

CHESAPEAKE **BAY CROSSING STUDY** — TIER 1 NEPA —

HIGHWAY NOISE QUALITATIVE ASSESSMENT



Maryland
Transportation
Authority

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LIST OF ACRONYMS

Corridor Alternatives Retained for Analysis (CARA)
Environmental Impact Statement (EIS)
Equivalent Residence (ER)
Federal Highway Administration (FHWA)
Maryland Department of Transportation State Highway Administration (MDOT SHA)
Maryland Transportation Authority (MDTA)

National Environmental Policy Act (NEPA)
Noise Abatement Criteria (NAC)
Noise Sensitive Area (NSA)
Transportation Systems Management (TSM)
Travel Demand Management (TDM)

1.0 INTRODUCTION

1.1 Project Description

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA) is preparing a Tier 1 Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA) for the Chesapeake Bay Crossing Study: Tier 1 NEPA (Bay Crossing Study). The purpose of the Bay Crossing Study is to consider corridors for providing additional traffic capacity and access across the Chesapeake Bay in order to improve mobility, travel reliability and safety at the existing Governor William Preston Lane Jr. Memorial (Bay) Bridge. Evaluation of any potential new crossing corridor will include an assessment of existing and potentially expanded transportation infrastructure needed to support additional capacity, improve travel times, and accommodate maintenance activities, while considering financial viability and environmental responsibility. The Tier 1 study initiates the NEPA process with the goal of narrowing the scale and scope of this complex project prior to more detailed analysis in a future Tier 2 NEPA analysis. The Tier 1 study area includes the entire length of the Chesapeake Bay in Maryland, extending nearly 100 miles from the northern part of the Chesapeake Bay near Havre de Grace, Maryland south to near Point Lookout, Maryland (**Figure 1-1**).

The focus of this technical report is to assess potential traffic noise sensitive areas within the corridors based on local planning agency land use or zoning designations.

1.2 Purpose and Need

The Bay Crossing Study Tier 1 NEPA included an assessment of existing and potentially expanded transportation infrastructure needed to support additional capacity, improve travel times, and accommodate maintenance activities, while considering financial viability and environmental responsibility. The Tier 1 NEPA analysis considers a “No-Build” alternative and addresses the following needs listed under **Section 1.2.1** through **1.2.4**.

