEE SHEET NO. SI-
FOR VERTICAL CURVE DATA, SEE SHEET NO. SI-
FOR RAILING DETAILS, SEE SHEET NO. SI-
FOR GEOMETRIC LAYOUT, SEE SHEET NO. SI-
SHEET NO. SI-
REVISIONS
-STATIONS
-UTILITIES
-R/W
-EW
-FIX/EXP.
-BASE LINE
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES
BRIDGE REPLACEMENT
PRESTRESSED CONCRETE SLAB BRIDGE NO. 1008900
ON MD RTE. 478 (KNOXVILLE ROAD)
OVER BRANCH OF POTOMAC RIVER
GENERAL PLAN AND ELEVATION
SCALE AS SHOWN
DATE
CONTRACT FR1025180
DESIGNED BY J.W.N., R.S.K. AND J.A.M.
DRAWN BY J.W.N., R.S.K. AND J.A.M.
CHECKED BY
SHEET NO. 1 6 OF
OTHER CONTRACTS FOR THIS STRUCTURE
STRUCTURE INVENTORY NO 1008900
SURVEY BOOK NO XXXXX
S:\CADD\OBD\1008900\Option 2\gpe.dgn
PRINT DATE: Thursday, August 06, 2015 at 3:26:43 PM
INDEXED



PROPOSED TYPICAL SECTION

SCALE: 1/2" = 1'-0"

NOTE:
THE ENTIRE CONCRETE OVERLAY, SHALL BE MADE IN ONE CONTINUOUS POUR FROM ABUTMENT TO ABUTMENT AND FROM CURB TO CURB.

REFER TO SECTION 440.03.22 FOR SLAB SURFACE PREPARATION PRIOR TO PLACING MIX NO. 8 CONCRETE OVERLAY.

ALL SLAB UNITS TO BE PLACED PARALLEL TO BASE LINE CONSTRUCTION.

SECTION SHOWN LOOKING STATIONS AHEAD.

* THE COST OF ALL REINFORCING AND CONCRETE IN THE OVERLAY AND CURB ELEMENT SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR THE 'SUPERSTRUCTURE CONCRETE' ITEM.

** DEPTH OF OVERLAY TO VARY TO COMPENSATE FOR VERTICAL VARIATION OF ROADWAY OVER THE PLANE OF THE TOP OF THE SLAB UNITS.

NOTE:
FOR GENERAL PLAN AND ELEVATION, SEE SHEET NO. SI-
FOR GENERAL NOTES, SEE SHEET NO. SI-
FOR SLAB LAYOUT, SEE SHEET NO. SI-
FOR SLAB DETAILS, SEE SHEET NO. SI-
FOR ADDITIONAL SUPERSTRUCTURE DETAILS, SEE SHEET NO. SI-
FOR CURB DETAILS, SEE SHEET NO. SI-
FOR RAILING DETAILS, SEE SHEET NO. SI-

SHEET NO. S1-

REVISIONS

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES
BRIDGE REPLACEMENT
PRESTRESSED CONCRETE SLAB BRIDGE NO 1008900
ON MD RTE. 478 (KNOXVILLE ROAD)
OVER BRANCH OF POTOMAC RIVER
TYPICAL SECTION

