

3. AFFECTED ENVIRONMENT/ENVIRONMENTAL CONSEQUENCES

3.1 TRAFFIC AND TRANSPORTATION

3.1.1 Existing Roadway Network and Traffic Study Area

Route 52 operates as a major north/south arterial extending from Route 9 in Somers Point to Bay Avenue in Ocean City. Between Route 9 and the Somers Point traffic circle, it is called MacArthur Boulevard. South of the circle, Route 52 continues as a causeway across the bay area and the barrier islands, into the Ocean City, where it continues southward as 9th Street.

The traffic study area for the project consisted of the major signalized intersections along Route 52, including the key intersections at US Route 9, Bay Avenue and West Avenue, as well as the Goll Avenue / CR 585 intersection and the Somers Point traffic circle.

During August 1996, traffic data with count periods, speed, and delay were collected along Route 52 in Somers Point and Ocean City. This included movement and vehicle classification at five intersections. The count data indicated that Friday evening and Saturday mid-afternoon/evening represented peak periods. On Fridays, traffic volumes peaked between 4:00 and 7:00 PM, while traffic volumes peaked on Saturdays between 10:00 AM and 12:00 PM and between 3:30 and 5:30 PM.

An analysis of accidents between January 1, 1991 and December 31, 1995, revealed that the total number of accidents in the study area was 320. The total number of accidents at the traffic circle was 174, which accounts for 54% of all motor vehicle accidents along Route 52. This is attributed to the high traffic volumes entering the traffic circle from Shore Road and Mays Landing Road attempting to weave through the Route 52 traffic in the relatively short weaving lengths available. 91% of accidents at the circle, were same direction rear-end, same direction sideswipe and angle collisions.

3.1.2 Projected Traffic Volumes

Two future analysis years 2004 and 2024 were selected for the study. The 2004 analysis year represents the expected midpoint of construction while 2024 represents a point 20 years into the future. Using the 1996 volumes as base, it was projected that the future traffic volumes would be increased by eight percent by 2004 and 32 percent by 2024. These increases represent approximately a one percent increase per year. The volume increases take into account both background traffic growth and volume projections due to new developments in the study area. The following 2024 peak hour volumes have been projected on the causeway between the traffic circle and Bay Avenue:

	Northbound	Southbound	Two-Way
Weekday PM peak	1975 vph	1590 vph	3565 vph
Weekend PM Peak	1995 vph	1980 vph	3975 vph

These volumes are well within the capacity of a 4-lane facility but greatly exceed the capacity of the current 2-lane roadway.

3.1.3 No Build Alternative Level of Service

Based on the projected traffic volumes, the study area intersections are expected to operate at Level of Service (LOS) F during peak hours under the 2024 No Build conditions. For details, please refer to Section 3.1.7 of the DEIS.

3.1.4 Build Alternative

It is not expected that traffic will be diverted or generated by the reconstruction project so that projected traffic volumes will be the same for the Build and No Build alternatives. The Preferred Alternative (Alternative 9-1) will include a High Fixed Span bridge over the Ship Channel as well as the ICWW at Beach Thorofare. This alternative will provide uninterrupted traffic flow over the waterways since no bridge openings will be required.

3.1.5 Build Level of Service – Traffic Circle

Four MacArthur Boulevard/Somers Point traffic circle options were originally analyzed to determine optimum configuration for the Somers Point traffic circle and widening of MacArthur Boulevard. These included keeping the circle but metering the approaches and replacing the circle with a 4-legged intersection. MacArthur Boulevard options included the no build option (existing two lanes), adding a center turning lane and widening to four lanes with center turning lane. The analysis indicated that considering the entire corridor the option that proposed four lanes plus a center turning lane for MacArthur Boulevard and a 4-legged intersection with signals for replacing the Somers Point Traffic Circle would provide the best configuration and therefore was selected as the preferred option. Traffic simulation results for this option did not show any significant queues, spillbacks, or congestion. This option would generally increase the accessibility of the area by all pedestrians. For details, please refer to DEIS Section 3.1.9.

In response to public comments, the right turn movement from CR 559 (Mays Landing Road) onto southbound Route 52 in Somers Point at the proposed four-legged intersection was studied further. Four different configurations of the right turn at this location were studied. It was determined that a Single Free Right Turn Lane Eastbound, with yield condition was the most desirable. This configuration would provide LOS A with safe ingress to Circle Liquor. For details, please refer to section 3.1.4.3 in the DEIS.

3.1.6 Build Level of Service at Intersections

The Build Level of Service analysis is based on the assumption that the Preferred Alternative for the causeway (Alternative 9-1) would be implemented, the Somers Point traffic circle would be replaced by a signalized intersection, and the MacArthur Boulevard would be widened to four lanes plus a center turning lane. The resulting conditions are then compared with the No Build Alternative, using the traffic simulation model NETSIM.

There is not much difference in the operating levels of service in Ocean City between the No Build and Build conditions since no significant widening or improvements are proposed there. The signalized intersection of 9th Street and Bay Avenue does increase in LOS from D to C (except the southbound approach that continues to operate at LOS D).