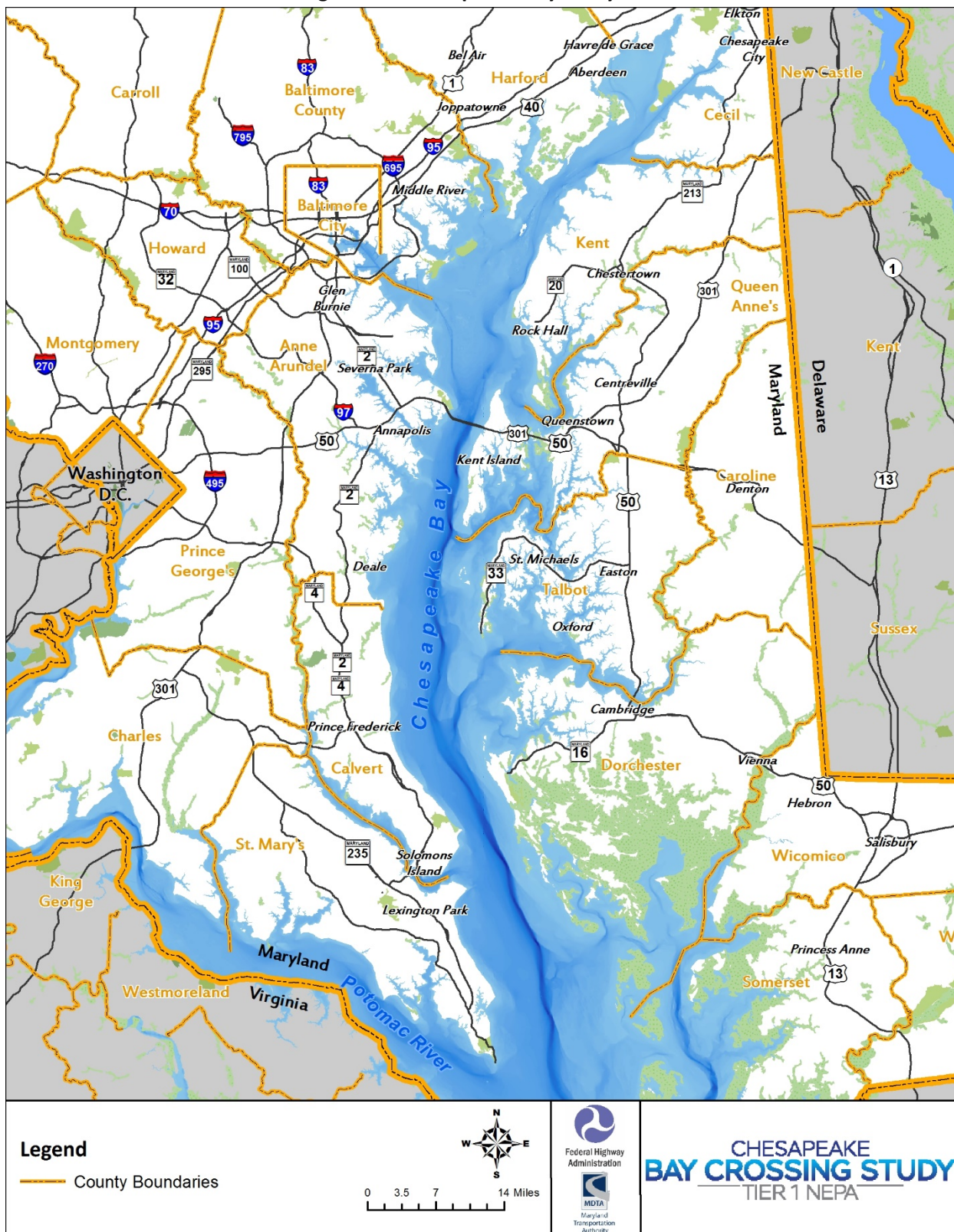
1.2.1 **Adequate Capacity**

The existing two spans of the Bay Bridge, which are part of US 50/US 301 between Anne Arundel and Queen Anne’s counties, Maryland, carry increasing volumes of travelers. Congestion resulting from high regional travel demand by weekday commuter and summer weekend recreation trips is expected to worsen by the planning horizon year of 2040 due to planned growth in population and employment. Additional capacity is needed to address existing congestion, future congestion, and related safety concerns, all resulting from increasing travel volume on the Bay Bridge and approach transportation network.

1.2.2 **Dependable and Reliable Travel Times**

The anticipated population increase in communities on both sides of the Chesapeake Bay and associated increase in commuter travel, as well as expected increased tourism and recreational travel, will continue to stress mobility across and around the Bay. Marylanders and visitors need dependable Chesapeake Bay crossing options with reliable operating speeds and travel times that provide access to employment and recreation areas, as well as facilitate emergency services and evacuation events.

Figure 1-1: Chesapeake Bay Study Area



1.2.3 Flexibility to Support Maintenance and Incident Management in a Safe Manner

Maintenance and rehabilitation activities will increase and exacerbate congestion as the Bay Bridge ages. Additional capacity is needed to maintain flexible options for safe travel during maintenance and for management of other incidents on the Bay Bridge. Safety of travelers, maintenance workers and incident responders will also be considered during corridor alternative development.

1.2.4 Additional Considerations

Additional capacity across the Chesapeake Bay and/or improvements to existing facilities must be financially viable. In order to assess potential additional Bay crossings, it is necessary to consider the means to pay for the development, operation and maintenance of such facilities.

The Chesapeake Bay is a critical environmental resource in Maryland; therefore, any Bay Crossing improvements must take into account the sensitivity of the Bay, including existing environmental conditions and the potential for any new capacity to adversely impact the Bay and the important natural, recreational, socio-economic and cultural resources it supports.

2.0 ALTERNATIVES CONSIDERED

MDTA conducted a comprehensive screening of 14 corridors throughout the extent of the Chesapeake Bay in Maryland, along with four Modal and Operational Alternatives (MOA) and the No-Build Alternative. The screening resulted in the identification of three Corridor Alternatives Retained for Analysis (CARA); none of the MOA were carried forward for further Tier 1 Analysis as standalone alternatives.

The alternatives assessed in this technical study include the three CARA and the No-Build Alternative.