SCALE AS SHOWN DATE CONTRACT FR1025180

DESIGNED BY J.W.N., R.S.K. AND J.A.M.
DRAWN BY J.W.N., R.S.K AND J.A.M
CHECKED BY

SHEET NO. 17 OF

OTHER CONTRACTS FOR THIS STRUCTURE

STRUCTURE INVENTORY NO. 1008900

SURVEY BOOK NO XXXX

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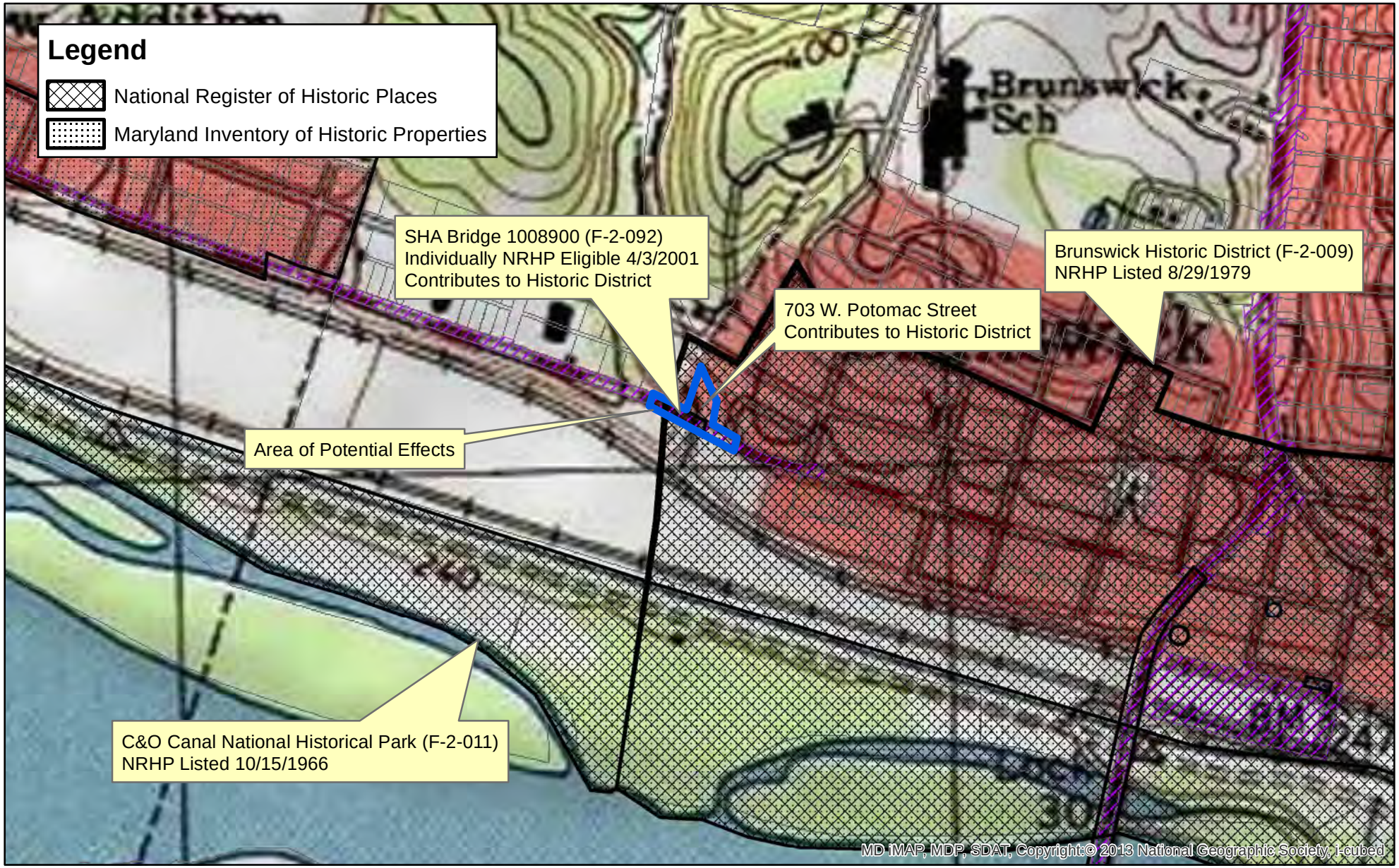
PRINT DATE: Thursday, October 09, 2014 at 1:30:58 PM

INDEXED

Attachment 2

APE Map



MD 478 over Branch of Potomac River
Bridge Replacement
Frederick County
USGS Harpers Ferry Topo Quad

N

August 19, 2016
1:6,911
0 350 700 1,400 Feet

MEMORANDUM OF AGREEMENT AMONG
THE FEDERAL HIGHWAY ADMINISTRATION,
THE MARYLAND DEPARTMENT OF TRANSPORTATION'S
STATE HIGHWAY ADMINISTRATION AND
THE MARYLAND STATE HISTORIC PRESERVATION OFFICER
PURSUANT TO 36 CFR PART 800 REGARDING
THE REPLACEMENT OF MDOT/SHA BRIDGE NO. 1008900
IN FREDERICK COUNTY, MARYLAND

WHEREAS, the Federal Highway Administration (FHWA) proposes to assist the Maryland Department of Transportation's State Highway Administration (MDOT/SHA) with the Replacement of MDOT/SHA Bridge No. 1008900 on MD 478 over a Branch of Potomac River in Brunswick, Frederick County (Undertaking); and

