

SUSQUEHANNA RIVER PEDESTRIAN BRIDGE CROSSING

FEASIBILITY STUDY

Sponsored By



**Maryland Department
of Transportation**

&



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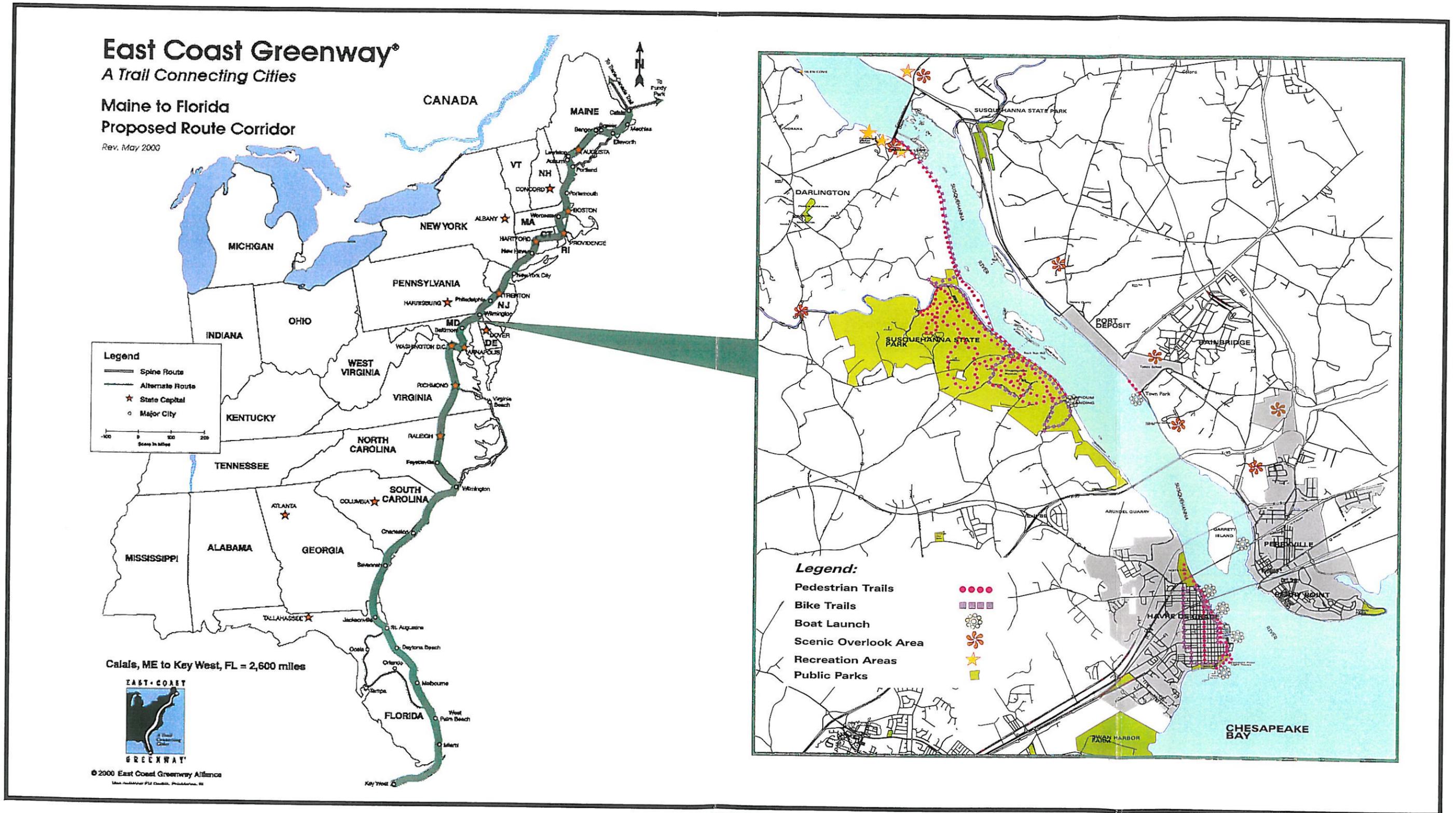
I. Project Background

The Lower Susquehanna River offers numerous natural, recreational, cultural and economic resources. Communities have sprung up and thrived as a result of these opportunities. The municipalities of Perryville and Port Deposit lie on the east bank of the river and Havre de Grace is situated along the west bank at the confluence of the river with the Upper Chesapeake Bay. While the river serves as a boundary between the Maryland counties of Cecil to the east and Harford to the west, both have benefited from its shared use.

There are two bridges that carry motor vehicles and two bridges that are utilized by railroad traffic spanning the river. An additional motor vehicle crossing over the river exists along US 1 over the Conowingo Dam. While these crossings provide opportunities for motorized modes of transportation, they do not allow for pedestrian and bicyclist access. Existing or proposed recreational trails meander through the region on both sides of the river, but are unable to be joined because of the natural barrier created by the river. Similarly, visitors to the region are unable to cross the river except by boat or motorized vehicles. This situation discourages regional travel that would otherwise be more recreationally and environmentally friendly.

The 190-mile long Mason-Dixon Trail passes through this region which, due to the present pedestrian inaccessibility across the river, contains the only break in the trail. Currently, any hiker utilizing the trail and wishing to cross the river must contact the Maryland Transportation Authority (MdTA) Police, Hatem Bridge Detachment, to be transported across. In addition, this trail is a component of a larger trail system, the East Coast Greenway. The vision of the Greenway is to provide a unified, connected network of trails reaching from Maine to Florida. The linking of the trail system within the Lower Susquehanna River region would provide a critical link in accomplishing this goal. Figure 1 illustrates the East Coast Greenway.

Figure 1: East Coast Greenway



In 1998, Congress passed the Chesapeake Bay Initiative Act due to public interest in enhancing education and interpretation of the Bay, increasing public access, and conserving natural and cultural resource sites. To achieve the purpose of the Act, the National Park Service (NPS) was directed to provide technical and financial assistance in cooperation with other agencies, state and local governments and the private sector in order to: identify, restore and interpret the Bay region's cultural, historical, natural and recreational resources; identify Gateways for enhancing public education of and access to the Chesapeake Bay; develop water trails within the Bay watershed; and link Gateways with trails, tour roads, scenic byways, and water trails, creating an overall network. The Susquehanna River is a waterway that could be used to link many of these facilities, and as such, providing a river crossing would greatly enhance its ability to be successfully integrated into the overall Gateway Network.

A number of potential options have been identified as a means of overcoming this obstruction. These include varying degrees of new construction and possible utilization of existing facilities. In addition, non-bridge crossing options were also considered. For future reference, these alternatives have been identified in the following manner:

Alternative A - New Bridge between Havre de Grace and Perryville

Alternative B - Attach Facility to Existing Bridge

Alternative C - New Bridge between Port Deposit and the Susquehanna State Park

Alternative D - Non-Bridge Alternatives

- Water Taxi or Ferry
- Van or Bus Service
- Gondola or Suspended Cable Car

Each of these options contains several sub-options and is discussed in further detail within the text. It should be noted that each option was also examined with respect to the Lower Susquehanna Heritage Greenway Management Plan and maintains compatibility and compliance with the plan. This study reviewed the feasibility of the various options as well as the implications of costs, regulations and environmental considerations.

II. General Requirements and Restrictions

In conducting the analysis, general requirements and restrictions were first identified as a means of providing comparisons between the alternatives. These included physical requirements based on needs, agency regulations and effects of natural environment. These considerations affected the height of the structure, the width of the decking and the type of structure necessary to address the overall requirements.

The Susquehanna River supports commercial boating activity from the upper extents of the Chesapeake Bay to the Port Deposit vicinity. Water depth and tidal events have a direct effect on shipping throughout this segment, and as such, the United States Coast Guard reviews any proposed structures intended to span the river. Any new bridge would require an elevation providing the same vertical separation between the water surface elevation of high tide and the underdecking of the highest existing bridge crossing. In this case, the Millard E. Tydings Memorial Bridge (I-95 crossing), located approximately 3 miles north of the mouth of the river, would be the critical structure. The required vertical separation is approximately 90 feet.

North of Port Deposit, where tidal influences are not easily observed and where the water depths are insufficient for commercial shipping, alternate considerations are applied in determining the required bridge height. Under these conditions, depths of flow occurring for 100-year storm events are of paramount concern. The study of the effects of Hurricane Agnes in 1972 resulted in a recommended minimum height clearance of 20 feet. Available information suggests this height should accommodate known recreational boating needs.

The relationship of height requirements and bridge landings on the banks of the river prompts the review of accessibility to any proposed structure. The Federal Americans with Disabilities Act (ADA) generally requires that any facility made accessible to the public be made accessible to those with physical disabilities. In the case of this study,

these requirements must be addressed as they relate to providing alternate means to stairs for overcoming grade changes, maximum grades of approaches, running slopes and minimum travel way widths.

For emergency access reasons, the width of the bridge decking was set at a width of 20 feet. This width would permit both emergency and maintenance vehicles to pass pedestrians utilizing the bridge.

Various other requirements applicable to the feasibility analysis involve environmental impacts and associated regulations. Natural, socio-economic and cultural resources are reviewed to balance need and impact. Natural environmental considerations include topography, soils, floodplains, streams, wetlands, forests and area wildlife. Socio-economic resources involve land use, park properties and population concerns. Finally, historical and archaeological assets are studied for potential cultural resources impacts. If possible effects are identified; a Section 4(f) action may be triggered under the Federal Department of Transportation Act.

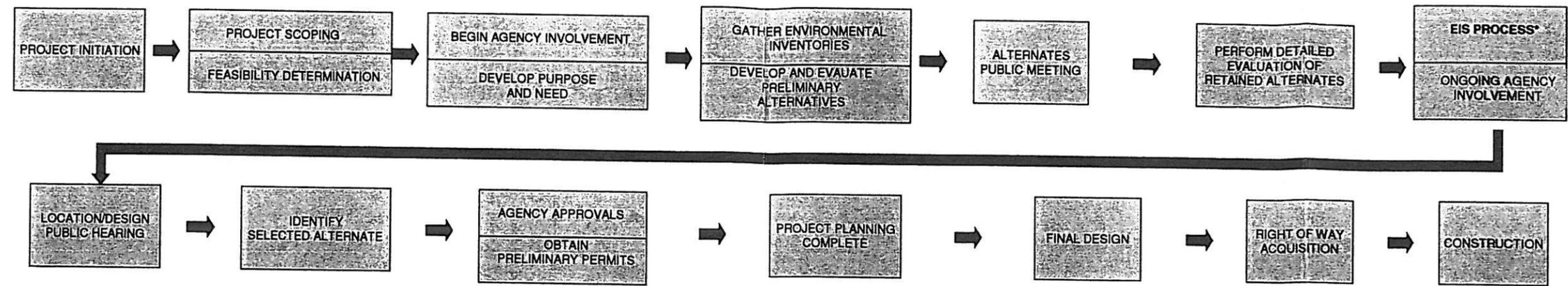
The National Environmental Policy Act of 1969 (NEPA), one of the nations broadest environmental laws, affects all federal agencies and their activities. NEPA was written in response to national pressure for federal agencies to provide greater protection for the environment. The purpose of the law is to establish a national environmental policy; promote efforts to prevent or eliminate damage to the environment and enrich the understanding of ecological systems and natural resources important to the nation; provide for an interdisciplinary approach to agency decision-making and project development; and establish the Council of Environmental Quality (CEQ) to oversee federal agency implementation of NEPA.

To carry out this policy and avoid or minimize environmental damage, Congress mandated that federal agencies analyze all significant environmental impacts of a proposed action to the human environment. When significant impacts exist, they are presented in an environmental impact statement. In addition to preparing an analysis of

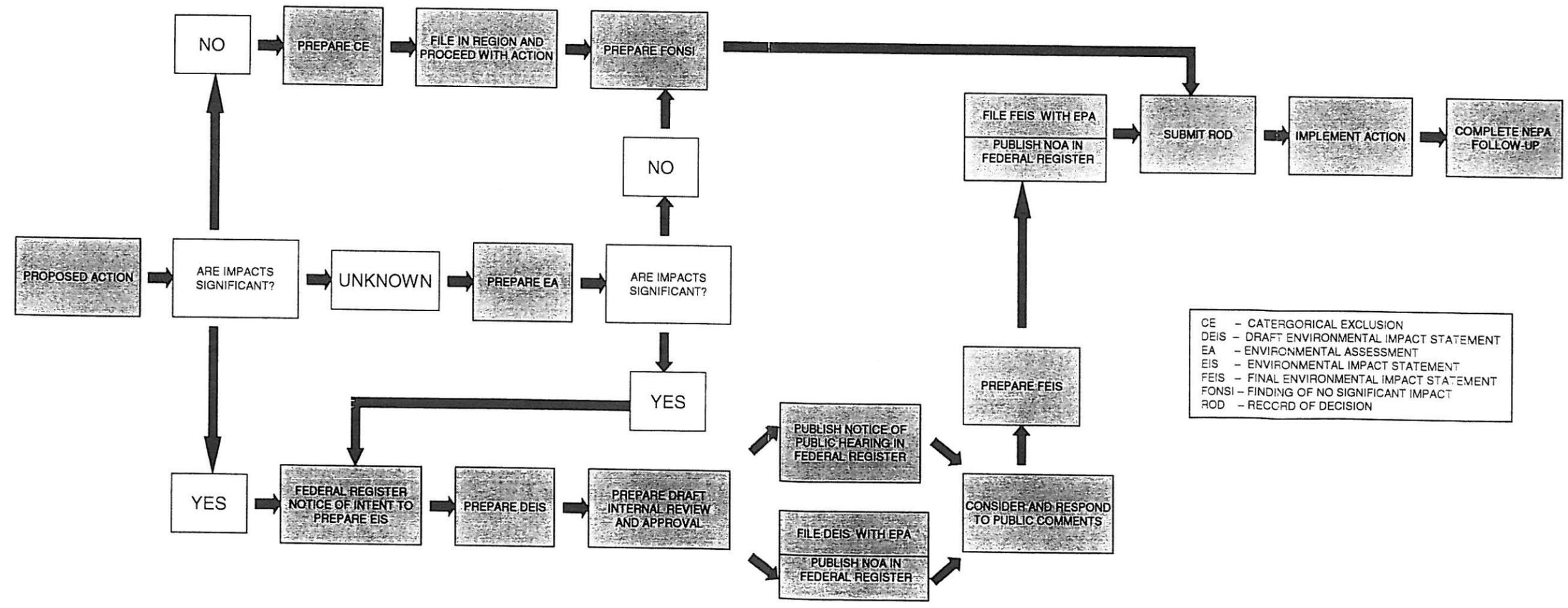
the environmental impacts of a proposed action, the federal agency (or state or local agency through a federal agency) proposing the action must study and develop appropriate project alternatives. All of the above activities must be conducted using adequate coordination with other federal, state, or local agencies and public input from citizens. Diagram 1 presents a general overview of the NEPA process.

In Maryland, the Federal Highway Administration (FHWA) has delegated the responsibility for preparing environmental documents, as they relate specifically to federally funded transportation projects, to the Maryland Department of Transportation. The Department oversees CEQ regulations relating to the preparation of environmental documents; participation of lead and cooperating agencies; scoping; administrative details such as timing and recommended formats; agency comments on environmental documents; agency decision-making; and public involvement.