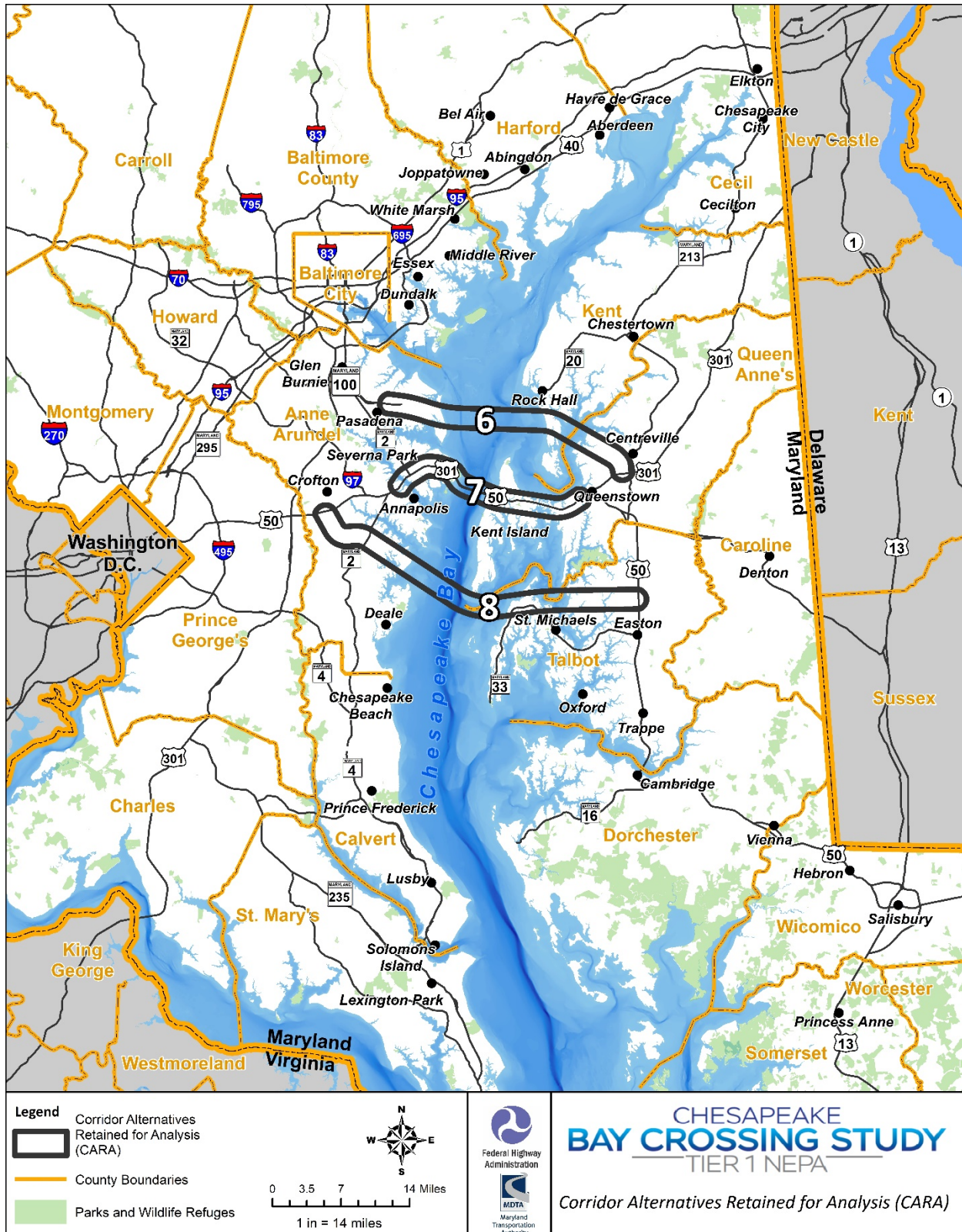
2.1 No-Build Alternative

The No-Build Alternative is included as a baseline for comparison to the corridor alternatives described below. The No-Build Alternative includes all currently planned and programmed infrastructure projects as of Project Scoping in 2017, as well as regular maintenance at the existing Bay Bridge. The No-Build Alternative includes existing transportation systems management/travel demand management (TSM/TDM) measures including contraflow lanes on the existing bridge, as well as any planned and funded TSM/TDM measures as of Project Scoping in 2017, such as automated contraflow lanes.