WHEREAS, after detailed study of alternatives, the MDOT/SHA has selected the following Preferred Alternative for construction: Alternative 4A, replacing MDOT/SHA Bridge No. 1008900, realign MD 478, and acquiring for demolition the dwelling at 703 West Potomac Street; and

WHEREAS, the FHWA has determined that the Undertaking shall have an adverse effect on MDOT/SHA Bridge No. 1008900, which is eligible for inclusion in the National Register of Historic Places (NRHP) under Criterion C; and

WHEREAS, the MDOT/SHA has determined that mitigation for the adverse effect on MDOT/SHA Bridge No. 1008900 shall follow the method established in the Historic Bridge Programmatic Agreement among the Maryland Historical Trust, the FHWA, the MDOT/SHA and the Advisory Council on Historic Preservation (Council) on July 19, 2013; and

WHEREAS, the FHWA has determined that the Undertaking shall have an adverse effect on the Brunswick Historic District, which is listed in the NRHP under Criteria A and C; and

WHEREAS, the FHWA has consulted with the Maryland State Historic Preservation Officer (MD SHPO) pursuant to 36 CFR Part 800, the regulations implementing Section 106 of the National Historic Preservation Act (54 USC 306107); and

WHEREAS, the FHWA has identified and consulted with the following parties in the Section 106 process: Frederick County Historic Preservation Commission; and

WHEREAS, the MDOT/SHA has participated in consultation, has responsibilities for implementing stipulations under this Memorandum of Agreement (MOA), and pursuant to 36 CFR § 800.6(c)(2) has been invited to be a signatory to this MOA;

WHEREAS, the FHWA notified the Council of the Undertaking's adverse effect on historic properties and it has declined to participate in the consultation in a letter dated [Preparer's Note: date will be inserted here]; and

WHEREAS, the MD SHPO agrees that fulfillment of the terms of this MOA shall satisfy the responsibilities of any Maryland state agency under the requirements of the Maryland Historical Trust Act of 1985, as amended, State Finance and Procurement Article §§ 5A-325 and 5A-326 of the Annotated Code of Maryland, for any components of the Undertaking that require licensing, permitting, and/or funding actions from Maryland state agencies; and

NOW, THEREFORE, the FHWA, the MDOT/SHA and the MD SHPO agree that upon the FHWA's decision to proceed with the construction of the Undertaking, the FHWA shall ensure that the following stipulations are implemented in order to take into account the effects of the Undertaking on historic properties, and that these stipulations shall govern the Undertaking and all its parts until this MOA expires or is terminated.

STIPULATIONS

The FHWA and MDOT/SHA shall ensure that the following measures shall be implemented:

I. Addendum Forms

A. MIHP Addendum Form – At the conclusion of the project, the MDOT/SHA shall complete an MIHP Addendum Form for MDOT/SHA Bridge No. 1008900 (F-2-092) to document the demolition of the bridge.

B. NRHP Addendum Form – MDOT/SHA shall also complete an NRHP Addendum Form for the Brunswick Historic District. The update will include:

- An inventory listing of contributing and non-contributing resources, noting any demolitions or alterations to resources that have resulted in a change in integrity;
- Mapping of contributing and non-contributing resources;
- General streetscape photographs documenting the historic district's overall appearance;
- Updated statement of significance with additional historic context focusing on the historic district's Baltimore & Ohio Railroad history;
- One (1) page documentation of both 703 W Potomac Street and MDOT/SHA Bridge No. 1008900 including photographs of each resource prior to demolition and its relationship to buildings/landscape in the historic district.

C. Use of *Standards and Guidelines for Architectural and Historical Investigations in Maryland* – The Addendum Forms shall be developed in consultation with the MD SHPO's Project Review and Compliance Section and shall follow the requirements detailed in the *Standards and Guidelines for Architectural and Historical Investigations in Maryland* (Maryland Historical Trust 2000) and in the *Standards for Submission of Digital Images to the Maryland Inventory of Historic Properties* (Maryland Historical Trust 2008, as Revised January 2015). The documentation shall include black and white digital photographs sufficient to portray the elevations and architectural details and a historic context that provides an accurate record of the resources. The documentation associated with the MIHP Forms shall consist of black and white photographs; negatives or slides (if used); color digital images on a 75-year "gold"-type archival CD or DVD; photo log; and two location maps using the USGS Quadrangle Map.