Diagram 1: NEPA PROCESS OVERVIEW



*EIS PROCESS OVERVIEW



III. Environmental Inventory

The study area was defined as the portion of the Susquehanna River and its adjoining banks south of the Conowingo Dam to the mouth of the river at the upper end of the Chesapeake Bay. This area was targeted because of the anticipated higher level of interest and desire to cross the river based on existing and projected trail systems and the presence of larger population centers and parks.

Existing data for the study area were obtained from a range of sources, including the National Wetlands Inventory, FEMA 100-year floodplains mapping, the Cecil County soil survey, the Harford County soil survey, USGS Topographic quad maps, the Cecil County Comprehensive Plan, the Harford County Master Plan, and the Lower Susquehanna Heritage Greenway Resource Report. These data were reviewed as a secondary resource for the environmental, social, and cultural characteristics in the project area. Areas that required further investigation were identified and a preliminary field reconnaissance was then conducted to verify the secondary data. The field reconnaissance focused on park resources, socioeconomic resources, wetlands, historic resources, streams, and forests.

A. Natural Resources

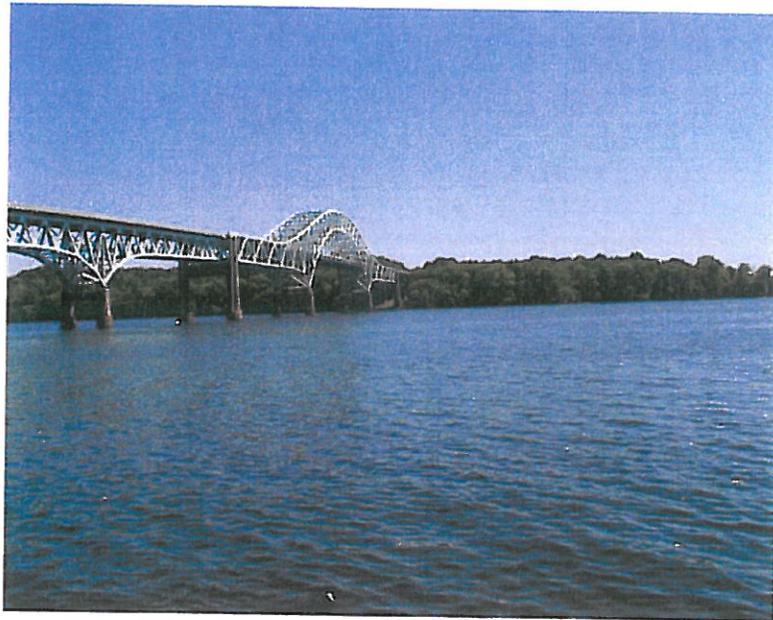
1. Topography

The study area consists of diverse topography that varies between rolling hills and steep slopes with rocky surfaces. Along the Harford County side of the river, slopes are steepest around the Lapidum area and become more moderate southeast toward Havre de Grace. Granite-faced cliffs mark the Cecil County side of the study area, with some slopes rising to more than 200 feet above the river. East from the cliff face, the land gently slopes toward Principio Creek.

2. Streams and Waterways

There are a number of streams and waterways present in the study area. The largest and most important of these is the Susquehanna River, which flows northwest to southeast through the study area and is navigable as far north as Port Deposit. The Susquehanna River flows from New York State, through Pennsylvania and enters Maryland before entering the Chesapeake Bay, encompassing a drainage area of 13 million acres. In Maryland it forms the boundary between Harford and Cecil Counties. The 444-mile long river system empties into the upper Chesapeake Bay near Havre de Grace, providing the bay with its largest source of fresh water. The Susquehanna River varies in width throughout the study area, but averages about one mile wide.

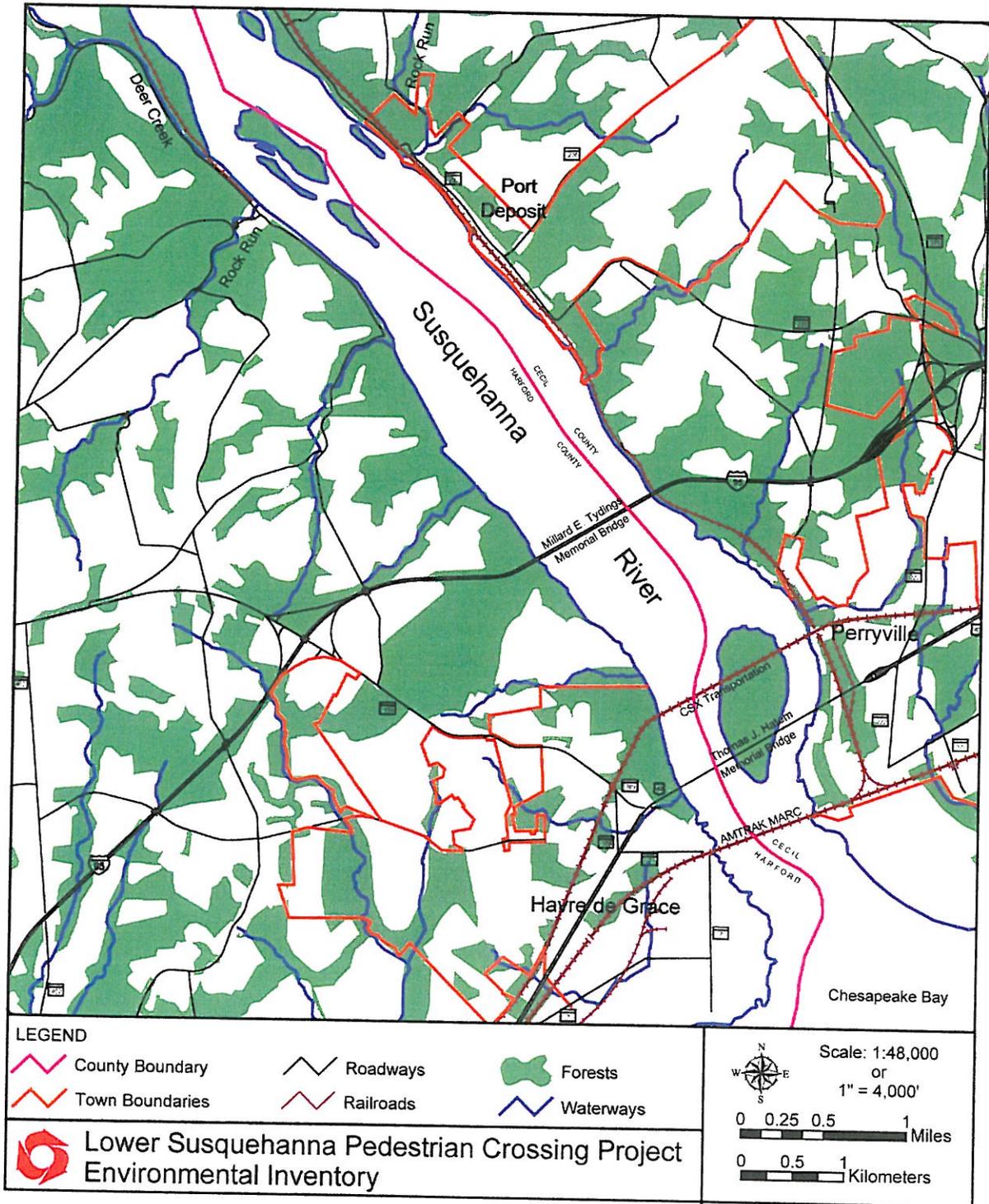
Several islands are scattered within the Susquehanna, including Garrett Island, Robert Island, Spencer Island, Sterret Island, and Wood Island. The largest of these is Garrett Island, which is located between Havre de Grace and Perryville and is crossed by both the Hatem Memorial Bridge and a CSX railroad bridge. The remaining islands are located in the Port Deposit vicinity. All are privately owned by the Exelon Corporation, with the exception of Wood Island, which is part of Susquehanna State Park.



The Hatem Memorial Bridge at Garrett Island

There are also numerous smaller streams in the project area that drain to the Susquehanna River and generally flow west to east or east to west. Named streams include Deer Creek and Rock Run in Harford County, and Happy Valley Creek, Octoraro Creek and Rock Run in Cecil County. Various other small, unnamed tributaries feed the Susquehanna River within the study area and flow in the same general directions (Figure 2).

Figure 2: Streams and Forests



3. *Submerged Aquatic Vegetation*

The 1999 data for Harford County and 1996 data for Cecil County reveals various patches of Submerged Aquatic Vegetation (SAV) within the Susquehanna River study area (Figure 3). The SAV is most prevalent at the northern end of the study area near the limit of tidal influence, but is also found in large patches along the shoreline of the Susquehanna River. On the Cecil County side, SAV is predominantly restricted to the shoreline around Garrett Island and Perryville. On the Harford County side, an SAV patch is located north of the Tydings Bridge.

4. *Wetlands*

Wetlands of the project area provide important habitat for both flora and fauna, including rare species (See section entitled "Wildlife"). Based on National Wetlands Inventory (NWI) mapping and field reconnaissance, there are both tidal and non-tidal wetlands in the study area (Figure 4). Generally, the tidal wetlands are associated with the Susquehanna River and its shoreline between Deer Creek and the Chesapeake Bay. Non-tidal wetlands are associated with smaller tributaries to the Susquehanna River. In the more urban areas, particularly near Havre de Grace and Perryville, wetlands are rare except along the river itself. The low topography on the Cecil County side below the Conowingo Dam contains the most widespread wetland systems of the study area. Palustrine forested wetlands are the predominant wetland type, particularly in the many stream valleys of the region. Scattered throughout the region are also scrub-shrub and emergent wetlands that are generally smaller in area than the palustrine forested wetlands.

Wetlands of Special State Concern (WSSC) are found within the study area on both the Harford and Cecil County sides of the Susquehanna River (Figure 4). The largest area of WSSC is located on the Harford County side between Rock Run Road and Lapidum Road. This wetland system follows the river shoreline westward from Stafford Road and is associated with Deer Creek and Rock Run. Across the Susquehanna River, north of Port Deposit, WSSC are found along the river shore near Canal Road. Further south near Frenchtown, a WSSC follows the east shoreline from south of the Tydings Bridge to

north of the CSX railroad bridge. There are also WSSC located on the west shore of the Susquehanna River near the Tydings Bridge (I-95 crossing).

5. *Forest*

The study area is extensively covered by forest. Observations revealed that mature deciduous forest is the most widespread forest type in the study area. Present in the deciduous forest are various species of dominant trees, including oaks, black walnuts, hickories and tuliptrees. As shown in Figure 2, large patches of contiguous forest are located on both sides of the Susquehanna River, particularly between Port Deposit and Perryville and in the vicinity of Susquehanna State Park.

6. *Wildlife*

The large areas of forest habitat provide for a high diversity of plants and animals within the study area. Bald eagle nests are located along the western shore of the Susquehanna River. Warblers and great blue herons nest near the river in Susquehanna State Park. The northern parula, American redstart, cerulean warbler, hooded warbler, veery and prothonotary warbler can all be found along the forest slopes and shorelines of the Susquehanna with regularity. Yellow throated warblers are an uncommon resident, but have been noted for study and conservation within the region. The National Audubon Society has designated the Susquehanna State Park and the Conowingo Dam as Important Bird Areas.