2.2 Corridor Alternatives Retained for Analysis

The screening process resulted in the identification of three CARA known as Corridor 6, Corridor 7, and Corridor 8 (**Figure 2-1**). Each CARA is a two-mile wide corridor extending far enough on each shore to connect to existing major roadway infrastructure of 4 lanes or greater. Specific roadway alignments are not identified in this Tier 1 Study; identification of alternative alignments would occur if a Preferred Corridor is selected and carried forward into Tier 2.

Figure 2-1: Corridor Alternatives Retained for Analysis



2.2.1 Corridor 6

From west to east, Corridor 6 begins with a tie-in at MD 100 and follows MD 177, with the crossing located north of Gibson Island. After crossing the Chesapeake Bay, Corridor 6 returns to land on the Eastern Shore north of the Eastern Neck National Wildlife Refuge, roughly perpendicular to MD 445. From there, the corridor turns southeast to cross the Chester River and does not follow existing roadway network until the tie-in with US 301 south of Centreville.

2.2.2 Corridor 7

Corridor 7 follows existing infrastructure along the location of the existing Bay Bridge. From west to east, the corridor begins just west of the US 50/301 crossing of the Severn River. The corridor continues to follow US 50/301 over the Severn River, crossing the Chesapeake Bay and returning to land on Kent Island near Stevensville. The corridor continues to follow US 50/301 over Kent Narrows, ending at the US 50/301 split near Queenstown. While this corridor follows the existing crossing along its centerline, a new crossing and the associated infrastructure could potentially be located anywhere within the two-mile wide corridor.

2.2.3 Corridor 8

From west to east, Corridor 8 begins with a tie-in at US 50/301 at the interchange with MD 424. From there, the corridor roughly follows MD 424 and MD 214. The crossing begins near Mayo on the western shore, passing just south of the southern tip of Kent Island, then curving northeast. The corridor returns to land on the Eastern Shore near MD 33, west of St. Michaels. From there, Corridor 8 crosses the Miles River, and does not follow the existing roadway network until it ties in with MD 50 north of Easton.

3.0 REGULATORY CONTEXT

FHWA regulations at 23 CFR 772.7 require highway agencies to develop noise policies for the study and possible abatement of traffic noise impacts from highway projects requiring FHWA approval, regardless of funding source. FHWA provides agencies additional guidance for the application of 23 CFR 772 within FHWA's "Highway Traffic Noise: Analysis and Abatement Guidance". MDTA currently utilizes the existing The Maryland Department of Transportation State Highway Administration (MDOT SHA) "Highway Noise Abatement Planning and Engineering Guidelines" for the evaluation of potential noise impacts resulting from highway projects, which received FHWA approval April 17, 2020. The analysis of noise impacts and evaluation of abatement measures during a future Tier 2 NEPA analysis are anticipated to be completed under the MDOT SHA Highway Noise Abatement Planning and Engineering Guidelines.

A project involving construction of a new highway, capacity additions to the existing highways, major operational improvements, or the construction or modification of specific highway related facilities is considered a Type I project. For Type I projects, the Highway Noise Guidelines states a traffic noise impact is identified when design year traffic noise levels are projected to equal or exceed the appropriate Noise Abatement Criteria (NAC) for each activity category. The NAC for each "Activity Criteria" is shown in the following **Table 3-1** from the Highway Noise Guidelines. The BCS Tier 1 study is being treated as a Type I project for purposes of the assessment of potential noise sensitive areas. If a Tier 2 study is initiated it will be for a Type I project, and as such the entire project area will be treated as a Type I project.