D. Submission – The MDOT/SHA shall submit the MIHP Addendum Forms including the accompanying documentation to the MD SHPO for review and comment within five (5) years of execution of this MOA. The MD SHPO's review is subject to a thirty (30) day period beginning upon the date of receipt by the MD SHPO of said documentation package. If applicable, the MDOT/SHA shall revise the MIHP Addendum Forms to address any MD SHPO comments.

II. Public Interpretation

A. Interpretive Materials – The MDOT/SHA shall complete a public interpretive element that may include, but is not limited to, a temporary interpretive display and accompanying pamphlet. These elements would focus on evolution of transportation routes in and through Brunswick throughout the nineteenth and early twentieth centuries and their importance to the city's growth and prosperity.

B. Submission –The MDOT/SHA shall submit the proposed interpretive materials to the MD SHPO and Frederick County for review and comment within one (1) year of completion of the undertaking. The MD SHPO's review is subject to a thirty (30) day period beginning upon the date of receipt by the MD SHPO of said documentation package. If applicable, the MDOT/SHA shall revise the interpretive panel to address any MD SHPO comments.

III. Design Development, Alignment Modifications and Ancillary Activities

The project may result in unforeseen effects on other historic properties due to changes made during design development, alignment modifications, or as a result of associated ancillary activities including, but not limited to: construction staging

areas, stormwater management facilities, wetland mitigation areas, reforestation areas, environmental stewardship activities, or other actions. All design and construction elements that may affect historic properties shall be subject to review and concurrence by the MD SHPO. The FHWA and the MDOT/SHA shall ensure that avoidance of adverse effects to historic properties is the preferred strategy and shall utilize all feasible, prudent, and practicable measures to avoid adverse effects.

Should such activities be added for which cultural resources studies have not been completed, the MDOT/SHA shall ensure that consultation ensues with the MD SHPO, the FHWA and other relevant consulting parties as appropriate, and that all required cultural resources studies are implemented in accordance with the applicable performance standards in Stipulation IV and with the following procedures:

A. Identification -- The MDOT/SHA professional cultural resources staff shall review any additions or changes to the project and implement identification investigations as necessary to identify any historic properties that may be impacted by the proposed activity or alignment modification. The MDOT/SHA shall provide all completed information to the MD SHPO and relevant consulting parties under this MOA for review and comment. If the MD SHPO does not provide comments within thirty (30) calendar days of receipt, the MDOT/SHA may assume the MD SHPO acceptance of the results.

B. Evaluation -- The MDOT/SHA shall evaluate all cultural resources identified in the areas inventoried under Stipulation II.A. in accordance with 36 CFR § 800.4(c) to determine their eligibility for the NRHP. The MDOT/SHA shall provide the results of any such evaluation efforts to the MD SHPO and relevant consulting parties for review and comment. If the MD SHPO does not provide comments within thirty (30) calendar days of receipt, the MDOT/SHA may assume the MD SHPO's acceptance of the results.

C. Treatment -- Should any property eligible for inclusion in the NRHP be identified under Stipulation II.B., the MDOT/SHA shall make a reasonable and good-faith effort to avoid adversely impacting the resources by relocating or modifying the proposed action. If adverse effects are unavoidable, the MDOT/SHA, the FHWA, the MD SHPO and relevant consulting parties shall consult in accordance with 36 § CFR 800.6 to resolve adverse effects on NRHP-eligible historic properties. If adverse effects are unavoidable, the MDOT/SHA, the FHWA, the MD SHPO and relevant consulting parties shall develop and implement appropriate treatment and mitigation options as part of a Treatment Plan. The FHWA shall ensure that the MDOT/SHA shall implement the Treatment Plan once the MD SHPO concurs with the Plan. The MDOT/SHA shall ensure that any resulting cultural resources work is accomplished in accordance with the relevant performance standards in Stipulation IV.

III. Unexpected Discovery of Historic Properties during Construction

If historic properties are discovered or unanticipated effects on historic properties are found after the Undertaking is implemented the MDOT/SHA shall ensure that reasonable efforts are made to avoid, minimize, or mitigate adverse effects to such properties, and shall consult with the MD SHPO and relevant consulting parties to resolve any adverse effects pursuant to 36 CFR § 800.13(b). The MDOT/SHA shall ensure that any resulting cultural resources work is accomplished in accordance with the relevant performance standards in Stipulation IV.

IV. Performance Standards

A. Professional Qualifications – the MDOT/SHA shall ensure that all cultural resources work performed pursuant to the MOA is carried out by or under the direct supervision of a person or persons meeting at a minimum the Professional Qualifications Standards set forth in the Secretary of the Interior's Standards for Architectural History and Archeology (36 CFR Part 61).