Figure 3: Submerged Aquatic Vegetation

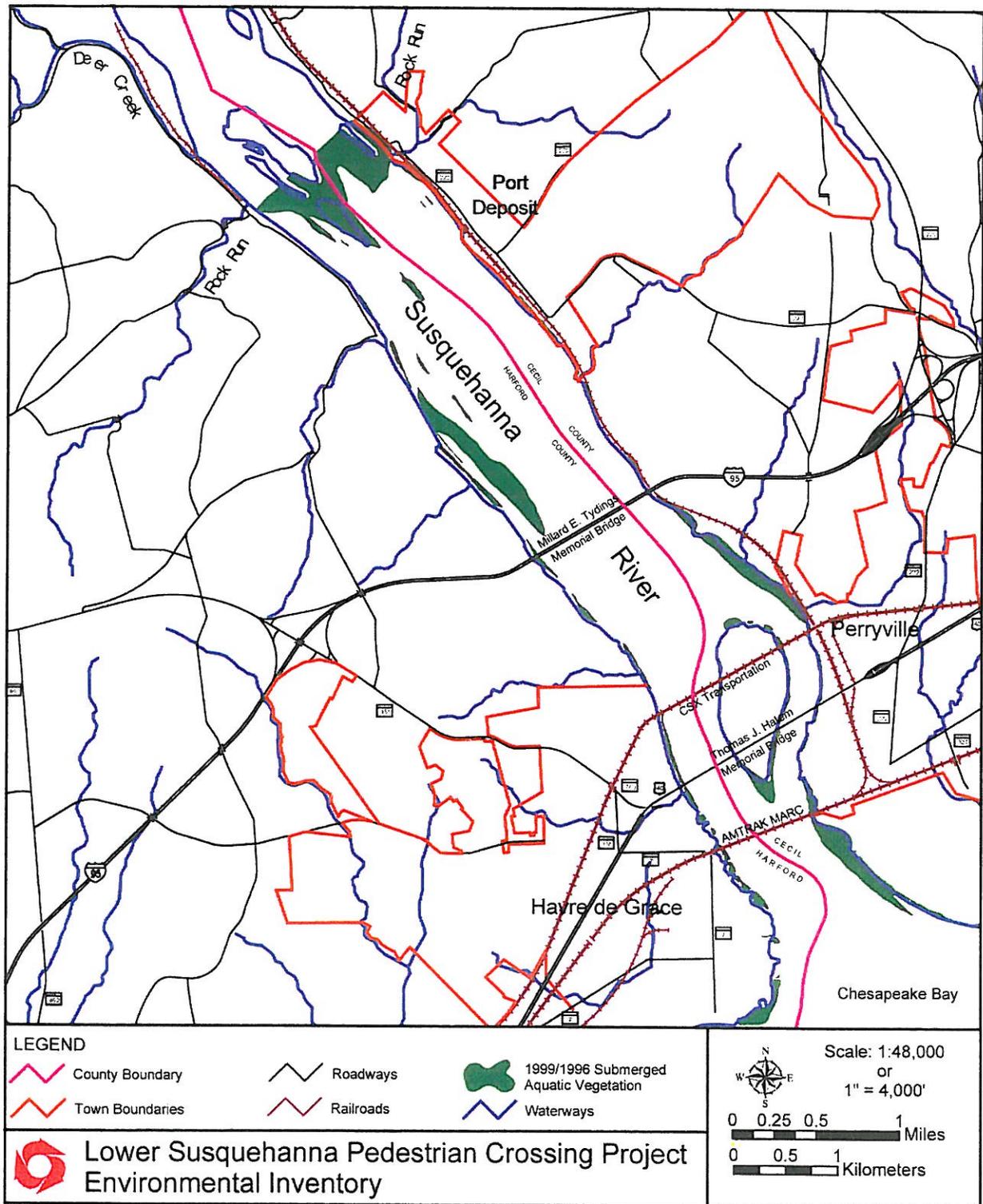
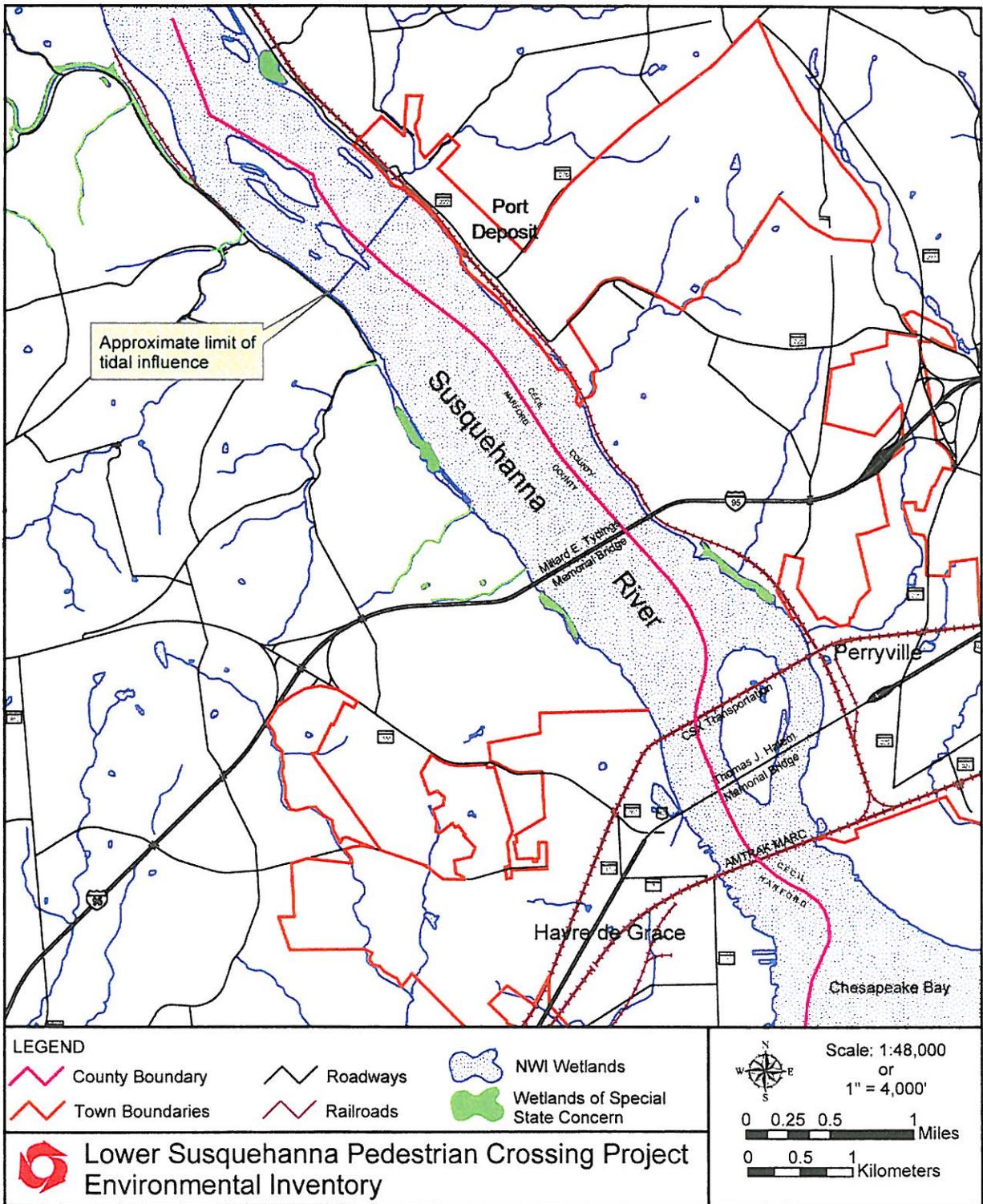
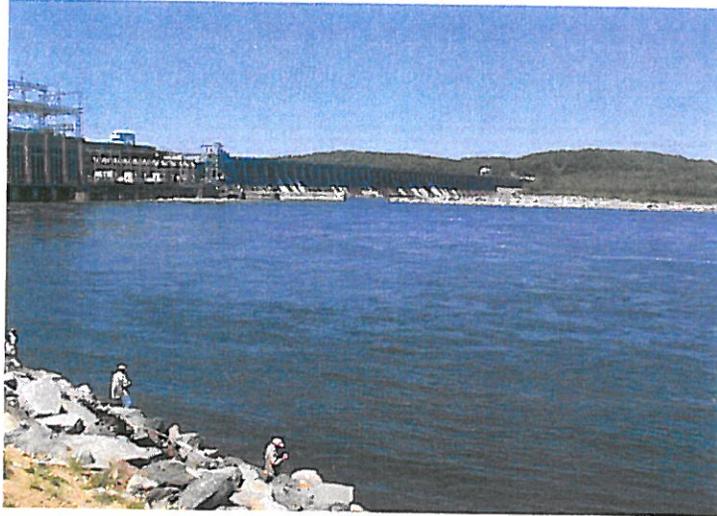


Figure 4. Wetlands





The Conowingo Dam

Notable plants consist of Threatened and Rare ferns and daisies found in the Harford County portion of the study area. A rare white form of red trillium can be found growing in large numbers on the steep northeast facing slopes of the Susquehanna River, especially in the Susquehanna State Park near the historic Susquehanna and Tidewater Canal. Other plants found in this area include Dutchman's Britches and wild ginger, which bloom on the extensive northeast-facing slopes near Stafford Road in Harford County.

7. Floodplains

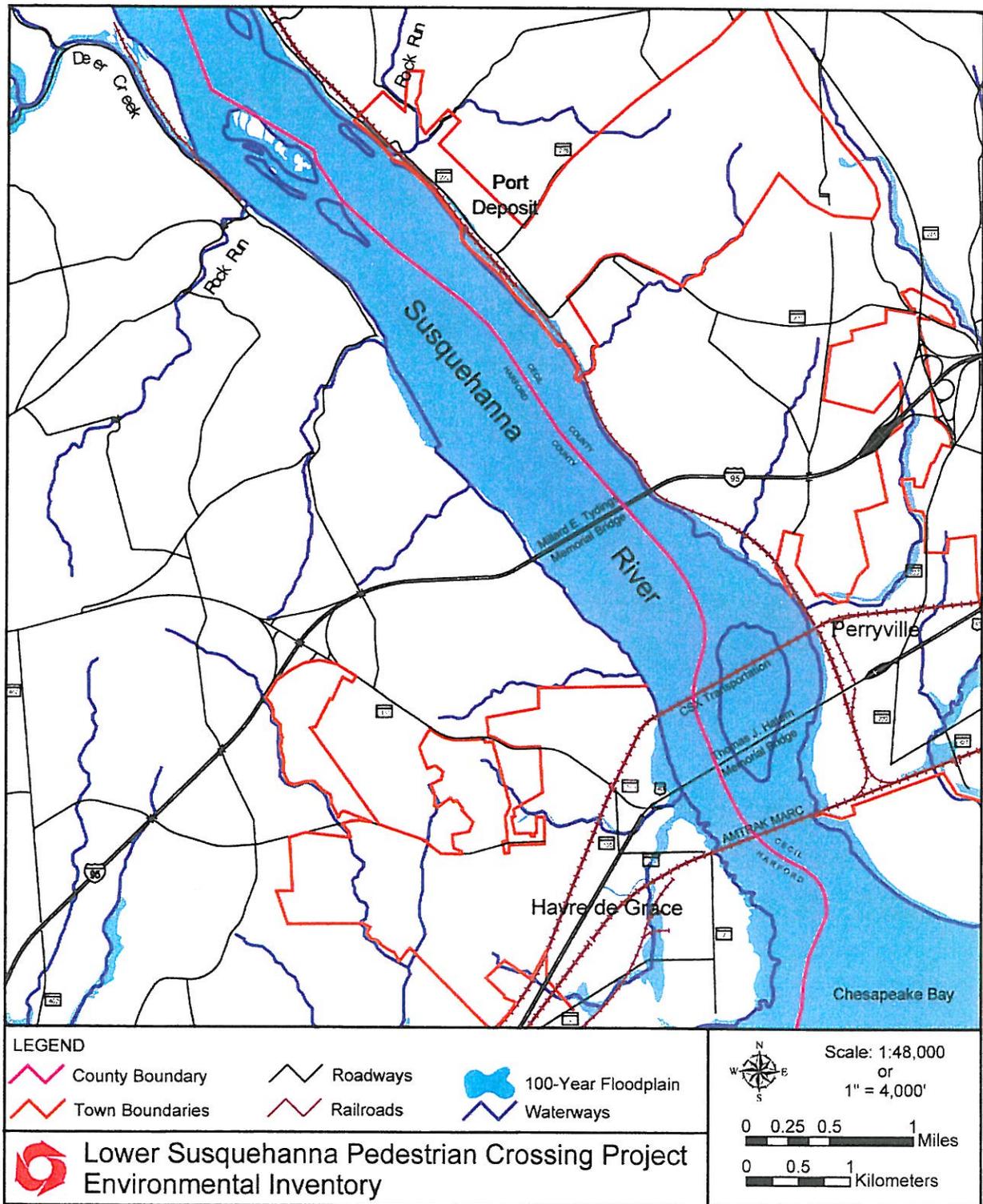
The basin of the Susquehanna River has a large drainage area of approximately 27,500 square miles and nearly 40,000 miles of streams. Floodplains are essential in this region because they provide beneficial functions such as capacity to store and absorb floodwaters and provide wildlife habitat. Within the study area, 100-year floodplains are associated with the Susquehanna River and its tributaries (Figure 5).

The 100-year floodplains of the Susquehanna River are narrowest south of Garrett Island between Havre de Grace and Perryville. The width of the floodplain at this point is approximately 0.8 miles. The width of floodplain between Susquehanna State Park and Port Deposit across Spencer Island is also narrow, and is roughly the same width. The

broadest 100-year floodplain in the study area is located at the northern end of Garrett Island where Happy Valley Creek meets the river. The width of the floodplain in this area is approximately 1.1 miles.

There are only a few tributaries to the Susquehanna River within the project area that have associated 100-year floodplains. On the Cecil County side, 100-year floodplains are associated with an unnamed tributary near Frenchtown. In Harford County, Deer Creek is included in a 100-year floodplain, as is an unnamed tributary located north of Havre de Grace.

Figure 5: 100-Year Floodplains



8. *Soil*

There are three main soil associations located on the Harford County side of the Susquehanna River. The first association is the Glenelg-Manor association, which extends from the Conowingo Dam to Lapidum. This soil is composed of deep soil that is found on a gentle to a fairly steep slope. The soil type found here is considered excessively well drained. The next major soil association, extending south from Lapidum and continuing to US 40, is the Legore-Neshaminy-Aldino association. Both acidic and basic rocks are found beneath this soil association. The third major soil association found in the study area is the Matapeake-Mattapex association, which extends from US 40 through Havre de Grace to the Chesapeake Bay. This soil association is nearly level with some mild slope. This soil is found to be deep and well drained and is underlain by sandy sediment.

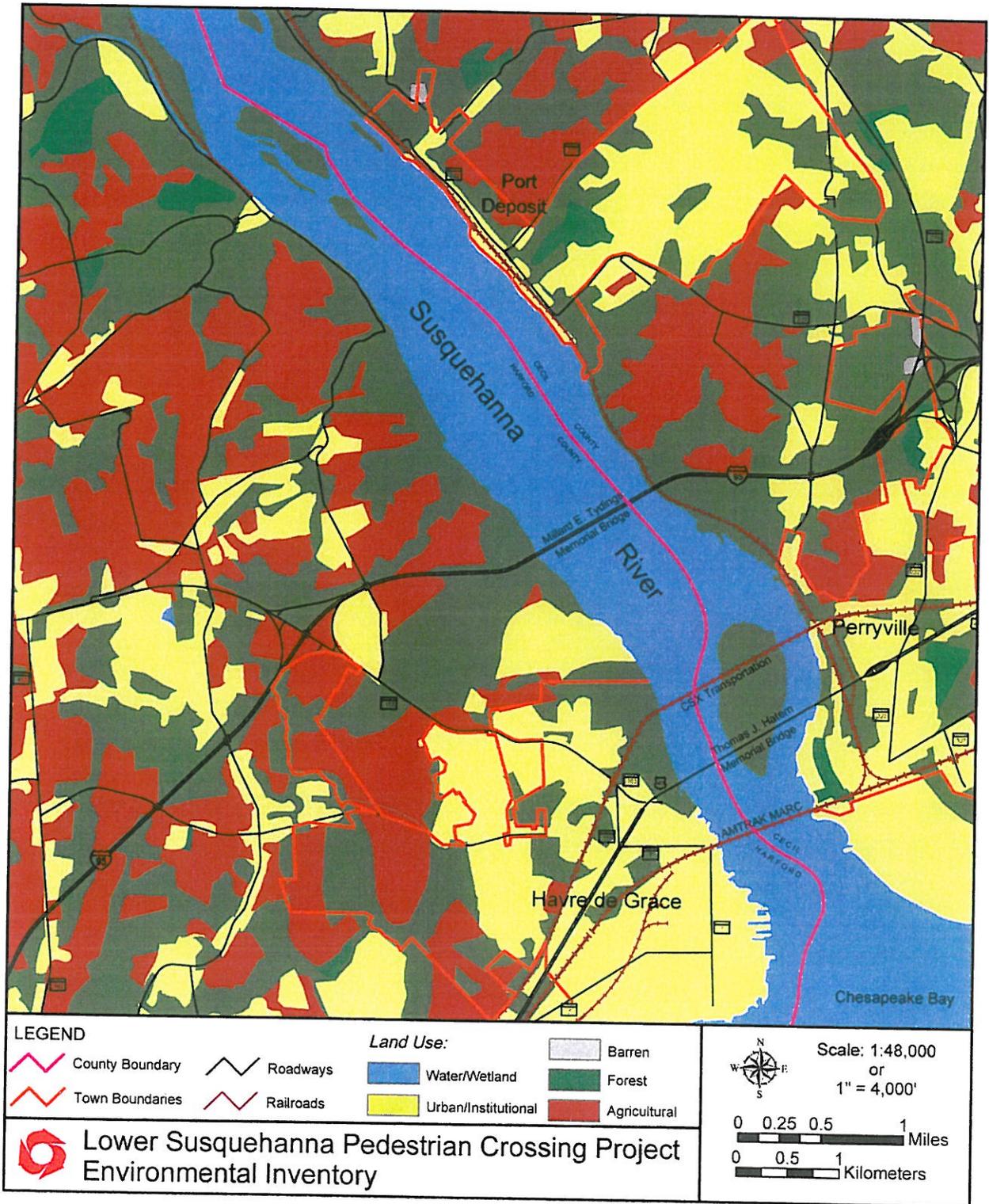
On the Cecil County side, there are also three different soil associations located within the study area. The first is the Glenelg-Manor-Glenville association, which is composed of deep, somewhat excessively drained to moderately well drained, gently sloping to steep, loamy soils derived from micaceous rock material. This soil association covers nearly all of the study area north of I-95. South of I-95 there are small patches of the Neshaminy-Montalto-Legore association. This soil association can be characterized as deep, well drained, gently sloping to steep, loamy, clayey, and stony soils derived from basic rock. Small patches of the Matapeake-Butlertown association are also found within the project area. This soil association consists of deep, nearly level to gently sloping, well drained and moderately well drained loamy soils on the coastal plain.