The Highway Noise Guidelines defines traffic noise impact criteria based upon the identified activity category in areas where frequent human use occurs within various land use types. Activity Categories A

through E are considered noise sensitive land use types, and Activity Categories F and G are considered non-noise sensitive land use types. A noise impact is defined as noise levels that approach or exceed the applicable NAC, and/or experiences a substantial noise level increase of 10 dB(A). FHWA regulations and the MDOT SHA *Highway Noise Guidelines* require that noise abatement be investigated at all Noise Sensitive Areas (NSAs) where impacts have been identified. Where noise abatement is warranted for consideration, additional criteria is examined to determine if the abatement is feasible and reasonable. The assessment of noise abatement feasibility, in general, focuses on whether it is physically possible to build an abatement measure (i.e. noise barrier) that achieves a minimally acceptable level of noise reduction. Barrier feasibility considers three primary factors: acoustics, safety & access, and site constraints. The assessment of noise abatement reasonableness, in general, focuses on whether it is practical to build an abatement measure. Barrier reasonableness considers three primary factors: viewpoints, design goal, and cost effectiveness. Traffic noise impacts and noise abatement measures have not been determined in the Tier 1 study, but would be investigated if a Tier 2 study is initiated.

Table 3-1: Noise Abatement Criteria (NAC) [Hourly A-Weighted Sound Level in Decibels db(A)]

Activity Category	Activity Criteria ¹ Leq(h) ²	Maryland SHA Approach Criteria ³	Evaluation Location	Description of Activity Category
A	57	56	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve
B	67	66	Exterior	Residential
C	67	66	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails,
D	52	51	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E ⁴	72	71	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	--	--	--	Agriculture, airports, bus yards, emergency services, industrial, logging maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	--	--	--	Undeveloped lands that are not permitted

1. *The Leq(h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures.*
2. *The equivalent steady-state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same time period, with Leq(h) being the hourly value of Leq.*
3. *Table is adapted from Table 1 in 23 CFR 772. 23 CFR 772 specifies that Highway agencies establish an approach level to be used when determining a traffic noise impact. The approach level shall be at least 1 dB(A) less than the NAC for activity categories A to E.*
4. *Includes undeveloped lands permitted for this activity category.*

Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds, and greater numbers of trucks. FHWA has established the following vehicle categories to use in traffic noise analyses:

- Automobiles - vehicles with two axles and four tires;
- Medium trucks - all cargo vehicles with two axles and six tires;
- Heavy trucks - all cargo vehicles with three or more axles;
- Buses - all vehicles designed to carry more than nine passengers; and
- Motorcycles - all vehicles with two or three tires and an open-air driver/passenger compartment

Noise levels are affected by distance from the noise source, terrain between the noise source and receptor, vegetation and other natural or manmade obstacles between the noise source and receptor.

4.0 METHODOLOGY

Since the Tier 1 study area consists of approximately two-mile wide corridors and does not identify a specific alignment within these corridors the Tier 1 traffic noise assessment for the BCS identified land use types in the CARA based on local planning agency land use or zoning designations. Noise sensitive areas within the retained corridors were identified based on the NAC categories shown in **Table 3-1**. A detailed analysis of traffic noise impacts and abatement would be completed during a subsequent Tier 2 evaluation as the scale and scope of this project is narrowed using the analysis methodology of Type I projects as defined by the Highway Noise Guidelines. A subsequent Tier 2 evaluation would also consider potential impacts from the construction of the project together with measures to minimize or eliminate adverse construction impacts to the community. The Bay Crossing Study Tier 1 noise assessment included:

- Identifying land uses based on local planning agency land use cover mapping and categorization of the land into Activity Categories within each CARA; and
- Quantifying the number and percentage of noise sensitive areas (NSAs) within each CARA.

Additionally, a description of noise implications for potential alignments considered in a Tier 2 study within these NSAs is provided. NSAs will be further refined and delineated for the Tier 2 study. Identification of areas of potential noise receptor locations for traffic noise monitoring and initiation and completion of field noise measurements will be conducted in Tier 2.

5.0 LAND USE DESIGNATIONS AND NOISE IMPLICATIONS

The land within each CARA has been classified into Activity Categories as defined in **Table 3-1** based on the Maryland Department of Planning 2010 Land Use/Land Cover Update. The 2010 Land Use data is the most recent available data as of the writing of this report. New developments may have occurred since this data was generated; however, it would only affect a relatively small amount of acres compared to the

overall size of each corridor. Each corridor is two miles wide and encompasses an area of approximately 35,000 acres for Corridor 6, 28,000 acres for Corridor 7, and 47,000 acres for Corridor 8. A majority of this area is open water which does not fall into any of the Activity Categories and will not require any consideration for the noise analysis. Because the nature of the land uses varies between the Western Shore and Eastern Shore, the percentage breakdowns of land use activity have been divided into separate tables for each shore. Only Categories B, C, and E (considered noise sensitive areas) and F and G (considered non-noise sensitive areas) have been identified based upon the land use data. Category A and D activities are not yet identified because they require a field inspection of the activities present within each parcel, which would occur during a future Tier 2 NEPA analysis once alignment alternatives are developed. Land use data has not been verified in the field for the Tier 1 assessment, but would be verified and updated during any future Tier 2 NEPA analysis.