For Somers Point, LOS is improved at the intersections with Route 9, Shore Road, and C.R. 585 at Goll Avenue. These improvements are due to roadway widening, intersection modifications, re-channelization of approach roads, and signal timing modifications. For details, please refer to DEIS Section 3.1.10.

All of the approaches at the Somers Point traffic circle, except the northbound approach, are greatly improved by conversion to a four-legged intersection. The northbound and westbound approaches at Goll Avenue will be greatly improved because of the removal of the restriction caused by the traffic circle.

On the basis of these results, a Build Alternative with high fixed bridges over the waterways, a four-legged intersection at Shore Road and four lanes on MacArthur Boulevard represents an improvement capable of handling future traffic with little or no impact.

3.1.7 Additional Study of Route 52/Route 9 Intersection

In response to public comments the intersection of northbound Route 52 and Route 9 was re-evaluated to determine the impact of proposed improvements on queue lengths for northbound traffic. The analysis indicated that with Improved Geometry and Improved Signal Timing there will be a significant reduction in queue length on the northbound approach and much improved Level of Service, as compared to the No Build with projected year 2024 traffic volumes. For complete results of the analysis see Table 3.1-22 in the DEIS.

3.1.8 Additional Study – MacArthur Blvd.

In response to comments received at the Public Hearing and Information Center held to solicit comments on the DEIS (November 15, 2000 at the Jordan Road School in Somers Point NJ) additional studies were made to address issues that were raised by concerned local citizens. The results of these studies were presented to Somers Point local officials. The following issues were studied:

- A. Alternate widening schemes for MacArthur Boulevard
- B. Safe pedestrian crossing of the Boulevard

3.1.8.1 Alternate Widening Schemes for MacArthur Boulevard

The study of alternative widening schemes for MacArthur Boulevard consisted of traffic analysis and simulation using the SYNCHRO/SIMTRAFFIC computer model. The model determined Level of Service and Delay for the signalized and unsignalized intersections in the project area and provided a visual simulation of traffic operations and queues for the project corridor. The results provided a comparison of the traffic operations for different widening schemes to assist in determining a preferred widening scheme.

The study included the following three widening schemes for Route 52 between Route 9 and Route 585:

1. Five Lanes (Two Lanes each direction plus Center Left Turn Lane)
2. Three Lanes (One Lane each direction plus Center Turn Lane)
3. Two Lanes (One Lane Each Direction)

A variation of the 3 Lane Alternative was also studied. This involved 3 Lanes between Route 9 and Braddock Avenue and 5 Lanes between Braddock Avenue and Route 585 (See MacArthur Blvd Access plan – Modified 3 Lane configuration in Appendix D).

For all the alternatives, the analysis assumed Full Build Geometrics and Signalization for the Route 52/Route 9 and Route 52/Route 585 intersections. The analysis also assumed signalization of the Route 52/Braddock Drive intersection. Unsignalized conditions were assumed for the Route 52/Sixth Ave, Route 52/Par Drive, Route 52/Braddock Ave, and Route 585/Goll Avenue intersections.

Traffic analysis was performed using traffic growth projections of about one percent per year as provided by NJDOT Bureau of Mobility Strategy (BMS). Using actual traffic data collected along Route 52 during August of 1996 as a base, these projections take into account the background traffic growth and volumes due to new developments and natural growth in the project area. Actual recorded traffic counts obtained from the New Jersey Highway Authority at Exit 30 on the Garden State Parkway for the years 1992 through 2000 has shown a consistent increase in traffic volumes at the average rate of 3.2% in both directions at this location. In addition the annual growth rate projected by the Garden State Authority is 2.6 % on the parkway segment between Exits 29 and 36. Traffic for side streets between Route 9 and Route 585 was estimated. Analysis was performed for Weekday and Weekend Peak Hours for 2024 and 2004 Design Years for the three alternatives.

The SYNCHRO/SIMTRAFFIC program analyzes and simulates signalized and unsignalized intersections and can provide for the coordination of signals along an arterial. The program provides Level of Service and Delay for the intersections based on methods of the Highway Capacity Manual (HCM), 2000 Revision. The program also provides a simulation that provides a visual representation of traffic operations and permits viewing of traffic conditions, queuing and the relationship between intersections. The Level of Service and Delay ranges used by the program are shown in Tables 1 and 2, and the results of the analysis are shown in Table 2.