B. Socio-Economic Resources

1. Land Use

Most of the land use in the project area consists of forests that have few urban or anthropogenic uses. However, residential, commercial and other urban land uses are common in scattered locations within the study area and within the Towns of Perryville, Port Deposit and Havre de Grace. Land use within the project area is shown on Figure 6.

Figure 6: Land Use



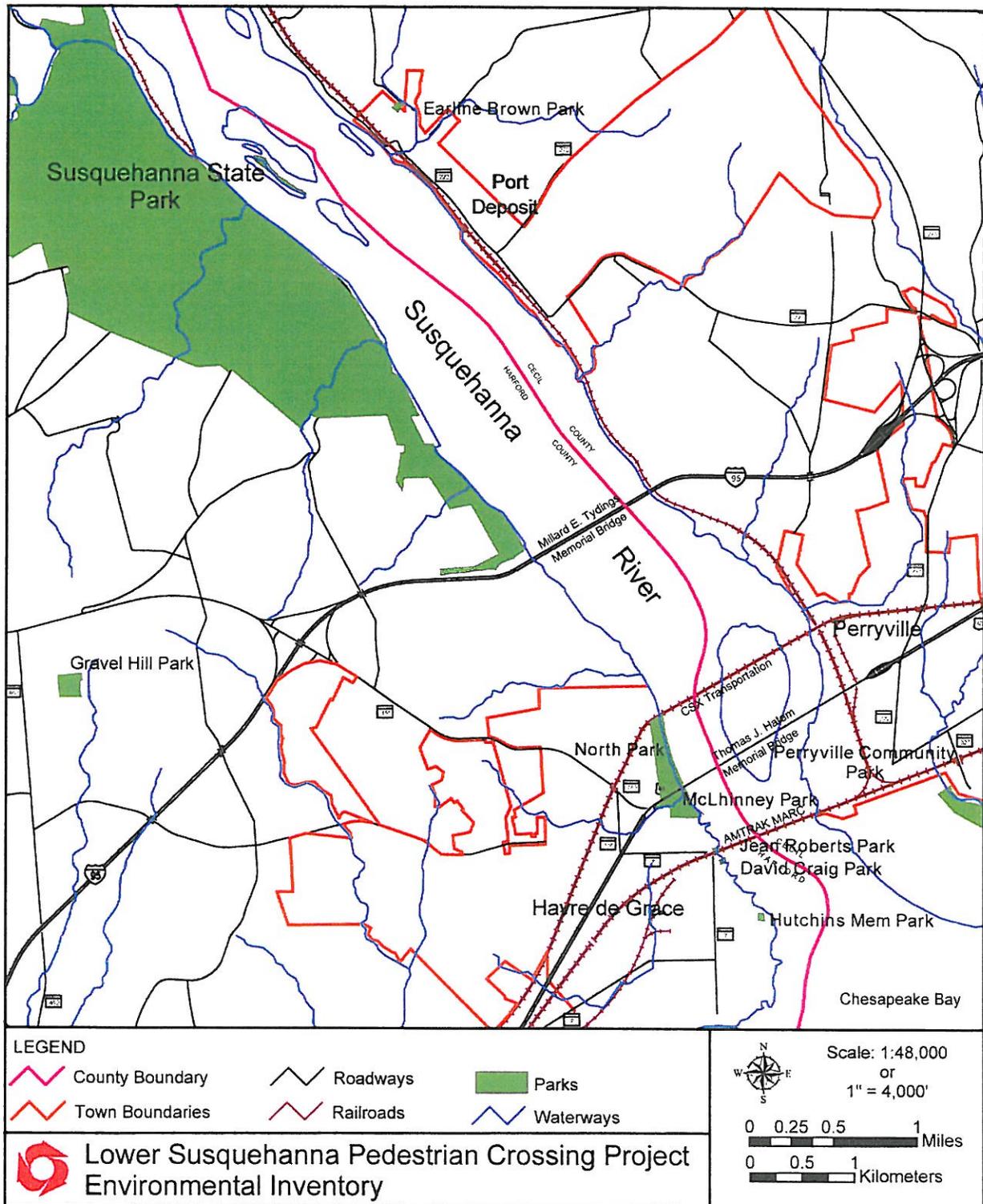


Port Deposit Commercial Area

2. Park Properties

Susquehanna State Park is found within the proposed study area. In total, the park property covers 2,591 acres, with 2,525 of those acres located in Harford County. The remaining Susquehanna State Park property is found within Cecil County on MD 222, approximately two miles north of Port Deposit. The park provides various recreational resources for hikers, bikers and horseback riders. The National Audubon Society has designated it as an Important Bird Area. Also located within the lower Susquehanna region is Earline Brown Park and Perryville Community Park in Cecil County and North Park, McLhinney Park, Jean Roberts Memorial Park, Hutchins Memorial Park, Tydings Park and David Craig Park in Havre de Grace. Parks within the project area are shown on Figure 7.

Figure 7: Parks





Amtrak Bridge, as seen from Jean Roberts Memorial Park

3. Population

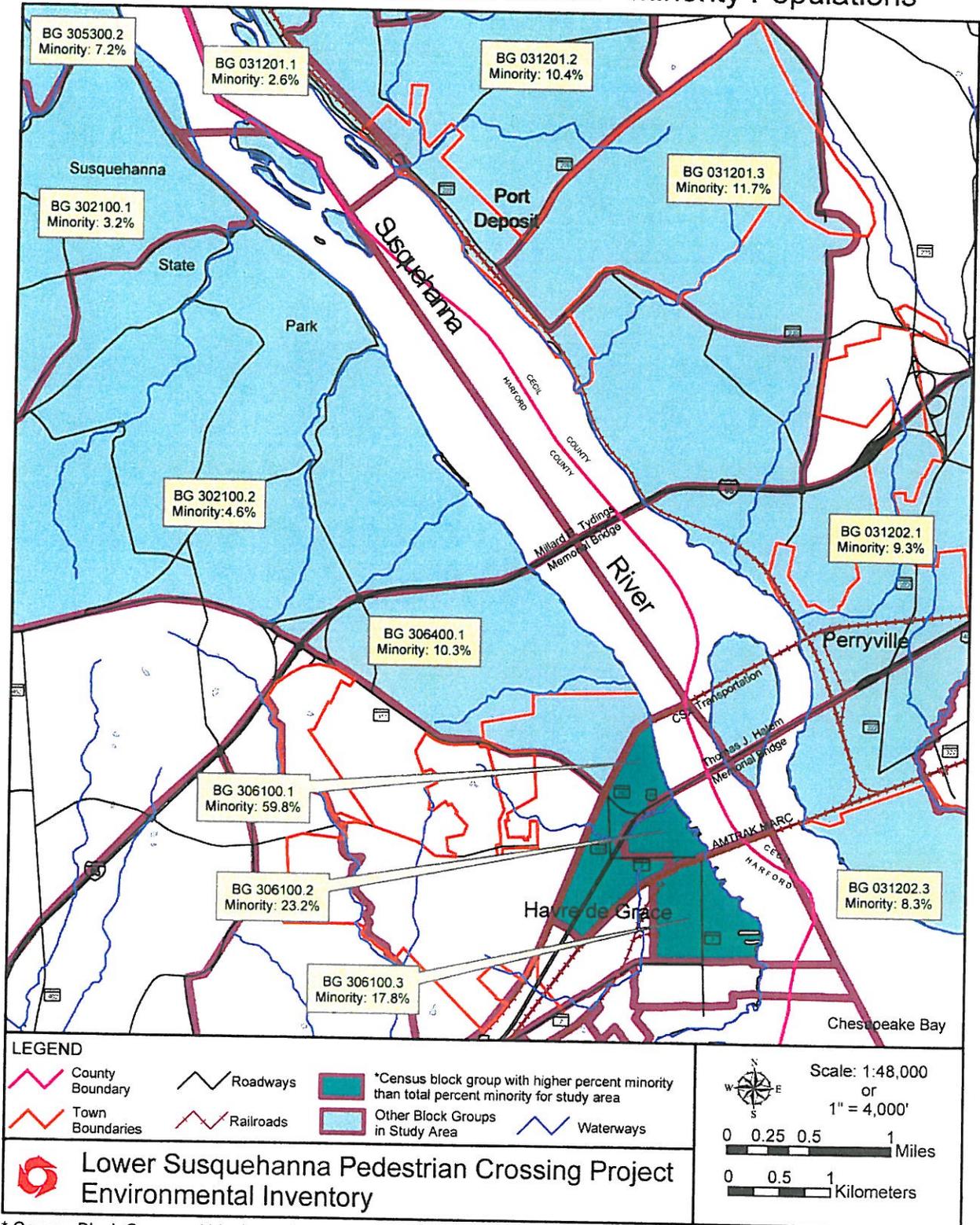
A preliminary review of US Census data indicates that some of the Census block groups in the project area contain minority or low-income communities. There are a total of 12 block groups located within the project area: seven in Harford County and five in Cecil County (Table 1). The population data for these block groups were combined to determine the percent of minority and low-income populations within the overall project area. Each block group was then individually analyzed to determine if the percent population of each of these populations was greater than the overall study area percentage. The results of this analysis are also shown on Figures 8 and 9.

Table 1. 2000 Census data for the 12 Study Area Block Groups

| Block Group Number | Total Population (2000) | Minority Population (2000) | % Minority (2000) | Total Population (1999) | Low-Income Population (1999) | % Low-Income (1999) |
|--------------------|-------------------------|----------------------------|-------------------|-------------------------|------------------------------|---------------------|
| Harford County | | | | | | |
| 302100.1 | 1,206 | 38 | 3.2 | 1,216 | 23 | 1.9 |
| 302100.2 | 875 | 40 | 4.6 | 891 | 22 | 2.5 |
| 305300.2 | 1,245 | 90 | 7.2 | 1,268 | 119 | 9.4 |
| 306100.1 | 629 | 376 | 59.8 | 624 | 66 | 10.6 |
| 306100.2 | 815 | 189 | 23.2 | 797 | 53 | 6.6 |
| 306100.3 | 2,237 | 398 | 17.8 | 2,027 | 278 | 13.7 |
| 306400.1 | 513 | 53 | 10.3 | 522 | 22 | 4.2 |
| Cecil County | | | | | | |
| 031201.1 | 1,440 | 38 | 2.6 | 1,370 | 89 | 6.5 |
| 031201.2 | 1,211 | 169 | 10.4 | 1,331 | 155 | 11.6 |
| 031201.3 | 540 | 63 | 11.7 | 536 | 51 | 9.5 |
| 031202.1 | 1,627 | 152 | 9.3 | 1,657 | 61 | 3.7 |
| 031202.3 | 1,824 | 152 | 8.3 | 1,597 | 174 | 10.9 |
| TOTAL | 14,162 | 1,758 | 12.4 | 13,836 | 1,113 | 8.0 |

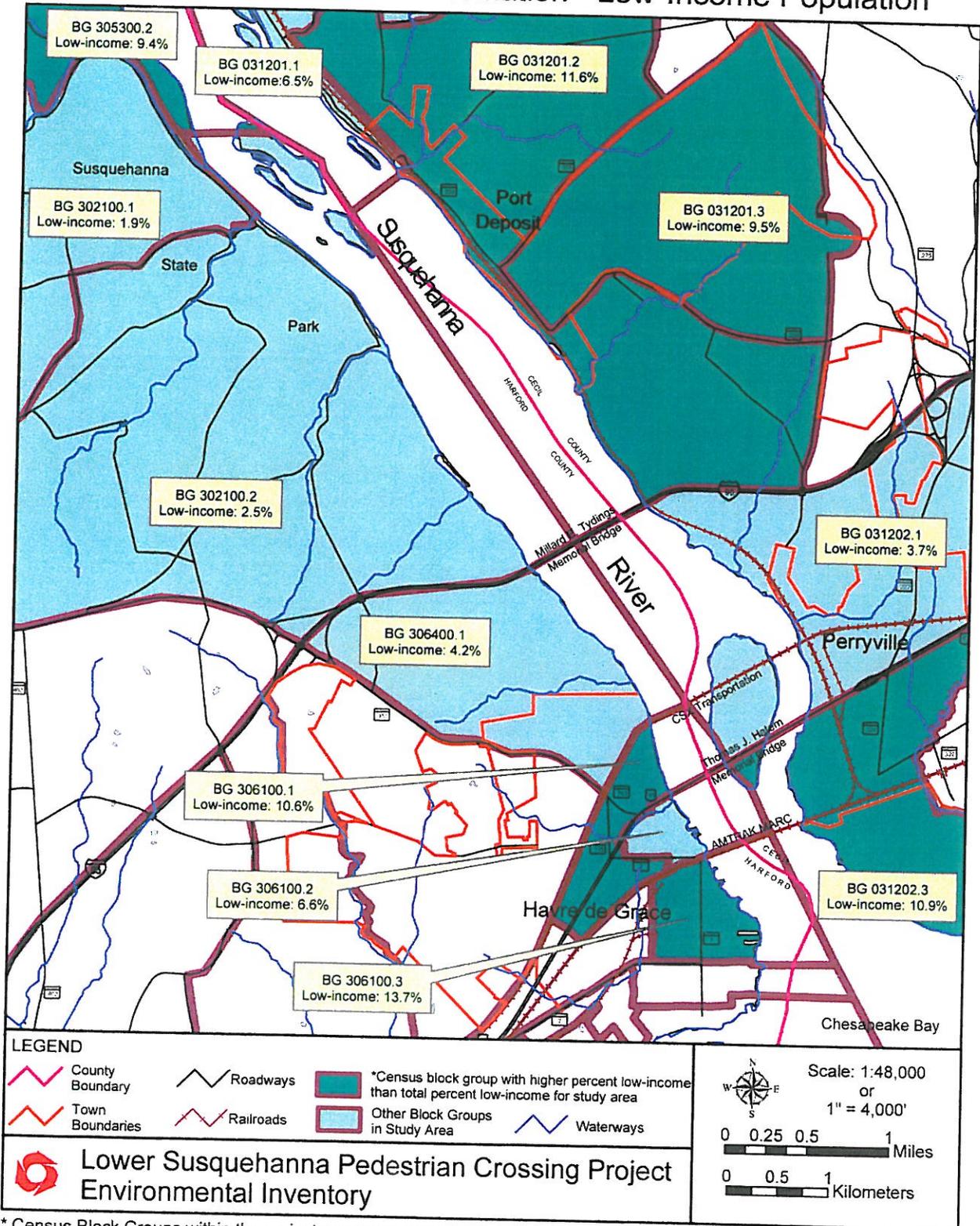
Grayed cells have minority or low-income percentages above the study area overall percentage.