B. Standards and Guidelines - the MDOT/SHA shall ensure that all cultural resources investigations and work performed pursuant to this MOA shall be conducted in a manner consistent with the principles and standards contained in the documents (and subsequent revisions thereof) listed below:

- *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation* (1983 and successors);
- *Standards and Guidelines for Archeological Investigations in Maryland* (Shaffer and Cole 1994);
- *Standards and Guidelines for Architectural and Historical Investigations in Maryland* (Maryland Historical Trust 2000);
- *Guidelines and Resources for Compliance-Generated Determinations of Eligibility (DOEs)* (Maryland Historical Trust 2009);
- *Standards for Submission of Digital Images to the Maryland Inventory of Historic Properties* (Maryland Historical Trust 2008, as Revised January 2015)
- *Advisory Council on Historic Preservation – Section 106 Archaeology Guidance* (Council 2007);
- *Secretary of the Interior's Standards for the Treatment of Historic Properties* (36 CFR Part 68).

VI. Administration

A. Resolution of Objections by the Signatories - Should the MD SHPO, or any

of the signatories to this MOA, object in writing within thirty (30) days to any plans or actions proposed pursuant to this MOA, the FHWA shall consult with the objecting party to resolve the objection. If the FHWA determines that such objection cannot be resolved, the FHWA shall:

1) Forward all documentation relevant to the dispute, including the FHWA's proposed resolution, to the Council. The Council shall provide the FHWA with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, the FHWA shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the Council, signatories and concurring parties, and provide them with a copy of this written response. The FHWA shall then proceed according to its final decision.

2) If the Council does not provide its advice regarding the dispute within the thirty (30) day time period, the FHWA may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, the FHWA shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties to the MOA, and provide them and the Council with a copy of such written response.

3) The FHWA's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remains unchanged.

B. Resolution of Objections by the Public - At any time during implementation of the measures stipulated in this MOA, should an objection pertaining to this agreement or the effect of the undertaking on historic properties be raised by another consulting party, a concurring party to the MOA, or a member of the public, the FHWA shall notify the parties to this agreement and take the objection into account, consulting with the objector and, should the objector so request, with any of the parties to this MOA to resolve the objection.

C. Amendment - If one of the signatories believes that the terms of the MOA shall not or cannot be carried out, or that an amendment to the terms must be made, that signatory shall immediately consult with the other signatories to develop amendments. This MOA may be amended when such an amendment is agreed to in writing by all signatories. The amendment shall be effective on the date a copy signed by all of the signatories is filed with the Council. If an amendment cannot be agreed upon, the dispute resolution process set forth in Stipulation VI.A. shall be followed.

D. Termination - If any signatory to this MOA determines that its terms shall not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation VI.C, above. If within thirty (30) days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the MOA upon written notification to the other signatories.

This Agreement may be terminated by the execution of a subsequent agreement that explicitly terminates or supersedes its terms.

Termination of this Agreement without a subsequent agreement in place would require compliance with 36 CFR 800. Once the MOA is terminated, and prior to work continuing on the undertaking, the FHWA must either (a) execute an MOA pursuant to 36 CFR § 800.6, or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR § 800.7. The FHWA shall notify the signatories as to the course of action it shall pursue.

E. Duration - This MOA shall be null and void if its terms are not carried out within five (5) years from the date of its execution, unless the signatories agree in writing to an extension for carrying out its terms.

Execution of this MOA by the FHWA, MDOT/SHA and MD SHPO, its subsequent submission to the Council and implementation of its terms, is evidence that FHWA and MDOT/SHA have taken into account the effects of the undertaking on historic properties.

FEDERAL HIGHWAY ADMINISTRATION

By: _____ Date: _____
Gregory Murrill, Division Administrator

MARYLAND STATE HISTORIC PRESERVATION OFFICER

By: _____ Date: _____
Elizabeth Hughes, State Historic Preservation Officer

MARYLAND DEPARTMENT OF TRANSPORTATION'S STATE HIGHWAY ADMINISTRATION

By: _____ Date: _____
Gregory C. Johnson, P.E. , Administrator

ACHP Coordination

Larry Hogan, *Governor*
Boyd K. Rutherford, *Lt. Governor*

State Highway Administration
Maryland Department of Transportation

Pete K. Rahn, *Secretary*
Gregory C. Johnson, P.E., *Administrator*

January 23, 2017

Mr. Gregory Murrill
Division Administrator
Federal Highway Administration
City Crescent Building – Suite 2450
10 South Howard Street
Baltimore MD 21211