Table 3.1. Level of Service and Delay (Seconds) for Signalized and Unsignalized Intersections

Level of Service	Signalized Intersections	Unsignalized Intersections
	Control Delay Per Vehicle (Seconds)	Control Delay Per Vehicle (Seconds)
A	<10	<10
B	>10 and <20	>10 and <15
C	>20 and <35	>15 and <25
D	>35 and <55	>25 and <35
E	>55 and <80	>35 and <50
F	>80	>50

Table 3.2. Summary of Level of Service and Delay for Three Alternatives

	Weekday						Weekend					
	5 Lane		3 Lane		2 Lane		5 Lane		3 Lane		2 Lane	
	LOS	delay	LOS	delay	LOS	delay	LOS	delay	LOS	delay	LOS	delay
2024 SIGNALIZED												
Rt 52/Rt 9	C	23.5	C	23.5	C	23.5	D	39.1	D	39.1	D	39.1
Rt 52/Braddock Dr	A	5.3	B	12.2	C	32.0	A	5.2	B	13.9	D	36.9
Rt 52/Rt 585	D	41.7	D	40.2	D	40.1	D	44.7	D	43.0	D	41.8
UNSIGNALIZED**												
Rt 52/Sixth Ave	F	196.1	F	679.9	F	784.5	F	130.2	F	683.4	F	683.4
Rt 52/Par Dr	F	91.4	F	317.0	F	317.0	F	140.8	F	345.8	F	345.8
Rt 52/Braddock Ave	F	*	F	*	F	*	F	*	F	*	F	*
Rt 585/Goll Ave	F	*	F	*	F	*	F	342.0	F	342.0	F	342.0
2004 SIGNALIZED												
Rt 52/Rt 9	B	18.2	B	18.2	B	18.2	C	22.3	C	22.3	C	22.3
Rt 52/Braddock Dr	A	5.3	A	8.2	B	10.4	A	5.9	A	8.8	B	12.9
Rt 52/Rt 585	C	34.6	C	34.1	C	34.0	C	33.0	C	32.6	C	32.4
UNSIGNALIZED**												
Rt 52/Sixth Ave	F	62.6	F	208.2	F	208.2	F	51.5	F	229.9	F	229.9
Rt 52/Par Dr	E	40.9	F	83.6	F	83.6	F	56.8	F	196.2	F	196.2
Rt 52/Braddock Ave	F	*	*	*	F	*	F	*	F	*	F	*
Rt 585/Goll Ave	F	939.5	F	939.5	F	939.5	F	81.5	F	81.5	F	81.5

*Delay is beyond limit of model.

**Level of Service and Delay for Minor Movement

The variation of the 3 Lane alternative with 5 Lanes between Braddock Avenue and Route 585 that was studied did not exhibit significantly different traffic operation from the 3 Lane version as the southbound Route 52 queue continued to back up north of Braddock Drive. However, this 3-lane variation provided some improvement to storage capacity south of Braddock Drive.

As shown in Table 2, the three project signalized intersections will operate at satisfactory Levels of Service under 2024 and 2004, Weekday and Weekend traffic volumes for all three alternatives. The Route 52/Route 9, Route 52/Route 585, and Route 585/Goll Ave intersections show virtually no difference in Level of Service and Delay between the alternatives. The Route 52/Braddock Drive intersection operates best under the 5 Lane Alternative, slightly worse with the 3 Lane Alternative and slightly worse with the 2 Lane Alternative. The SIMTRAFFIC simulation shows good operations under all conditions and scenarios for the Route 52/Route 9 and Route 52/Braddock Drive intersections. The Route 585/Goll Avenue intersection operates poorly under all conditions. The simulation shows significant queuing under all conditions and scenarios on the westbound Route 585 approach at Goll Avenue and at Route 52 and on the Goll Avenue northbound approach to Route 585. There is also significant queuing on the southbound Route 52 approach with 2024 and 2004 traffic volumes and 2 or 3 Lane Alternatives. This queue backs up under these alternatives beyond Braddock Drive. Under the 5 Lane Alternative, there is minimal queuing on the southbound Route 52 approach since the extra lanes provide more storage area for the intersection queues.

The three unsignalized intersections, located in the section between Route 9 and Route 585, operate at Level of Service F for all side street movements for all traffic conditions and lane arrangement alternatives. Under the 5 Lane Alternative, however, delays to side street traffic at these locations is significantly lower than under the 2 or 3 Lane Alternatives and capacity is significantly higher under the 5 Lane Alternative. The simulation shows that at the Sixth Ave and Par Drive intersections with MacArthur Blvd. there are delays under the 5 Lane Alternative, but sufficient gaps will exist to allow turns into MacArthur Blvd. Under the 2 or 3 Lane Alternatives (at these intersections), there are virtually no gaps and traffic cannot turn into MacArthur Blvd. At the Braddock Ave intersection, under the 5 Lane Alternative for 2004 traffic volumes there is some capacity for entering MacArthur Blvd. and very limited capacity

for 2024 traffic volumes. Under the 2 or 3 Lane Alternative for 2004 and 2024 conditions, there are virtually no gaps and traffic cannot enter MacArthur Blvd. from Braddock Ave.

In conclusion, the 5 Lane Alternative has acceptable traffic operations under all traffic conditions at the signalized intersections and significantly better traffic operations at the unsignalized intersections than the 2 or 3 Lane Alternatives. Under the 5 Lane Alternative there is some capacity for side street access to Route 52 between Route 9 and Route 585, while there is virtually no capacity and no gaps for traffic from the side streets under the 2 or 3 Lane Alternative. Queuing is acceptable on Route 52 under the 5 Lane Alternative, whereas there are extremely long queues southbound on Route 52 under the 2 or 3 Lane Alternatives. The Route 585/Goll Avenue intersection has poor traffic operations as an unsignalized intersection under all alternatives.