Figure 8: 2000 Census Information - Minority Populations



* Census Block Groups within the project area were combined to determine the total percent minority population.
 Total study area population (2000): 14,162; Percent minority in project area = 12.5%

Figure 9: 2000 Census Information - Low-Income Population



* Census Block Groups within the project area were combined to determine the total percent low-income population.
Total study area population (1999): 13,836; Percent low-income in project area = 8.0%

C. Cultural Resources

1. Historical Resources

The study area contains diverse economic and cultural settings centered on the Susquehanna River (Figure 10). The river is the dominant physical feature and has provided a means of sustenance and commerce to the region for over two hundred years. The following historic resources within the project area are listed on or eligible for the National Register of Historic Places:

- Port Deposit Historic District, including the Paw Paw House
- Tome School Historic District, located in Port Deposit
- Lower Deer Creek Valley Rural Historic District, roughly bounded by the Susquehanna River, MD 543, Harmony Church and Trappe Roads.
- Susquehanna and Tidewater Canal District (Includes Toll House and South Lock #1)
- Existing Amtrak/MARC Railroad Bridge over Susquehanna River (Eligible)
- Havre de Grace Historic District
- Rodgers Tavern, located near the eastern terminus of the Amtrak Bridge in Perryville
- Perry Point Mansion House and Mill, located in the Veteran's Administration Hospital
- Havre de Grace Lighthouse

Other important Historic Features include:

- Lapidum Lock, Susquehanna and Tidewater Canal
- Carter-Archer House, located in Susquehanna State Park
- Rock Run Bridge Toll House, located in Susquehanna State Park
- Rock Run Mill, located in Susquehanna State Park
- Rock Run Mill, located in Port Deposit

- The early covered bridge from Port Deposit to Rock Run, which was the first crossing of the Susquehanna River in Maryland. (Currently only several bridge piers remain)
- Principio Furnace, located east of Perryville
- Bainbridge Naval Training Center in Port Deposit

2. *Archeological Resources*

An investigation of the Maryland Historical Trust records concerning the location and types of archeological resources within the Lower Susquehanna Valley region revealed a total of seven prehistoric sites within Harford County and twenty-five sites within Cecil County (Figure 10). The majority of the recorded sites are located outside the study area.



Rock Run Mill Area in Susquehanna State Park

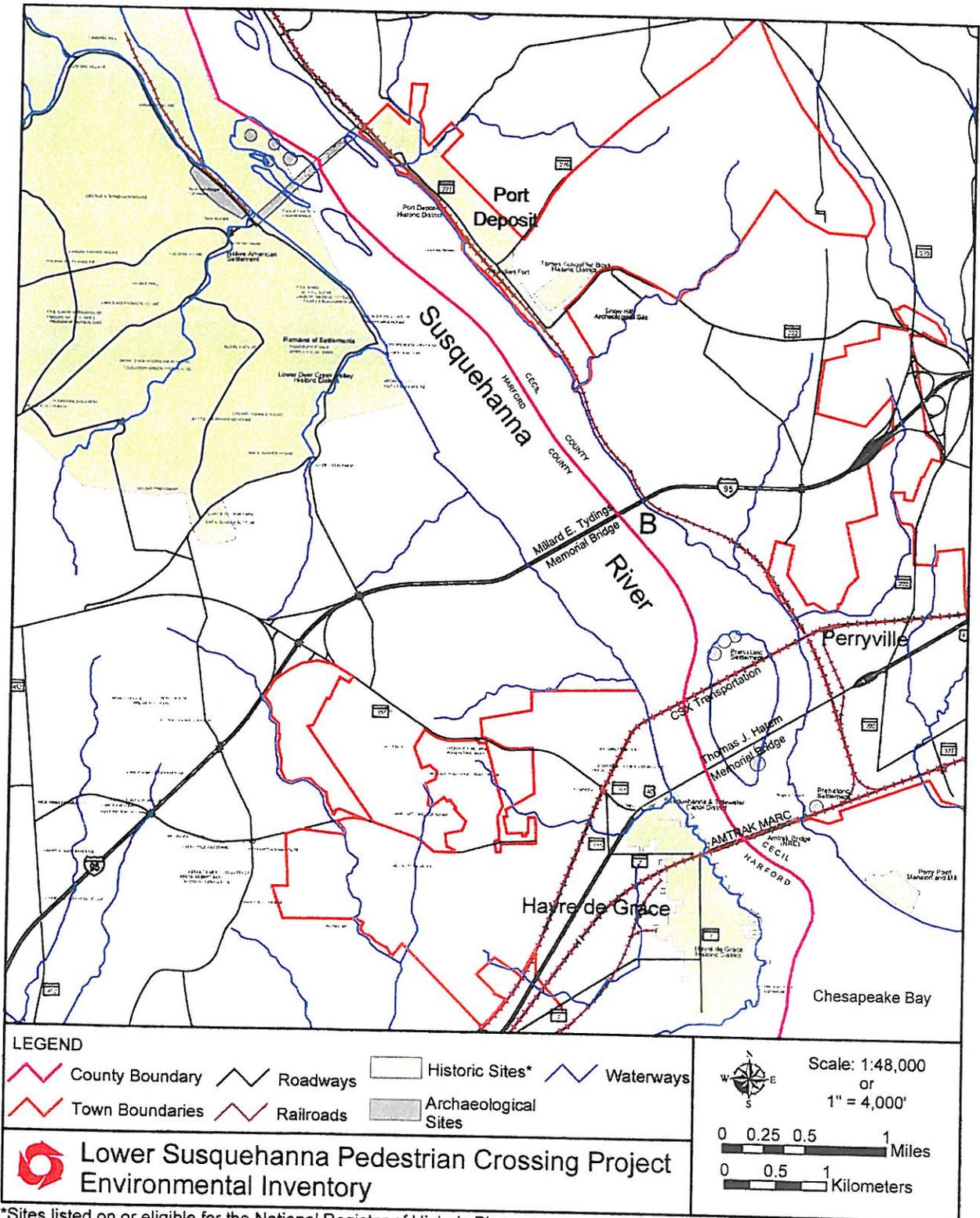
Perhaps the most important archeological site within the project area is located on Garrett Island. This island witnessed settlement by the prehistoric peoples from the Archaic Period to the Contact Period. Garrett Island was also the first area settled by Europeans venturing into the Upper Chesapeake Bay region and was apparently a location for trade between the Native Americans inhabiting the Susquehanna River Valley and Europeans.

Other archeological resources in the project area include:

- The Native American settlements and archaeological sites along Rock Run
- The Old Indian Fort and settlement remains north of Port Deposit
- Early Native American and Colonial settlements, such as Garrett Island (referred to in earlier history as Palmer's Island)
- Remains of settlements near Principio Creek and at Lapidum Village
- African-American related resources, such as the Snow Hill archaeological remains

In addition to the stated resources, both historical and archeological, it should be noted that the project area falls within the area of the Chesapeake Bay Gateways and Water Trails Initiative. This initiative was passed by Congress in 1998 and recognizes the interest in promoting education of the Bay and waterways as well as increasing public access and conserving the natural and cultural resources in the area.

Figure 10: Cultural Resources



*Sites listed on or eligible for the National Register of Historic Places. Other historic/archaeological sites are shown with text only.

IV. Alternatives Examined

A description and analysis of each alternate follows for consideration. Two or more options are described within each alternate since not only does the alternate's location have possible impacts, but so does its method of implementation. The analysis of each alternate led to issues that would need further consideration in determining the feasibility of each alternate. These issues involved physical requirements, both long-term and short-term costs, agency regulations and resulting service limitations. A narrative description of each ensues within the respective sections, with a summary provided in the table at the end of the chapter. Finally, a breakdown of the preliminary cost estimates is contained within the Appendix.

A. Alternative A - New Bridge Between Havre de Grace and Perryville

1. Alternative Description

This alternative, as illustrated on Map 1, considered the possible crossing opportunities between two primary, regional cultural/historical resource areas. These two municipalities also represent hubs of commercial activity as well as principal population centers. Two possible options were identified for study as part of this alternative. The first considered the utilization of the existing abandoned piers south of the AMTRAK Bridge. The spacing, size and overall condition of the piers would dictate the feasibility of this option. The second option proposed new construction, including the supporting piers. This would allow for more flexibility in design.

This crossing location required review of necessary bridge to water vertical separations due to the presence of shipping activity in the area. This, in turn, led to the consideration of ADA access regulations with respect to permissible grades or the necessity of providing means for overcoming vertical changes within short distances. Required heights and loading requirements would also ultimately dictate the necessary size and spacing of the piers.

2. Alternative Findings

Based on information obtained from the United States Coast Guard, any proposed bridge south of Port Deposit would require a vertical separation of the current most elevated crossing structure. This requirement applies within the Lower Susquehanna River area because of measurable tidal influences and the presence of commercial boating activity. More specifically, a vertical separation of 90 feet between the bridge underdecking and the water surface is based on the height of the most elevated crossing structure, the Tydings Memorial Bridge. This height requirement immediately causes one to question whether the casual traveler would feel safe at such heights. In addition to perceived safety, protection from high wind conditions is also an issue.

Since the height of any proposed bridge in this area is significant, accessibility to and along the bridge warrants special attention. In considering the landings for either end of the bridge, one must review methods available to accomplish this task. Either the bridge can terminate shortly after accomplishing its crossing, or it can extend as needed to tie into existing grades as the riverbank's terrain dictates. If the availability of properties at the tie down points is limited, the bridge would need to terminate abruptly. As a result, significant vertical elevation differences must be accomplished in shortened horizontal lengths. These differences are normally achieved with steps, ramps, or if necessary, elevators. Ultimately, applicable ADA requirements would dictate the extent and method(s) needed.

The proposed bridge would provide an inside decking width of 20 feet to allow for emergency vehicle access and to permit passing room. This requirement was used for both options in considering structural requirements and costs. In addition to this dimensional criterion, structural loads and anticipated live loads were estimated to aid in determining the required number, size and spacing of the supporting piers.

This alternative was reviewed with two possible options. One option consisted of using the existing abandoned piers south of the existing Amtrak bridge. The other option

consisted of all new bridge pier construction. In February 1999, the Maryland State Highway Administration conducted an underwater inspection of the existing piers and prepared a report of findings in the document entitled Abandoned Bridge Piers at Susquehanna River – Harford and Cecil Counties. This report was used to investigate the feasibility of using these piers to support the new pedestrian/bicycle bridge. The overall age and condition of the piers as well as their existing dimensions suggested that they would need to be greatly improved in order to support the required structure. First, they would need to be extended by more than 65 feet in order to obtain the 90 foot vertical clearance. This increase in height would in turn require an increase in the piers' basal dimensions. Finally, there is evidence of scour and slight rotation of some of the piers. This situation would need to be addressed before these piers could be considered sound enough to support the required structure.

The same parameters would apply for a bridge consisting of all new structural components. Unlike the previous option of starting with the existing pier locations, this option would place new piers. A precursory assessment might lead one to assume that this option would be more costly than using the existing piers. Upon further analysis, when considering the improvements that would be required to upgrade the existing piers and the limitations resulting from the piers' locations already being fixed, the overwhelming design constraints and associated costs favor the installation of new piers.

B. Alternative B - Attach Facility to Existing Bridge

1. Alternative Description

In an effort to save money and to minimize impacts that may result from the construction of a new bridge, the possibility of attaching a facility to an existing river crossing was considered. This investigation involved the Hatem Memorial Bridge (US 40 crossing) and the Millard E. Tydings Memorial Bridge (I-95 crossing). These possible bridge attachments, as illustrated in Map 1, required analysis of both current and future

structural loading needs of these bridges that are presently used exclusively for vehicular traffic.

The shared use nature of the option would require agreements among various entities. These agreements would be unique for the proposed usage. Maintenance responsibilities would also need to be resolved. Safety concerns were also a consideration in terms of the height of the bridges and the proximity of pedestrians and bikers to vehicular traffic. An additional consideration is to ensure compliance with ADA regulations.

2. Alternative Findings

An investigation of MdTA policies revealed that current State Code does not allow for pedestrian/bicycle facilities to share the same elevated crossing structures with motorized vehicles without a physical barrier placed between the two. If some arrangement were found to allow a separate structure to be attached to one of the existing bridges, a long-term maintenance agreement for joint use would need to be developed and would most likely be very complicated.

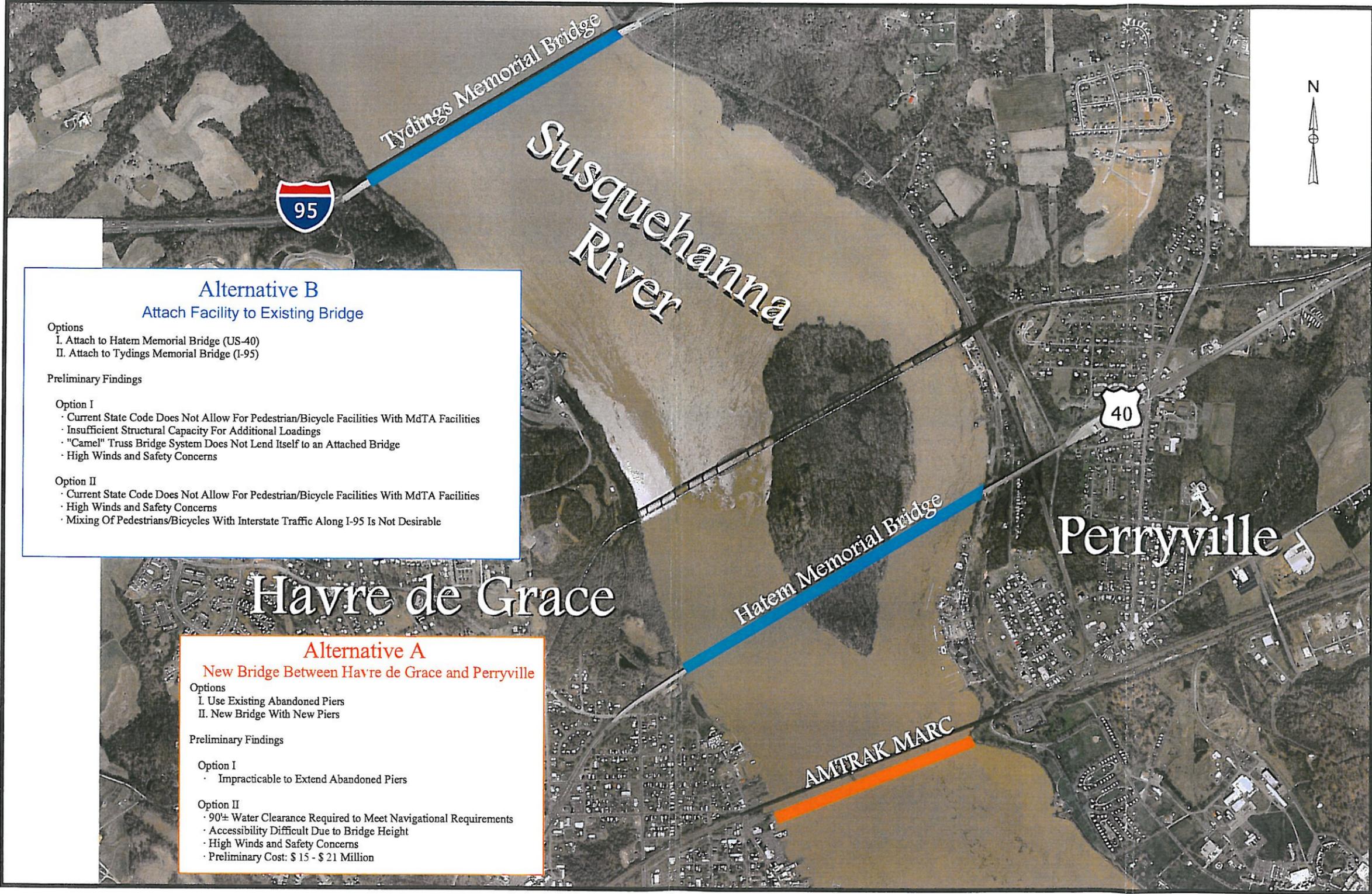
There are several issues unique to the possible use of the Hatem Memorial Bridge (US 40) versus the Tydings Memorial Bridge (I-95). The structural design of the Hatem Bridge (a "Camel" truss system) would make the attachment of a pedestrian/bicycle bridge very difficult. In addition, the present condition of the bridge would not permit any additional loading connected with an attached structure carrying pedestrians and bicyclists. In order to avoid complications associated with attaching a separate structure, the possibility of dedicating a separate lane at deck level to pedestrians was investigated. Due to anticipated future vehicular traffic needs and the temporary need for lane closures for maintenance reasons, the MdTA does not support providing a separate pedestrian/bicycle lane.