Attn.: Joy Liang

Dear Mr. Murrill:

The Maryland Department of Transportation's State Highway Administration (SHA) respectfully requests, in accordance with 36 CFR § 800.6(a)(1), that you notify the Advisory Council on Historic Preservation (ACHP) of the determination that the proposed SHA Project No. FR102A21, MD 478, Replacement of SHA Structure No. 1008900 has an adverse effect on historic properties, including Structure 1008900 (F-2-092) and the Brunswick Historic District (F-2-009). The Maryland State Historic Preservation Officer (MD SHPO) was notified concerning the effects of this project on August 19, 2016 and agreed with the adverse effect finding on January 17, 2017. We are providing the ACHP's *e-106* Form conforming to the documentation requirements cited at 36 CFR § 800.11(e) which has been provided for your use in notifying the ACHP (Attachment 1). SHA recommends that FHWA does not need to invite the ACHP to participate in consultation. The proposed Memorandum of Agreement (MOA) between SHA, the MD SHPO and FHWA is included for your review and comment (Attachment 2). MD SHPO comments on the MOA are forthcoming.

Thank you for your assistance in expediting this project's Section 106 consultation process. If you have any further questions or comments, please do not hesitate to contact Dr. Julie Schablitsky, Assistant Division Chief, Environmental Planning Division, at 410-545-8870, or via email at jschablitsky@sha.state.md.us. SHA will be pleased to assist you.

Sincerely,

Gregory C. Johnson, P.E.
Administrator

Digitally signed by don sparklin
DN: cn=don sparklin, o=sha, ou=oppe, email=dsparklin@sha.state.md.us, c=US
Date: 2017.01.20 15:54:03 -05'00'

by: C. Scott Pomento, P.E., Director
Office of Planning and Preliminary Engineering

Enclosures: 1) e106 Form and Supporting Documents
2) Draft MOA

cc: Mr. Steve Archer, SHA-EPLD
Ms. Sarah Groesbeck, SHA-EPLD
Ms. Elizabeth Hughes, MD State Historic Preservation Officer, MHT (w/Attachments)
Dr. Lisa Kraus, SHA-EPLD
Mr. Jamie Lake, SHA- EPLD
Mr. John Narer, SHA-OOS
Dr. Julie Schablitsky, SHA-EPLD

Preserving America's Heritage

February 9, 2017

Ms. Joy Liang
Federal Highway Administration
Maryland Division
City Cresent Building
10 South Howard Street, Suite 2450
Baltimore, MD 21201

Ref: *Replacement of SHA Bridge No. 1008900 carrying MD 478 over a Branch of the Potomac River Brunswick, Frederick County, Maryland*
MDOT/SHA Project No. FR102A21

Dear Ms. Liang:

The Advisory Council on Historic Preservation (ACHP) has received your notification and supporting documentation regarding the adverse effects of the referenced undertaking on a property or properties listed or eligible for listing in the National Register of Historic Places. Based upon the information provided, we have concluded that Appendix A, *Criteria for Council Involvement in Reviewing Individual Section 106 Cases*, of our regulations, "Protection of Historic Properties" (36 CFR Part 800), does not apply to this undertaking. Accordingly, we do not believe that our participation in the consultation to resolve adverse effects is needed. However, if we receive a request for participation from the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO), affected Indian tribe, a consulting party, or other party, we may reconsider this decision. Additionally, should circumstances change, and it is determined that our participation is needed to conclude the consultation process, please notify us.

Pursuant to 36 CFR §800.6(b)(1)(iv), you will need to file the final Memorandum of Agreement (MOA), developed in consultation with the Maryland State Historic Preservation Office (SHPO), and any other consulting parties, and related documentation with the ACHP at the conclusion of the consultation process. The filing of the MOA, and supporting documentation with the ACHP is required in order to complete the requirements of Section 106 of the National Historic Preservation Act.

Thank you for providing us with the notification of adverse effect. If you have any questions or require further assistance, please contact Sarah Stokely at 202-517-0224 or via e-mail at sstokely@achp.gov.

Sincerely,

LaShavio Johnson

LaShavio Johnson
Historic Preservation Technician
Office of Federal Agency Programs