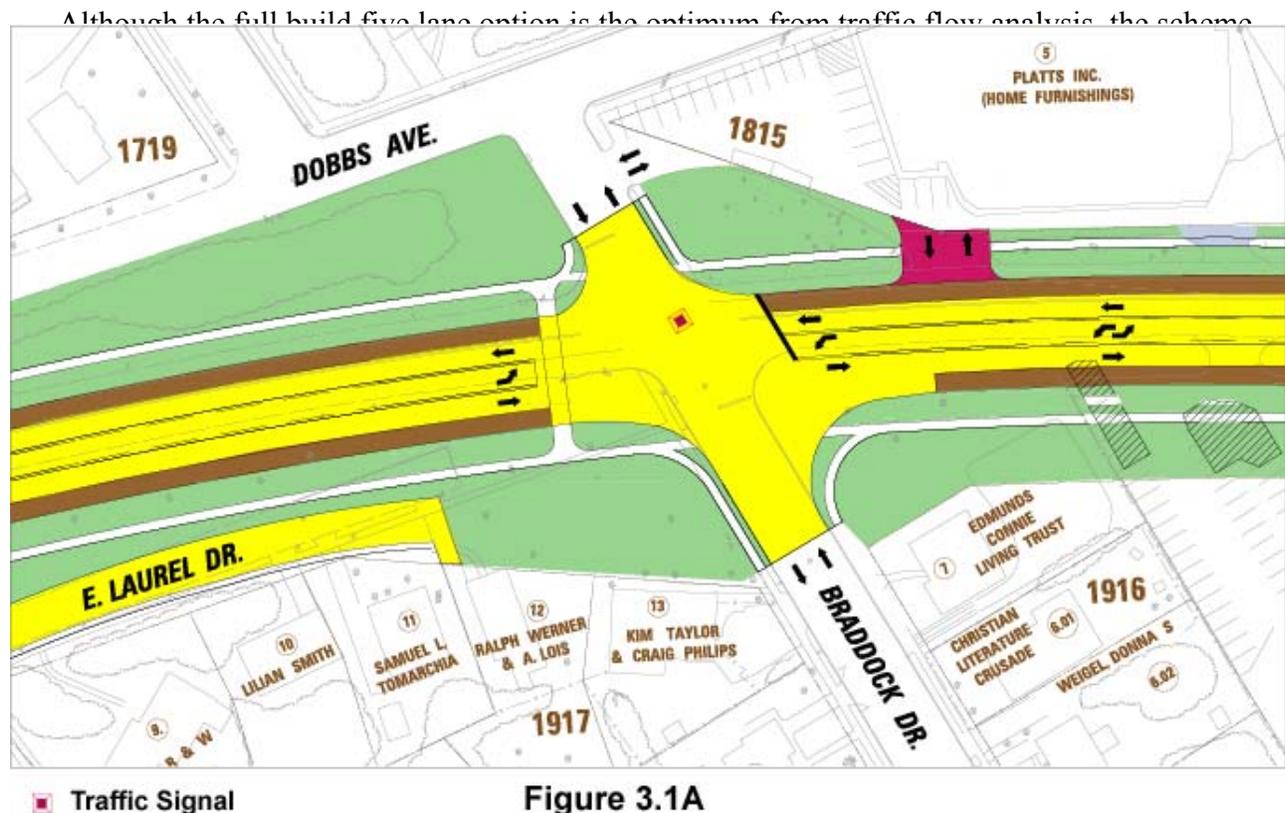


Figure 3.1A

**MacArthur Blvd. Modified 3 Lane Configuration
Proposed Crosswalk at Braddock Drive**

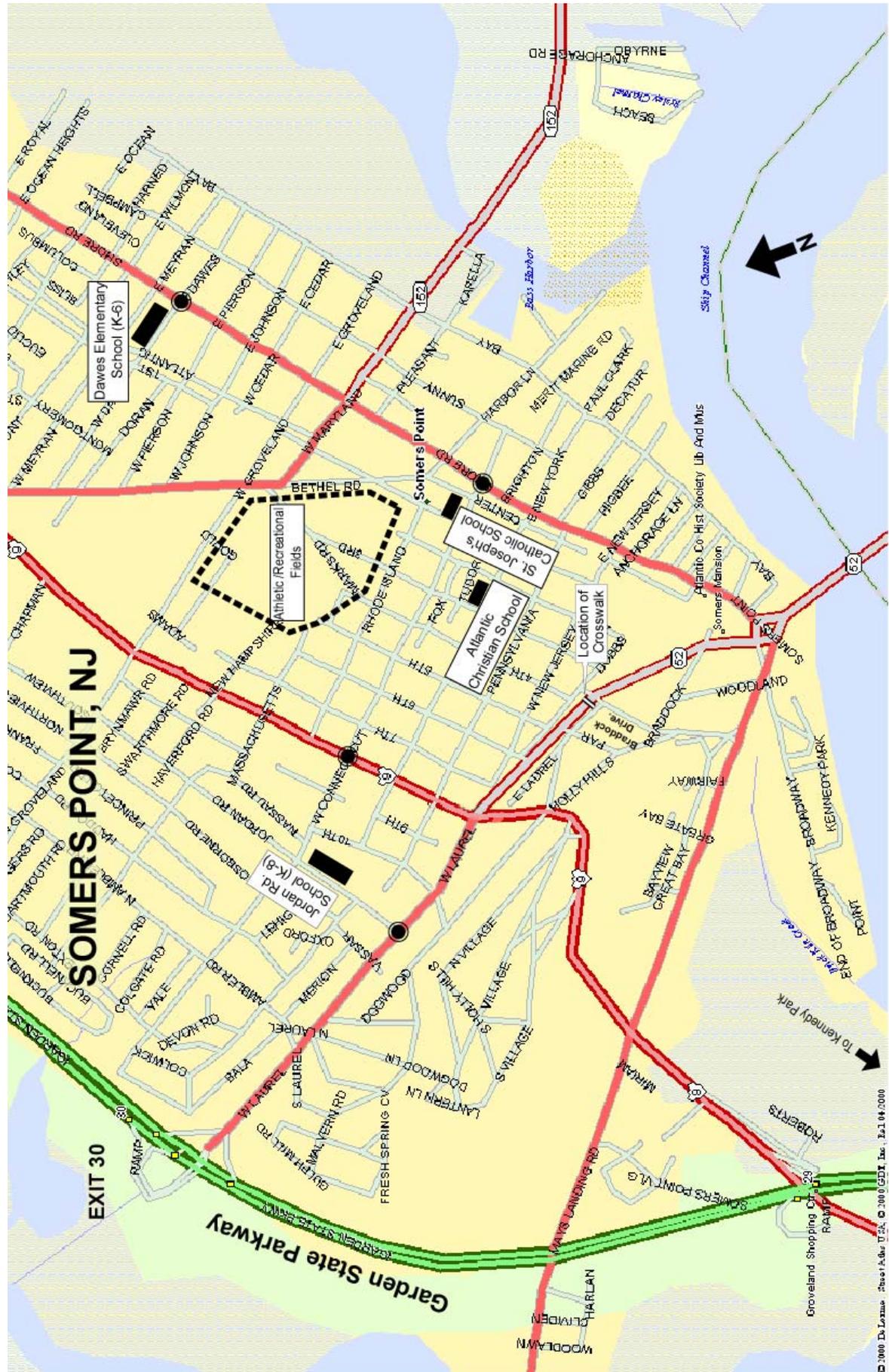


FIG. 3.1B

Location of Schools and Athletic Fields in Somers Point

3.1.8.2 Safe Pedestrian Crossing of the Boulevard

A safe crossing of MacArthur Boulevard was a major concern for local citizens especially for those residing west of the boulevard. These residents requested a safe access to local schools and recreation areas located east of the boulevard (see Figure 3.1A and Figure 3.1B).

In order to provide a signalized crosswalk at a location between the present traffic circle and the intersection of MacArthur Blvd and Route 9, a Traffic Signal Warrant Analysis was conducted to assess the need for a Traffic Control Signal at the intersection of Braddock Drive and MacArthur Blvd. The analysis was based in part on a traffic count Earth Tech performed on Braddock Drive for a twenty four (24) hour period on February 21, 2001 (See Table 3). Based on extrapolated peak summer volumes, two warrants were met. Warrant 1 – Condition B item C and Warrant 2 (As prescribed in the Manual on Uniform Traffic Control Devices (MUTCD) 2000 published by FHWA).

Warrant 1 - Condition B

Condition B - Interruption of Continuous Traffic							
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)			Vehicles per hour on higher-volume minor-street approach (one direction only)		
Major Street	Minor Street	100% ^a	80% ^b	70% ^c	100% ^a	80% ^b	70% ^c
1.....	1.....	750	600	525	75	60	53
2 or more...	1.....	900	720	630	75	60	53
2 or more...	2 or more ...	900	720	630	100	80	70
1.....	2 or more	750	600	525	100	80	70

^a Basic minimum hourly volume.

^b Used for combination of Conditions A and B after adequate trial of other remedial measures.

^c May be used when the major street speed exceeds 70 km/h (40 mph) or in an isolated community with a population of less than 10,000.