Due to the age and significance of the Hatem Memorial Bridge, permitting under the National Environmental Policy Act (NEPA) and Section 4(f) of the Department of Transportation Act would be required. The bridge opened in 1940 and was one of the

earliest to provide a crossing of the Lower Susquehanna River for motor vehicles. Its historical importance would most likely preclude the ability to attach any structure to this bridge.

Issues relating to MdTA policy, maintenance agreements and elevation also exist for the Tydings Memorial Bridge. In addition to these obstacles, the fact that this bridge is within the federal interstate system further diminishes this option. In addition to the height and safety issues discussed with the Hatem Bridge option, wind advisory warnings are routinely issued for the Tydings Bridge. This situation would most likely eliminate this option.

Susquehanna River Pedestrian / Bicycle Crossing ALTERNATIVES A and B



Alternative B
Attach Facility to Existing Bridge

Options

- I. Attach to Hatem Memorial Bridge (US-40)
- II. Attach to Tydings Memorial Bridge (I-95)

Preliminary Findings

Option I

- Current State Code Does Not Allow For Pedestrian/Bicycle Facilities With MdTA Facilities
- Insufficient Structural Capacity For Additional Loadings
- "Camel" Truss Bridge System Does Not Lend Itself to an Attached Bridge
- High Winds and Safety Concerns

Option II

- Current State Code Does Not Allow For Pedestrian/Bicycle Facilities With MdTA Facilities
- High Winds and Safety Concerns
- Mixing Of Pedestrians/Bicycles With Interstate Traffic Along I-95 Is Not Desirable

Alternative A
New Bridge Between Havre de Grace and Perryville

Options

- I. Use Existing Abandoned Piers
- II. New Bridge With New Piers

Preliminary Findings

Option I

- Impracticable to Extend Abandoned Piers

Option II

- 90± Water Clearance Required to Meet Navigational Requirements
- Accessibility Difficult Due to Bridge Height
- High Winds and Safety Concerns
- Preliminary Cost: \$ 15 - \$ 21 Million



C. Alternative C - New Bridge Between Port Deposit and Susquehanna State Park

1. Alternative Description

While the connection between Havre de Grace and Perryville provides for pedestrian crossings between two cultural/economical centers, a crossing between the Susquehanna State Park and Port Deposit provides for a natural/recreational alternative. Since part of the intent of the project is to provide for trail connectivity across the river, this option, as illustrated on Map 2, was reviewed in an effort to connect the existing trail system within the Susquehanna State Park on the west side of the river to the trails on the east side.

The shallowness of the water as compared to downstream depths and the greatly decreased tidal effects north of Port Deposit were factors in considering this location for a new crossing. Since commercial boat traffic does not occur within this area, it was found that the large bridge to water surface vertical separation required with the downstream options would not be required at this location.

Two options were reviewed as part of this alternative. One offered the possibility of providing intermediate landings on the islands between the two banks of the Susquehanna River. The other proposed a continuous, single span from one side to the other. An artist rendering is contained in Figure 11 showing what a covered bridge, if used, might look like. Such a bridge could possibly be used for either option.

2. Alternative Findings

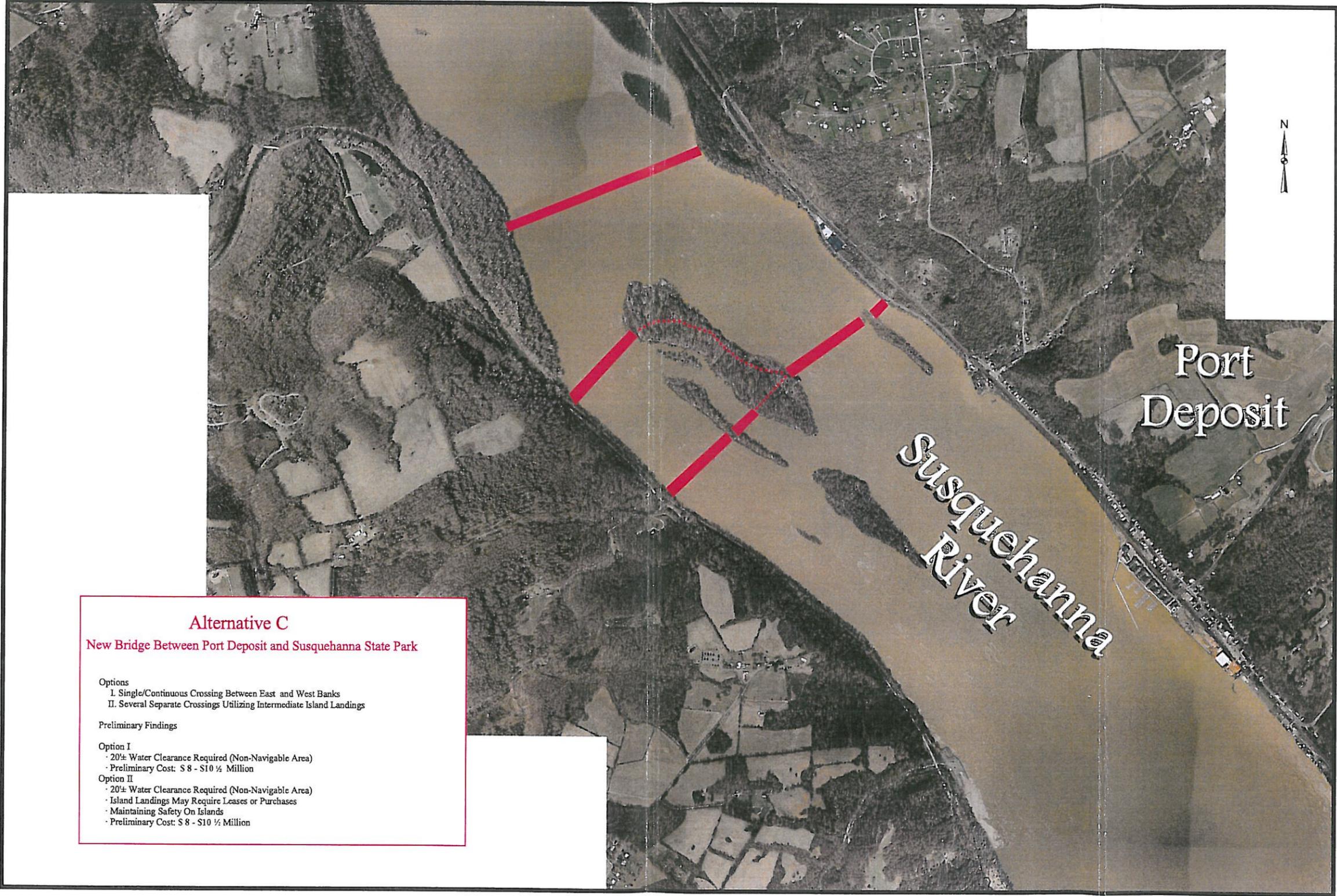
Preliminary investigations have revealed that the shallowness of the river inhibits commercial boating activity north of Port Deposit. In addition, measurable tidal influences are not evident within this section of the river. These conditions result in alternate criteria considered in determining necessary heights of structures crossing the river. Since this location is in proximity to the lower regions of the river that are clearly subject to Coast Guard regulations, this proposed crossing site would still undergo some review by this agency. Investigations into recreational boating activities would be

undertaken to assure that whatever boating may exist is not impeded. This would typically involve public notification and opportunities for public input in order to determine needs that may not be readily evident.

With reduced bridge height possibilities, regional flooding history was investigated to determine the required elevation necessary to keep a structure above floodwaters. Hurricane Agnes in 1972 resulted in the river's elevation increasing by approximately 17 feet around the study area. This suggests a recommended bridge height of approximately 20 feet. This height should accommodate resulting river and ice flows if a similar storm event were to occur again.

This alternative was reviewed with two possible options. One option consisted of a single, continuous bridge spanning the river. The other option identified the islands within the river as possible intermediate landing sites for several shorter bridges crossing the river. This option could possibly offer an enhanced trail system within the islands. Any affected islands under private ownership (Exelon Corporation) would require securing easements or purchase. Liability, safety and ADA compliance issues would also need to be addressed if this option was pursued.

Susquehanna River Pedestrian / Bicycle Crossing ALTERNATIVE C



Alternative C
New Bridge Between Port Deposit and Susquehanna State Park

Options
I. Single/Continuous Crossing Between East and West Banks
II. Several Separate Crossings Utilizing Intermediate Island Landings

Preliminary Findings

Option I
- 20± Water Clearance Required (Non-Navigable Area)
- Preliminary Cost: \$ 8 - \$10 ½ Million

Option II
- 20± Water Clearance Required (Non-Navigable Area)
- Island Landings May Require Leases or Purchases
- Maintaining Safety On Islands
- Preliminary Cost: \$ 8 - \$10 ½ Million



Figure 11: Covered Bridge Artist Rendering



Cross Sectional View
(Not to Scale)



Longitudinal View
(Not to Scale)

D. Alternative D - Non-Bridge Alternatives

1. Alternative Description

The non-bridge alternative, illustrated on Map 3, was proposed as a means of minimizing up front costs to the project and providing more “amusement” to the crossing. Several modes could be considered and could be incorporated individually or could supplement each other. Initially, two alternates were identified: 1) water taxi or ferry service and 2) van or bus service. During review by the technical advisory committee, another non-bridge alternative was suggested: a gondola or suspended cable car crossing.

The water taxi or ferry service would operate independently of existing structural crossings. Because of this, it was believed that it may offer the most flexible service. It could not only offer transportation crossing the river, but it could also provide movement along the river’s length within the region. Accommodations would also be required for patrons wishing to use the service that may be travelling by bicycles.

Land vehicles, such as van or bus service, would be required to operate along current river crossings, namely, the existing bridges. The vehicles could also offer transportation up or down the river similar to the water taxi, but would be limited to the existing regional road network. Again, bicycle accommodations would be needed for some users.

The gondola or suspended cable car option is a non-bridge alternative, but is unlike the previously described mechanized crossing options, in that it would terminate at two fixed points similar to the bridge crossing alternatives. The structure would consist of two or more towers that would support cables for the suspended cable car. The height restrictions applicable to the other bridge options would also affect the height required to provide the necessary vertical separation between the water surface and the cables.

2. Alternative Findings

The non-bridge alternative included numerous possibilities. These included the implementation of a water taxi or ferry service directly on the river, a van or bus shuttle

that utilized existing bridge crossings and lastly, a less traditional option, a gondola or suspended cable car. The first two options were reviewed with the idea that they would require the least amount of up-front costs. The last option was suggested as a possible means to address the greater structure height requirement with a downstream crossing alternative. Again, it should be noted while analyzing this Alternative that all options must be ADA compliant.

Both the water taxi and vehicular shuttle service would require the establishment of water taxi docks or "base stations" to operate from. The number of docks or stations would be directly related to the coverage area of the provided service. A minimum of three docking locations, one serving each of the municipalities, would be needed to provide for regional interconnections. The number of docks or stations would most likely depend on both available sites and the desired level of interconnectivity between the two sides of the river. While the vehicular shuttle service would be limited to the existing regional road network, the water taxi could operate anywhere along the river. However, the water taxi would require the use of docking areas that may or may not exist today.

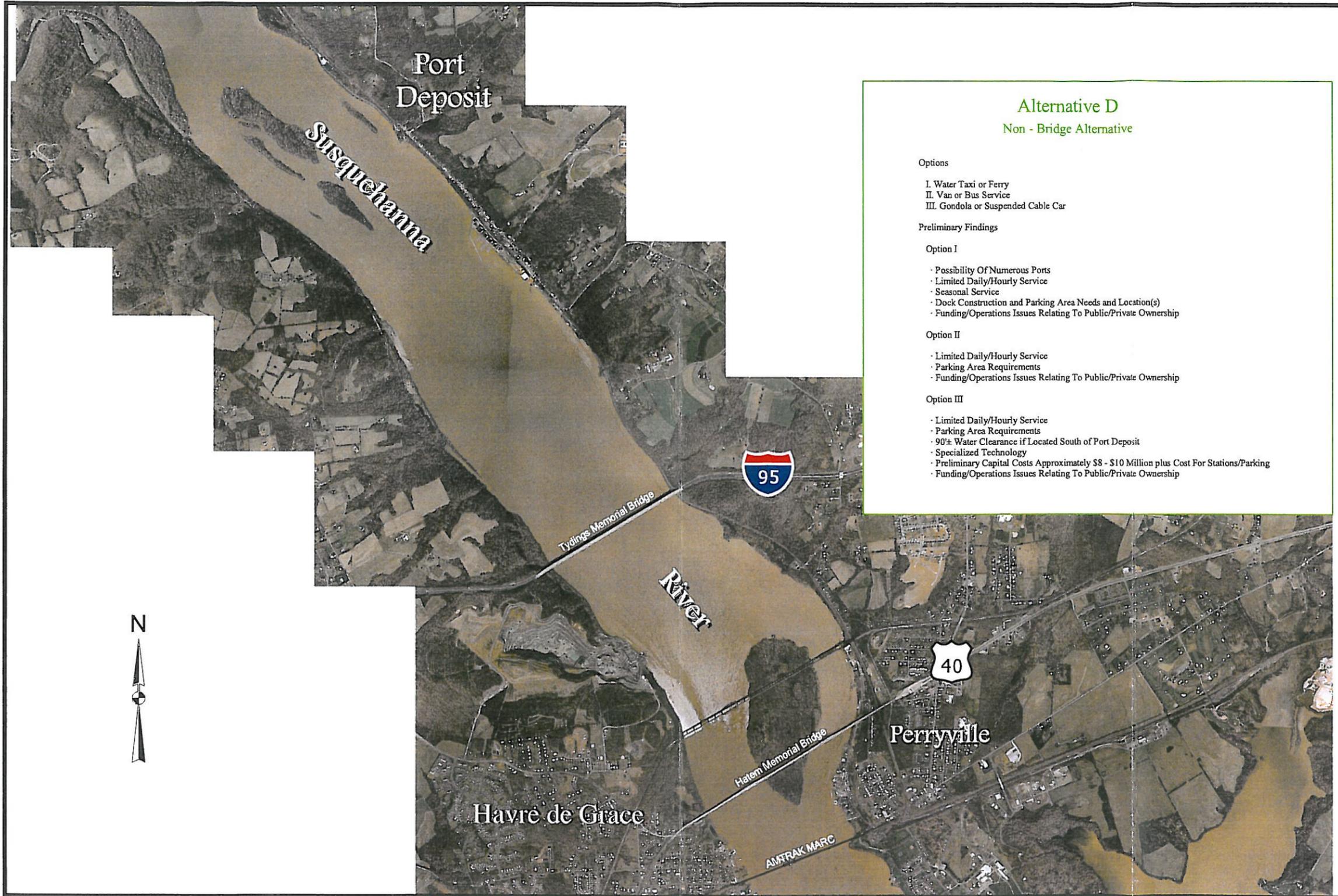
A Concept Plan was developed by Garden Architecture, LLC for a proposed Marina Park to be located in Port Deposit (Figures 12 and 13). These plans show what might be possible for docking facilities for the water taxi alternative at the Port Deposit location or possibly for other locations with appropriate alterations. Presently, Havre de Grace has two locations where docking is currently available (Hutchins and Tydings Parks) with plans ultimately for four. Perryville is currently undertaking a planning study to investigate the possibility of constructing a docking facility in the vicinity of Rodgers Tavern. It should be noted that the Port Deposit Jetty and Marina Park Project funded by the Transportation Enhancement Program will provide a water taxi dock. Advertisement for this project is anticipated to occur in early 2003.