5.1 Land Uses within Corridor 6

Corridor 6 would connect MD 100 on the Western Shore to US 301 on the Eastern Shore. On the Western Shore, the study area is located in the vicinity of Pasadena, Jacobsville, and Lake Shore in Anne Arundel County. A majority of the land use on the Western Shore is residential, with the commercial land uses primarily located along Mountain Road (MD 177). There are several schools and churches located within the corridor, as well as Compass Pointe Golf Course and the Lake Shore Athletic Complex. On the Eastern Shore, Corridor 6 first passes through Eastern Neck Road (MD 445), just south of Rock Hall in Kent County. This area includes approximately 20 single family residences and the Bayshore Campgrounds, while the rest of the corridor is agricultural or undeveloped in nature. The corridor then crosses the Chester River and connects to US 301 in the vicinity of Centreville in Queen Anne's County. There are two recreational areas, the Queen Anne's County 4-H Park and Route 18 Park located within the corridor; the rest of the area is primarily agricultural in nature. See **Table 5-1** and the **Appendix A** mapping for a summary of the land uses.

Table 5-1: Land Use Activity Category Areas and Summary: Corridor 6

Western Shore				Eastern Shore			
Noise Sensitive Areas	Activity Category	Acres	Percentage	Noise Sensitive Areas	Activity Category Areas	Acres	Percentage
Yes (60.9%)	B	4178	55.0%	Yes (8.2%)	B	682	7.4%
	C	427	5.6%		C	78	0.8%
	E	26	0.3%		E	1	0.0%
No (39.1%)	F	511	6.7%	No (91.8%)	F	5576	60.3%
	G	2456	32.3%		G	2910	31.5%

5.2 Land Uses within Corridor 7

Corridor 7 generally follows the existing US 50/301 corridor between Parole and Annapolis in Anne Arundel County and Queenstown in Queen Anne's County alongside the existing Bay Bridge. On the Western Shore, the land is primarily split between residential and agricultural/commercial uses. There

are several schools and churches located within the corridor, including a portion of the US Naval Academy, as well as Sandy Pointe State Park and Broadneck Park. On the Eastern Shore, the land is primarily agricultural/commercial in nature. There are also several schools and churches located within the corridor, as well as Queenstown Harbor Golf Course and Old Love Point Park. This corridor passes through the towns of Stevensville, Chester, Kent Narrows, Grasonville, and Queenstown. See **Table 5-2**, and the **Appendix B** mapping for a summary of the land uses.

Table 5-2: Land Use Activity Category Areas and Summary: Corridor 7

Western Shore				Eastern Shore			
Noise Sensitive Areas	Activity Category	Acres	Percentage	Noise Sensitive Areas	Activity Category Areas	Acres	Percentage
Yes (50.0%)	B	3560	41.8%	Yes (31.9%)	B	2111	21.4%
	C	645	7.6%		C	907	9.2%
	E	52	0.6%		E	129	1.3%
No (50.0%)	F	3263	38.3%	No (68.1%)	F	4752	48.1%
	G	1001	11.8%		G	1976	20.0%

5.3 Land Uses within Corridor 8

Corridor 8 would connect US 50/301 near Crofton in Anne Arundel County on the Western Shore to US 50 just north of Easton in Talbot County on the Eastern Shore. On the Western Shore the corridor roughly follows MD 424 to Davidsonville, then follows MD 214 to Mayo and the shoreline. A majority of the land is non-noise sensitive agricultural, undeveloped forest land, and industrial uses. There are several schools and churches located within the corridor, as well as recreation centers including: Riva Area Park, The Golf Club at South River, The YMCA Camp Letts, Camp Wabanna, and Mayo Beach Park. On the Eastern Shore, the corridor first passes through Claiborne and McDaniel before crossing the Eastern Bay towards Easton. This area is almost entirely non-noise sensitive agricultural land and undeveloped forest land, with some small pockets of residential areas. The Harbortown Country Club is the only recreational facility identified in this area. After the corridor crosses the Eastern Bay and ties into the mainland at US 50, the land is also almost entirely non-noise sensitive agricultural land and undeveloped forest land, with some small pockets of residential areas. Along US 50 there are three Category C land uses, including the Discovery Christian Church, the Talbot County Community Center, and Hog Neck Golf Course. See **Table 5-3**, and the **Appendix C** mapping for a summary of the land uses.