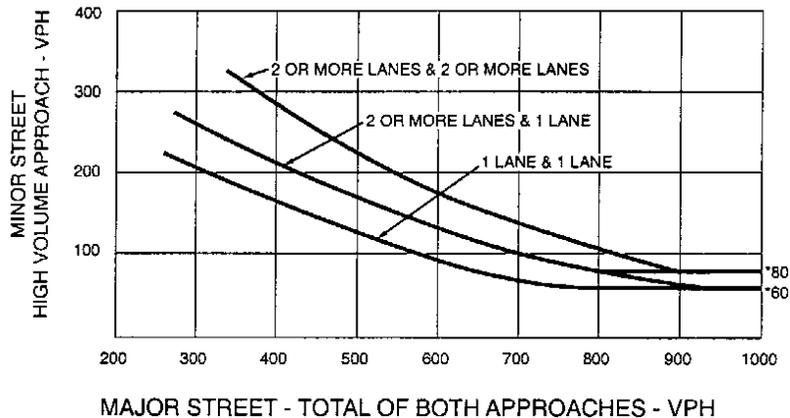
Table 3.3

**ATR Count on Braddock Drive at the intersection of MacArtur Blvd.
February 21, 2001**

Time	Measured Volume	Factor for summer Volume	2001 Summer Volume	Projected Volumes		
				2002	2003	2004
12:00 AM	2	1.61	3	3	3	3
1:00 AM	0	1.61	0	0	0	0
2:00 AM	3	1.61	5	5	5	5
3:00 AM	2	1.61	3	3	3	3
4:00 AM	1	1.61	2	2	2	2
5:00 AM	1	1.61	2	2	2	2
6:00 AM	12	1.61	19	20	20	20
7:00 AM	20	1.61	32	33	33	33
8:00 AM	21	1.61	34	34	34	35
9:00 AM	16	1.61	26	26	26	27
10:00 AM	36	1.61	58	59	59	60
11:00 AM	34	1.61	55	55	56	56
12:00 PM	35	1.61	56	57	57	58
1:00 PM	36	1.61	58	59	59	60
2:00 PM	34	1.61	55	55	56	56
3:00 PM	39	1.61	63	63	64	65
4:00 PM	58	1.61	93	94	95	96
5:00 PM	66	1.61	106	107	108	109
6:00 PM	27	1.61	43	44	44	45
7:00 PM	21	1.61	34	34	34	35
8:00 PM	8	1.61	13	13	13	13
9:00 PM	8	1.61	13	13	13	13
10:00 PM	13	1.61	21	21	21	22
11:00 PM	10	1.61	16	16	16	17
24 hour volume	503		810	818	826	834

Warrant 2 – Four hour Vehicular Volume will be met in 2004, it is projected that over 1780 vph on the major street and 60 vph in any 4 hour period on the minor street. (See table 3).

Warrant 2 – Four Hour Vehicular Volume (70% Factor)



Given the design speed of 40 mph for MacArthur Blvd. Warrant 1- Condition B (70% column) is met for 8 hours of an average summer season day. As stated in the Traffic Technical Environmental Study for the Route 52 project, 1650 vehicles/hr travel on the major road (MacArthur Blvd) during the summer period. That is over three times the required minimum of 525 vehicles per hour on major street. For the minor street approach (Braddock Drive - Table 3).

Based on the analysis, it was concluded that under current conditions the intersection of Braddock Dr. and MacArthur Blvd. meets Warrant 1- Condition B (70% column) and it also meets Warrant 2 under 2004 projected conditions. Furthermore, the traffic volumes on Route 52 are significantly higher than the volumes required to meet the main street portion of the either Warrant 1B or Warrant 2 (1650 vph vs. 525-630 vph).

Also, as indicated in the Alternative Lane Arrangement Study, each of the unsignalized intersections along MacArthur Blvd. between Rt. 9 and the Somers Point Circle result in LOS F. The projected high traffic volumes on MacArthur Blvd. will reduce the gaps in through traffic to the point where there will be no left turning capacity from the minor streets.

The installation of a signal and a crosswalk at Braddock Dr. intersection will allow such access without impacting corridor operations and provide a safe pedestrian crossing to destinations east of the boulevard.

3.1.9 Impact on Accidents

It is anticipated that there will be a significant decrease in the number of accidents resulting from the proposed improvements. The removal of the Somers Point Traffic Circle is expected to sharply reduce accidents at that intersection. A reduction of over 50% is anticipated. The principal safety improvements along the causeway that are expected to reduce accidents are the widening of lanes from 10 feet to 12 feet, the provision of a concrete median divider, and the addition of shoulders to handle breakdowns without endangering through traffic. Based on published FHWA studies, a 20% reduction in accidents is anticipated. The widening of MacArthur Boulevard is also expected to provide safer driving conditions.

3.1.10 Transportation System Management

Structural improvements as proposed under the various Build Alternatives are, in many instances, not the only way to handle projected increases in traffic. Some transportation system management alternatives that have been considered are:

- Alternate modes of transportation, such as light rail or increased bus usage.
- High occupancy vehicle (HOV) lanes where travel is restricted to vehicles carrying at least two, and sometimes three, persons.
- Congestion tolls, where toll amounts are increased during historical peak travel periods.
- Diversion to other points of access. This usually requires some strategy, like variable message signs (VMS) to be in any way effective.

Most such strategies apply more properly to routes where the predominant traffic is home-to-work and are not as effective when applied to resort destination traffic, which is the predominant component of traffic between Somers Point and Ocean City during the peak travel months. Analysis of these strategies indicated that none of them is viable for the project. For details, please refer to Section 3.1.13 of the DEIS.

3.1.11 Congestion Management Study

A congestion management study (CMS) was prepared for the portion of Route 52 between Route 9 and the Somers Point traffic circle. Its purpose was to examine whether any alternative traffic management technique could be feasibly implemented which would eliminate the need for increasing the capacity of MacArthur Boulevard and the traffic circle.