The docks or stations would likely require parking areas for both employees and some patrons of the services. Information and ticket sales facilities would be necessary and would probably need to be staffed. These services would most likely be restricted to

specific seasonal, daily or hourly operations. These conditions raise questions as to public versus private funding and operations. Up front costs, operational costs, and overall interest would need to be further evaluated before these decisions could be made.

The gondola option makes use of specialized technology, and as such, results in limited availability of vendors and servicing. Its present use in areas such as ski resorts and alpine communities support its usefulness as an elevated method of transporting people. However, it appears from reviewed cases that the technology was implemented generally where large numbers of people need to be transported. In addition, relief of traffic congestion and air quality concerns seemed to be the major contributing factors cited as reasons for using a gondola. As for the Susquehanna River crossing, it was felt that there would be insufficient use of the system to justify the costs and impacts.

Susquehanna River Pedestrian / Bicycle Crossing Alternative D



Alternative D Non - Bridge Alternative

Options

- I. Water Taxi or Ferry
- II. Van or Bus Service
- III. Gondola or Suspended Cable Car

Preliminary Findings

Option I

- Possibility Of Numerous Ports
- Limited Daily/Hourly Service
- Seasonal Service
- Dock Construction and Parking Area Needs and Location(s)
- Funding/Operations Issues Relating To Public/Private Ownership

Option II

- Limited Daily/Hourly Service
- Parking Area Requirements
- Funding/Operations Issues Relating To Public/Private Ownership

Option III

- Limited Daily/Hourly Service
- Parking Area Requirements
- 90± Water Clearance if Located South of Port Deposit
- Specialized Technology
- Preliminary Capital Costs Approximately \$8 - \$10 Million plus Cost For Stations/Parking
- Funding/Operations Issues Relating To Public/Private Ownership

200 0 200 400 Feet



March, 2002

Figure 12: Marina Park Concept Plan

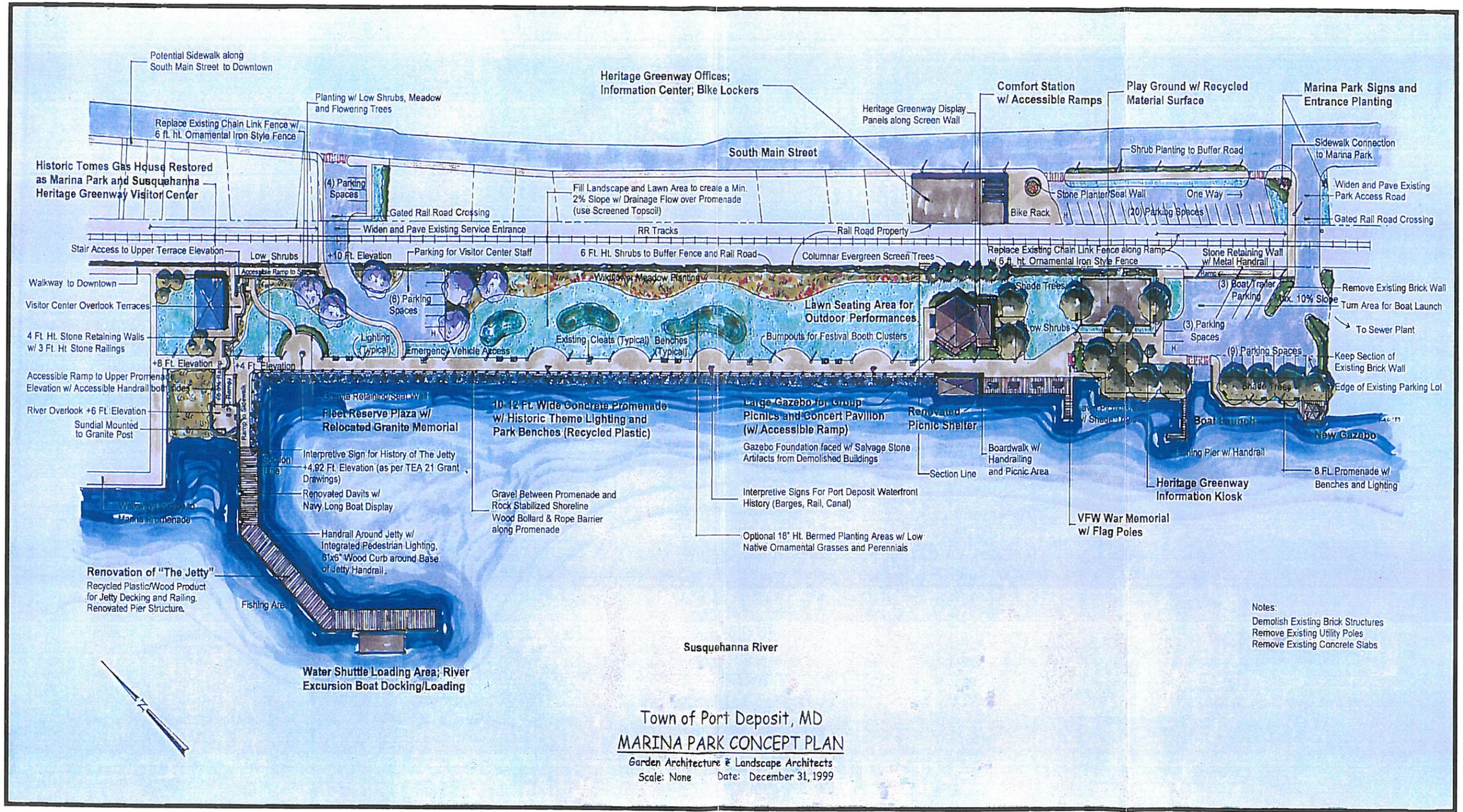


Figure 13: Marina Park Concept Plan

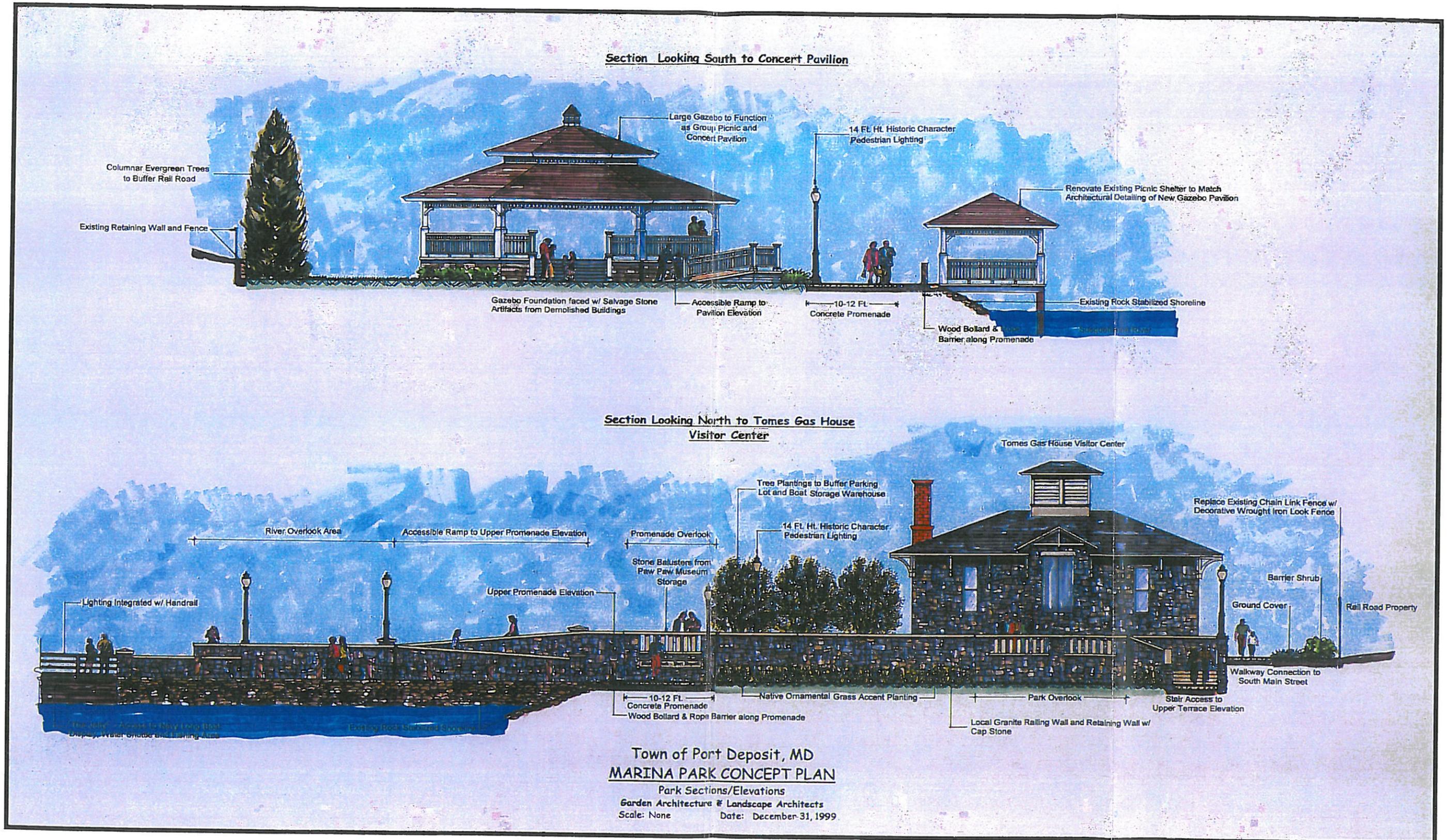


Table 2.
SUSQUEHANNA RIVER PEDESTRIAN BRIDGE CROSSING FEASIBILITY STUDY
ALTERNATIVES SUMMARY

| ALTERNATIVE | | OPTIONS | PRELIMINARY FINDINGS | | | | | | | | | | |
|---|--|---|--|-----------------|-----------------------|-----------------|-----------------------|----------------|-----------------------|----------------|-------------------------------|--------------|--------------------------------|
| A | New Bridge Between Havre de Grace & Perryville | I. Use Existing Abandoned Piers | - Impracticable to Extend Abandoned Piers | | | | | | | | | | |
| | | II. New Bridge With New Piers | - 90'± Water Clearance Required to Meet Navigational Requirements - Accessibility Difficult Due to Bridge Height - High Winds and Safety Concerns - Preliminary Cost Estimate*: <table style="margin-left: 20px; border: none;"> <tr> <td>Planning</td> <td>- \$0.6 – 1.0 Million</td> </tr> <tr> <td>PE & Permitting</td> <td>- \$1.7 – 2.3 Million</td> </tr> <tr> <td>Construction.</td> <td>- \$11 – 15 Million</td> </tr> <tr> <td>Project Admin.</td> <td>- \$1.7 – 2.3 Million</td> </tr> <tr> <td>Total</td> <td>- \$15.0 – 20.6 Million</td> </tr> </table> | Planning | - \$0.6 – 1.0 Million | PE & Permitting | - \$1.7 – 2.3 Million | Construction. | - \$11 – 15 Million | Project Admin. | - \$1.7 – 2.3 Million | Total | - \$15.0 – 20.6 Million |
| Planning | - \$0.6 – 1.0 Million | | | | | | | | | | | | |
| PE & Permitting | - \$1.7 – 2.3 Million | | | | | | | | | | | | |
| Construction. | - \$11 – 15 Million | | | | | | | | | | | | |
| Project Admin. | - \$1.7 – 2.3 Million | | | | | | | | | | | | |
| Total | - \$15.0 – 20.6 Million | | | | | | | | | | | | |
| B | Attach Facility to Existing Bridge | I. Attach to Hatem Memorial Bridge (US-40) | - Current State Code Does Not Allow For Pedestrian/Bicycle Facilities With MdTA Facilities - Insufficient Structural Integrity For Additional Loadings - “Camel” Truss Bridge System Does Not Lend Itself to an Attached Bridge - High Winds and Safety Concerns | | | | | | | | | | |
| | | II. Attach to Tydings Memorial Bridge (I-95) | - Current State Code Does Not Allow For Pedestrian/Bicycle Facilities With MdTA Facilities - High Winds and Safety Concerns - Mixing Of Pedestrians/Bicycles With Interstate Traffic Along I-95 Is Not Desirable | | | | | | | | | | |
| C | New Bridge Between Port Deposit & Susquehanna State Park | I. Single/Continuous Crossing Between East & West Banks | - 20'± Water Clearance Required (Non-Navigable Area) - Preliminary Cost Estimate*: <table style="margin-left: 20px; border: none;"> <tr> <td>Planning</td> <td>- \$0.6 – 1.0 Million</td> </tr> <tr> <td>PE & Permitting</td> <td>- \$0.8 – 1.1 Million</td> </tr> <tr> <td>Construction.</td> <td>- \$5.5 – 7.0 Million</td> </tr> <tr> <td>Project Admin.</td> <td>- \$0.8 – 1.1 Million</td> </tr> <tr> <td>Total</td> <td>- \$7.7 – 10.2 Million</td> </tr> </table> | Planning | - \$0.6 – 1.0 Million | PE & Permitting | - \$0.8 – 1.1 Million | Construction. | - \$5.5 – 7.0 Million | Project Admin. | - \$0.8 – 1.1 Million | Total | - \$7.7 – 10.2 Million |
| | | Planning | - \$0.6 – 1.0 Million | | | | | | | | | | |
| PE & Permitting | - \$0.8 – 1.1 Million | | | | | | | | | | | | |
| Construction. | - \$5.5 – 7.0 Million | | | | | | | | | | | | |
| Project Admin. | - \$0.8 – 1.1 Million | | | | | | | | | | | | |
| Total | - \$7.7 – 10.2 Million | | | | | | | | | | | | |
| II. Several Separate Crossings Utilizing Intermediate Island Landings | - 20'± Water Clearance Required (Non-Navigable Area) - Island Landings May Require Leases Or Purchases - Maintaining Safety On Islands - Preliminary Cost Estimate*: <table style="margin-left: 20px; border: none;"> <tr> <td>Planning</td> <td>- \$0.6 – 1.0 Million</td> </tr> <tr> <td>PE & Permitting</td> <td>- \$0.8 – 1.1 Million</td> </tr> <tr> <td>Construction.</td> <td>- \$5.5 – 7.0 Million</td> </tr> <tr> <td>Project Admin.</td> <td>- \$0.8 – 1.1 Million</td> </tr> <tr> <td>Total</td> <td>- \$7.7 – 10.2 Million</td> </tr> </table> | Planning | - \$0.6 – 1.0 Million | PE & Permitting | - \$0.8 – 1.1 Million | Construction. | - \$5.5 – 7.0 Million | Project Admin. | - \$0.8 – 1.1 Million | Total | - \$7.7 – 10.2 Million | | |
| Planning | - \$0.6 – 1.0 Million | | | | | | | | | | | | |
| PE & Permitting | - \$0.8 – 1.1 Million | | | | | | | | | | | | |
| Construction. | - \$5.5 – 7.0 Million | | | | | | | | | | | | |
| Project Admin. | - \$0.8 – 1.1 Million | | | | | | | | | | | | |
| Total | - \$7.7 – 10.2 Million | | | | | | | | | | | | |
| D | Non-Bridge Alternatives | I. Water Taxi or Ferry | - Possibility Of Numerous Ports - Limited Daily/Hourly Service - Seasonal Service - Dock Construction and Parking Area Needs and Location(s) - Funding/Operations Issues Relating To Public/Private Ownership | | | | | | | | | | |
| | | II. Van or Bus Service | - Limited Daily/Hourly Service - Parking Area Requirements - Funding/Operations Issues Relating To Public/Private Ownership | | | | | | | | | | |
| | | III. Gondola or Suspended Cable Car | - Limited Daily/Hourly Service - Parking Area Requirements - 90'± Water Clearance if Located South of Port Deposit - Specialized Technology - Preliminary Capital Costs Approximately \$8 - \$10 Million plus Cost For Stations/Parking - Funding/Operations Issues Relating To Public/Private Ownership | | | | | | | | | | |