Table 5-3: Land Use Activity Category Areas and Summary: Corridor 8

Western Shore				Eastern Shore			
Noise Sensitive Areas	Activity Category	Acres	Percentage	Noise Sensitive Areas	Activity Category Areas	Acres	Percentage
Yes (33.7%)	B	3831	28.9%	Yes (9.6%)	B	897	7.0%
	C	604	4.6%		C	320	2.5%
	E	28	0.2%		E	15	0.1%
No (66.3%)	F	3795	28.7%	No (90.4%)	F	7106	55.2%
	G	4981	37.6%		G	4527	35.2%

5.4 Noise Implications

In general, lands that fall within approximately 500 feet of a proposed alignment would need to be considered as a part of the noise impact study area, but study limits can be expanded if potential impacts are found to extend further from the alignment. At a distance of 500 feet traffic noise from the studied alignment will rarely result in an impact, and background noise sources such as local traffic, wind, animal, bird, insect noises, as well as traffic noise from other adjacent highways and arterials will begin to be the predominate noise sources. Whether a proposed roadway improvement involves widening of an existing roadway or a roadway on a new alignment will also affect the types of noise impacts that may be identified. Since existing roadways contribute to the noise environment, widening projects typically do not result in substantial increases in noise levels, so impacts are primarily based upon the NAC. However, when a roadway is constructed on a new alignment, there is a greater potential to identify substantial increases adjacent to the new alignment due to the absence of an existing noise source.

6.0 SUMMARY

Concentrations of potentially noise sensitive areas exist within each of the three CARA. Specific impacts to populations and noise sensitive land uses are not assessed during Tier 1, but would be studied in a more detailed Tier 2 NEPA analysis if a preferred corridor alternative is carried forward. Noise impact analysis must be conducted for all Category B residential land uses that fall within the study limits. Category C and E land uses will require verification of active outdoor land use areas in order to be considered noise sensitive. This primarily includes activities such as outdoor dining and recreational areas. However, locations where the activities may generate noise themselves, or where the uses may be transient in nature may not be considered noise sensitive. Per MDOT SHA Highway Noise Guidelines, Category C land uses that include large recreational areas are assigned an equivalent residence (ER) value based upon the amount of linear frontage they have adjacent to the proposed roadway. A determination is made that the typical uses would be of sufficient frequency and duration, and the ER value can be weighted based upon this “intensity of use” determination. If upon further investigation a Category C area contains no outdoor land uses, however indoor noise sensitive uses are present, these areas will be reclassified as Category D. The interior noise levels are analyzed for Category D areas by applying a building noise reduction factor based on the type of construction materials used for the structure to estimate the interior noise levels from the exterior noise levels just outside the building.

Lands that have been identified as non-noise sensitive using the land use cover data may also need further identification of potential noise sensitive areas. For Category F agricultural areas there are typically dwelling structures located within the lots, and the areas directly adjacent to these dwelling structures would need to be considered as a Category B noise sensitive area. Locations within the forest land identified as Category G may also contain recreational areas which may fall into a Category C.

The attachments to this report identify the Land Use Activity within each of the CARA. Every parcel within each CARA has been classified based on the Maryland Department of Planning 2010 Land Use/Land Cover Update and shaded accordingly. Open water is not considered noise sensitive, but does not fall into any of the Activity Categories and has not been included with the shading and these areas have also been excluded in the results. Land-locked freshwater lakes have been included in the results. The shaded areas correspond to the acreage and percentages shown in Tables 5-1 through 5-3.

APPENDIX A

Land Use Activity Categories: Corridor 6

APPENDIX B

Land Use Activity Categories: Corridor 7

APPENDIX C

Land Use Activity Categories: Corridor 8