The study concluded that, because of the limited length of highway involved and the predominately recreational character of its peak traffic periods, no feasible alternative exists.

3.1.12 Pedestrian and Bicycle Access

The present conditions provide virtually no pedestrian and bicycle usage between Somers Point and Ocean City. There are no existing shoulders or sidewalks. Pedestrian/bicyclist crossing is unsafe. The existing long causeway has four lanes of traffic between parapets. Given the visual appeal of its setting, Route 52 would make a very desirable route for bicyclists, joggers, in-line skaters, recreational fishermen and others, if it were safe to engage in these activities. The Preferred Alternative proposes 3-meter (10-foot) wide shoulders in both directions and a sidewalk on the north side of the causeway. Although these facilities, will provide safety to pedestrians the long steep bridge grades of 4 and 5% will make it difficult for the elderly, infirm and the handicapped. To the extent that it is feasible, provision of handicapped accessibility to recreation areas along the causeway will be provided.

3.1.13 Safety Issues Under Existing Conditions (No Build Alternative)

In addition to pedestrian and bicyclist safety, there are several other safety considerations under the existing conditions (the No Build alternative):

- The width of travel lanes, currently only 3.0 meters (10 feet) wide;
- The lack of paved shoulders to accommodate breakdowns;
- The lack of adequate sight distance on substandard vertical curves;
- A substandard horizontal curve on the bridge over the ICWW;
- The potential for accidents because of the deficiencies in the geometry of the Somers Point traffic circle;
- The lack of separation between the northbound and southbound directions of travel; and
- The potential blockage of emergency vehicles when the existing bascule bridges open to allow ships to pass.

There is another general safety concern involving the ability of residents of Ocean City to evacuate safely during a major storm event threatening that barrier island community. The elevation of the existing causeway is so low that, during major storms, waves can lap up onto the roadway and make driving hazardous.

If an evacuation of Ocean City were to be necessary, Route 52 would be converted to three lanes northbound, with one lane southbound for emergency and authorized vehicles. This additional capacity, along with simultaneous use of the 34th Street and the Ocean City-Longport bridges, would be needed to evacuate a peak summer population of 150,000 in less than eight hours. The existing Somers Point traffic circle and the continuing single northbound lane on MacArthur Boulevard represent bottlenecks that could prevent timely evacuation to safer areas.

3.1.14 Safety Issues Addressed in Proposed Build Alternative

The Preferred Alternative proposes the following Geometric and Safety Improvements:

- 1) The substandard horizontal curve with a radius of 105 meters (350 feet) located where Route 52 enters Ocean City at 9th Street will be increased to a radius of at least 245 meters (800 feet), which will accommodate a 64 km/h (40 mph) design speed.
- 2) The vertical curve over Beach Thorofare is adequate for a safe speed of only 48 km/h (30 mph). It will be lengthened to provide adequate stopping sight distance at a 64 km/h (40 mph) design speed.
- 3) The four 3.0-meter (10-foot) wide lanes will be widened to standard 3.6-meter (12-foot) wide lanes.
- 4) Breakdown shoulders 3.0 meters (10 feet) wide will be provided in both directions.
- 5) A concrete median barrier will separate opposing northbound and southbound traffic movements.

Peak Hour Capacity Improvements and Removal of Impediments to Emergency Access and Evacuation

- 1) The Somers Point traffic circle will be replaced with a 4-leg signalized intersection having separate turning lanes.
- 2) Route 52 (MacArthur Boulevard) between the circle and Route 9 will be widened from two lanes to four lanes with a center turning lane, all within the existing right-of-way.
- 3) The two low bascule bridges, which currently are opened twice an hour to let ships pass

during the tourist season, will be replaced either by high fixed span structures or high bascule bridges that will be opened only once or, at most, twice a day.

- 4) Embankments will be raised to at least 0.3 meters (1 foot) above the 100-year flood level. Structures will be designed to have the bottom of the superstructure at least 0.3 meters (1-foot) above the 100-year flood level.

Pedestrian and Bicycle Safety

- 1) Shoulders 3.0 meters (10 feet) wide will be available in each direction for joint use by bicyclists.
- 2) A sidewalk 1.8 meters (6.0 feet) wide, adequate for wheelchairs to pass, will be available on one side of Route 52 separated from the shoulder by a continuous concrete barrier.
- 3) Benches could be provided approximately 70 meters (230 feet) on center along the 4% or 5% approach gradients proposed on bridges over the ICWW and Ship Channel.

3.2 AIR QUALITY

3.2.1 Introduction/Methodology

The Air Quality TES was prepared pursuant to requirements set forth by the FHWA and the US Environmental Protection Agency (EPA). The air quality analysis was performed to determine the maximum one-hour and eight-hour carbon monoxide (CO) concentrations at locations near the project caused by vehicle traffic. Concentrations of CO were determined using EPA-approved models and were compared to the National Ambient Air Quality Standards (NAAQS) for construction and design year periods (2004 and 2024). The primary and secondary CO NAAQS are 35 parts per million (ppm) over a 1-hour period and 9 ppm over an 8-hour period, not to be exceeded more than once per year.