* Preliminary Costs do not include parking facilities, ADA accessibility at bridge landings, right-of-way acquisition, or ongoing maintenance. Details for these items will need to be addressed during the Project Planning Phase.

V. Public Open House

On March 4, 2002, a public Open House was conducted at the Conowingo Visitor's Center to present the findings of the feasibility study to the public and to solicit comments and questions from attendees. The Open House provided exhibits at several display stations. The displays provided information regarding different facets of the project relative to background information, regulations and proposed alternatives. Staff was made available to answer questions and to provide explanations as needed. In addition, those who attended were asked to complete a comment card in order to gauge preferences as well as identify issues at a local level.

Based upon the sign-in sheet, there were 51 attendees. As of March 25, 2002, a total of 27 written comments were received in either the form of comment cards or letters. Copies of these comments and a summary are included in the Appendix. Different categories were created in which to tally general support or opposition to alternatives as well as list other general comments received.

Based upon this summation, Alternative "D", the Non-Bridge alternative received the greatest amount of support with 23 positive comments. This total accounts for nearly half (23 of 51 or 45%) of the sign-in total and an overwhelming majority (23 of 27 or 85%) of the total number of comments received. It should be noted that with many of these responses, other crossing alternatives were desired, but the conclusions were that the Non-Bridge alternatives such as the water taxi or van service, would be the most expeditious method of providing a solution to the problem, albeit if it is only temporary.

Of the comments preferring a permanent bridge crossing, the Port Deposit / Susquehanna State Park location received the greatest support. In addition, more individuals favored the second option of intermediate island crossings utilizing the islands over the single, continuous crossing option.

VI. Conclusions and Recommendations

1. Alternatives

Several issues were identified for consideration in conducting the feasibility of providing a pedestrian/bicycle crossing over the Susquehanna River. These included governmental regulations, environmental impacts, engineering concerns and costs. The implications of these issues affect the alternatives somewhat differently and therefore, produce varying levels of acceptability. In addition, the alternatives appeared to result in varying degrees of feasibility based on relative ease of implementation. **The option of utilizing the existing abandoned piers to the south of the Hatem Memorial bridge (Alternative "A," Option I) seemed to be the only option that was not feasible** due to the impracticality of extending the height of the piers to meet the Coast Guard crossing height requirements of 90 feet. **In addition, it is recommended that Alternative "B" (attaching a facility to an existing bridge) not be carried forward due to the issues related to mixing pedestrian/bicycle traffic with motorized vehicle traffic and structural capacity.** Finally, **it is recommended that the gondola option from Alternative D not be pursued due to the associated costs and impacts.** All of the other options appeared "feasible" but will require further investigation to determine the various implications associated with each.

The main issues recognized in the study were: height requirements based on Coast Guard regulations or flood elevations; ADA accessibility relating to vertical changes; bridge dimensions required for safety/emergency access; environmental impacts; structural needs or considerations; and costs relating to initial capital expenditures and long-term maintenance. The two crossing locations considered for fixed structures, Alternative "A," Option II (Havre de Grace to Perryville) and Alternative "C" (Port Deposit to the Susquehanna State Park) differed primarily in the required height of any proposed structure. The downstream location (Alternative "A," Option II) would require the Coast Guard mandated height of 90 feet while the upstream location (Alternative "C") would

most likely require a vertical river clearance of 20 feet based on estimated “100-year reoccurrence” flooding elevations. These height requirements have ADA accessibility implications associated with them based on the degree of vertical changes that must be overcome.

The cost of any alternative will involve both initial capital expenditures as well as long-term maintenance. The water taxi and van options will most likely have the lowest start-up costs, although it is difficult to determine an actual number without knowing the exact operations or the extent of the area to be serviced. Long-term maintenance will also ultimately depend on the extent of service provided.

The respective height requirements for the fixed structures have a direct bearing on the resulting cost estimates. The downstream, or high-level, alternative would be the most expensive due to the increased size and construction costs associated with the support piers and increased ADA improvements that would be necessary to provide access to the crossing. The upstream, or low-level, alternative would be a lower cost fixed structure alternative. Other educational and recreational benefits may also be able to be realized from Option II of this alternative (utilization of intermediate island landings). In carrying the bridge alternative further, the planning study must evaluate the trail connections to the bridge also. This appears to be simplistic, but the evaluation must consider ADA compliant routes, maintenance vehicles access to the bridge and construction of service roads and staging areas.

Numerous environmental considerations have been identified in the “Environmental Inventory” portion of this report. These will require further study and consideration if any of the options are considered for further detailed analysis. As noted, environmental impacts must be investigated for natural, socio-economical and cultural resources. Inter-agency coordination will also be necessary as the selected alternative(s) proceed into the planning phase, as required by NEPA, to fully evaluate any environmental impacts.

Due to the resulting startup costs and likely extensive time required to address NEPA requirements, it appears that the non-bridge alternatives are the most feasible choices to provide a crossing if the goal were to provide one in both the shortest period of time and for the least amount of money. This may supply an interim solution while the fixed crossing options proceed into further planning to determine their economic and environmental implications. It is therefore recommended that the Lower Susquehanna Greenway Committee first investigate the potential of creating a public/private partnering that would provide a non-bridge crossing while it further studies the feasible fixed bridge crossings.

2. Required Permits and Approvals

Depending on the selected alternative, different permits and/or approvals will be required. The Greenway Committee may be partially or totally responsible for securing these approvals depending on the level of oversight that is either required of them or that they take upon themselves. Approvals may ultimately be required from the following agencies:

- US Coast Guard
- US Fish and Wildlife Services
- Maryland Department of the Environment
- Maryland Department of Natural Resources
- Maryland Historic Trust

In addition, specific permits or processes that will be required include:

- Erosion & Sediment Control
- Storm Water Management
- Environmental Joint Application
- NEPA process

3. *Anticipated Timeline*

The following timeline is anticipated for the fixed bridge crossing alternatives. It should be noted that these time estimates are minimums and are subject to change depending on extensive permitting that may result from detailed review:

- 1 -2 years NEPA process
- 2 years Design
- 2 years Construction

4. *Summary*

Based on public comments, future planning processes and the desire to provide a river crossing in the near future, possible solutions are identified relative to a timeframe. These are listed as short-term, mid-term and long-term solutions. Each is offered based on anticipated time to address costs, planning and permits. In general, the alternatives likely to have lower costs associated with them and shorter amounts of time expected for planning and permitting were noted as short-term solutions. A summary of the potential solutions over time are:

- *Short-term* - Alternative D, Option I or II: Water Taxi or Bus Service
- *Mid-term* - Alternative C: Low-level Bridge Crossing Between Port Deposit and the Susquehanna State Park
- *Long-term* - Alternative A, Option II: New Bridge and Piers Between Havre de Grace and Perryville

VII. APPENDIX

SUSQUEHANNA RIVER PEDESTRIAN/BICYCLE CROSSING FEASIBILITY STUDY

Summary of Written Comments and Mailed Letters Received from
the Open House on March 4, 2002

51 People Attended Based on Sign-In Sheet
27 Written Comments/Letters Received as of 3/25/02

Comments supporting a particular alternative or project in general:

- Alternative "A" - New Structure Between Havre de Grace & Perryville 4 (total)
 - Option I - Use Abandoned Piers
 - Option II - Construct New Piers (4)
- Alternative "B" - Attach Structure to Existing Bridge 1 (total)
 - Option I - Hatem Memorial Bridge (US 40) (1)
 - Option II - Tydings Memorial Bridge (I-95)
- Alternative "C" - New Structure Between Port Deposit & Susquehanna State Park 7 (total)
 - Option I - Continuous Crossing Between East & West Banks (2)
 - Option II - Several Separate Crossings Utilizing Island Landings (5)
- Alternative "D" - Non-Bridge Alternative 23 (total)
 - Option I - Water Taxi or Ferry (17)
 - Option II - Van or Bus Service(4)
 - Option III - Gondola or Suspended Cable Car (2)
- Permanent Structure/Bridge With No Preferred Location 3 (total)

Comments against a particular alternative or project in general:

- Alternative "A" - New Structure Between Havre de Grace & Perryville 2 (total)
- Alternative "B" - Attach Structure to Existing Bridge 1 (total)

Other suggested options:

- Utilizing abandoned piers of old covered bridge in Rock Run area for new bridge with similar appearance
- Cable ferry north of Option "C" to permit equestrian crossing

- Floating “Bailey Bridge”
- Suspended walkway under US 40
- Attach facility to CSX railroad bridge
- Bridge from Perryville to Garrett Island and then ferry from Garrett Island to Havre de Grace with later option of bridge between Garrett Island and Havre de Grace
- Construct a new bridge crossing for US 1 and convert the existing Conowingo Dam to a non-vehicular crossing. This would address the increasing deficiencies of the Dam relating to its ability to convey vehicular traffic and would also allow this historical structure to be preserved.

Comments to Proposed Alternatives:

- Alternative “A” - New Structure Between Havre de Grace & Perryville
 - Too costly considering construction costs, maintenance, security, etc.
 - Cost, height requirements
- Alternative “B” - Attach Structure to Existing Bridge
 - Not preferred because of the congested traffic and fumes.
 - Won’t be allowed by State
- Alternative “C” - New Structure Between Port Deposit & Susquehanna State Park
 - Seems to be the most cost effective option
 - Several separate crossing utilizing island landings is more desirable than continuous crossing
- Alternative “D”, Option I - Water Taxi or Ferry
 - Water Taxi first as a immediate solution while waiting for a permanent structure (2)
 - Cable Ferry preferred between Port Deposit and Susquehanna State Park just north of old bridge piling
 - Water Taxi as a immediate answer to river crossing (2)
 - Privately operated between Port Deposit, Perryville, Havre de Grace and perhaps Garrett Island
 - Water taxi would provide a fun experience in and of itself – potentially its own attraction for those that do not have access to a boat
 - Ferry alternative is a good starting point with participation levels unknown.
 - Control costs for Water Taxi through seasoning scheduling.
- Alternative “D”, Option II - Van or Bus Service
 - Seems to be the most cost effective option
 - Several separate crossings utilizing island landings is more desirable than continuous crossing
- Alternative “D”, Option III - Gondola or Suspended Cable Car
 - Preferred between Havre de Grace & Perryville using the existing abandoned piers

- Interesting option but too costly
 - As the LSHG grows and develops I believe a cable car is an exciting option.
 - Gondola south of AMTRAK bridge could be destination all on its own. Height would give unequalled views. Gondola, while intriguing, will probably not happen.
- Permanent Structure/Bridge
- Bridge alternative provides most access especially to equestrians
 - Pedestrian bridge should not be wider than necessary (i.e. 10'-12')

Other general comments/suggestions/concerns:

- Crossing alternative should also accommodate horseback riders
- Crossing alternative can also provide for fisherman's needs (stairs to go down to the water, fishing platforms)
- Preferred crossing between Port Deposit and Susquehanna State Park where the majority of the trails are located
- Because of the existing economic development, community development and tourism, I would support a water taxi. Such a taxi would promote Havre de Grace, Perryville, Port Deposit and the Susquehanna State Park.
- Preferred crossing between Perryville and Havre de Grace
- From economic development point of view, a connection, if any, must join Perryville and Havre de Grace.
- Lower crossing heights tend toward the beauty of the trail system
- Trail crossing should be away from vehicle traffic
- I am currently working with the Town of Havre de Grace to develop a water taxi service from Havre de Grace to Port Deposit.
- Crossing will be a great addition to trail system
- Alternative "C", Option II adds more intrigue to the trail. Trail users don't always seek out highly populated areas.
- Pedestrian bridge could be considered in the future when more people visit or live in the communities along the Susquehanna River.
- A crossing is preferred that requires no operation/transportation cost for users. Ask private supporters, state or federal representatives for support.
- Examples and cost for water taxi docking facilities required

COST ESTIMATE BASIS*

Assumed Dimensions:

Bridge Length = 3500 ft.
Deck Width = 20 ft.

Estimated Costs:

Deck Unit Cost = \$60/sq.ft.
Total Deck Cost = \$4.2 Million

Bridge Support Est. Costs:

Low-Level Option = 30% of Deck Cost
 $0.3 \times \$4.2 \text{ Mil.} = \1.3 Million

High-Level Option = 5 x Low-Level Support Cost
 $5 \times \$1.3 \text{ Mil.} = \6.5 Million

Total Bridge Construction Costs:

Low-Level = \$4.2 Mil. + \$1.3 Mil. = \$5.5 Million
High-Level = \$4.2 Mil. + \$6.5 Mil. = \$10.7 Million

Est. Construction Cost Range:

Calc. Est. Cost + 50%
Low-Level = \$5.5 - \$7.0 Million
High-Level = \$11 - \$15 Million

Estimated Additional Costs:

Planning = 10% of Construction Cost
PE & Permitting = 15% of Construction Cost
Project Admin. = 15% of Construction Cost

Total Estimated Cost Range:

Sum of Est. Construction Cost and Additional Costs
Low-Level = \$7.7 - \$10.2 Million
High-Level = \$15 - \$20.6 Million

* Note: Additional costs may be incurred as a result of aesthetic treatments to any crossing facility.