Primary constituents of motor vehicle emissions include CO, hydrocarbons, and nitrogen oxides. Of these pollutants, the EPA and the NJDOT focus on CO as the primary pollutant of concern when evaluating potential air quality impacts from motor vehicle exhaust. Increased concentrations of CO can be expected at congested intersections where long delays are common during peak traffic periods.

Carbon monoxide concentrations at a receiver near a roadway are comprised of two components: local and background concentrations. The local, microscale CO concentrations in the project area were estimated using the USEPA's line source atmospheric dispersion model CAL3QHC, with input from the EPA's emission factor model MOBILE 5a-H.

Background concentration is defined as the concentration at a receiver that is the result of emissions outside the local vicinity. Monitoring data on existing or background CO concentrations is not available for the project area; therefore, the NJDOT recommended using background values of 3.0 ppm for a one-hour averaging period and 2.1 ppm for an eight-hour averaging period for this analysis.

The MOBILE 5a-H composite emission factors were obtained from a table for South New Jersey

published by the NJ Department of Environmental Protection. The factors for the year 2010 were used in the analysis of 2024 traffic conditions. Since emission factors in the table decrease over time, using year 2010 emission factors with the 2024 traffic conditions was conservative.

CAL3QHC provides a conservative estimate of air quality impacts from motor vehicle emissions. The model results from CAL3QHC are added to the background concentrations to determine the total one-hour and eight-hour CO concentrations at a receiver near the roadway. These total values are then compared to the NAAQS for CO to determine whether the receiver would experience air quality impacts.

3.2.2 Existing Conditions

The existing conditions and the 2004 and 2024 No Build and Build conditions were evaluated at the Route 52/CR 585 (Shore Road) intersection in Somers Point and Route 52 (9th St)/Bay Avenue intersection in Ocean City. The project area was evaluated for the presence of potential sensitive receivers, including residences, schools, nursing homes, parks, sidewalks, recreation areas, and hospitals. See Table 3.2-1 in the DEIS for a summary of the maximum 1-hour and 8-hour CO concentrations (including background CO levels) predicted at these intersections.

MOBILE 5a-H Modeling

The DEIS indicated that conformity with the 1-hour ozone standard was not required since it was revoked. However, this rule has been reinstated as of January 2001, and therefore the long Range Plan and Transportation Improvement Program have been re-addressed to insure conformity.

Emission calculations with MOBILE 5a-H for the 70% centralized / 30% decentralized were made and compared to the original criteria used in the DEIS of 92% centralized / 8% decentralized Inspection and Maintenance (I&M) program. It was observed that the differences between the original and the revised criteria sets are not large enough to merit remodeling. Nevertheless, the emission calculations with MOBILE 5a-H for the 70% centralized / 30% decentralized I&M distribution were performed, and the results for the Year 2004 (in

grams/vehicle-mile) compared to the 92% centralized / 8% decentralized are summarized below:

Speed	<u>92%/8%</u>	<u>70%/30%</u>
Idle	249	255.9
20 mph	22.12	22.69
27 mph	15.55	15.96
33 mph	12.14	12.46
40 mph	9.48	9.48

The CO emissions for 70/30 versus 92/8 I&M increased by 3% or less, and therefore have an insignificant effect on the predicted CO impact for the Route 52 study.

3.2.3 Impacts

Alternative 9 would involve improvements to Route 52 and replacement of the Somers Point traffic circle with a signalized intersection. The predicted maximum CO concentrations at the Route 52/SR 585 (Shore Rd) intersection (Somers Point) for this alternative under all analyzed years are lower than the corresponding predicted maximum concentrations under the No Build Alternative. The lower concentrations under the Build Alternative are due to improved traffic flow at the intersection. The predicted maximum CO concentrations for the existing conditions, and for the Build Alternative for year 2004 and year 2024 at the Route 52 (9th St)/Bay Avenue intersection are the same because no modifications are proposed at this signalized intersection. Also, the projected traffic volumes do not change between the No Build and the preferred alternative.

The Route 52(1) Causeway project between the City of Somers Point, Atlantic County and Ocean City, Cap May County is included in the approved 1998-2002 STIP. This project is located in a CO attainment area. The results of the CO analysis suggest that the CO levels will be below the NAAQS of 35 ppm for a one-hour averaging time and 9 ppm for an eight-hour averaging time.

3.2.4 Mitigation

Predicted maximum one-hour and eight-hour CO concentrations at the Route 52/CR 585 (Mays Landing Road) intersection in Somers Point and the Route 52 (9th St)/Bay Avenue intersection in Ocean City under any Build Alternative would not exceed state and federal ambient air quality standards in the construction year (2004) nor the design year (2024). Consequently, the proposed improvements under the preferred alternative will have no significant impact on air quality, therefore no mitigation measures are warranted.

3.3 NOISE

3.3.1 Introduction/Methodology

The magnitude of noise is typically described by its sound pressure. A logarithmic scale is used to relate sound pressure to some common reference level, usually the decibel (dB). Sound pressures described in decibels are called sound pressure levels and are often defined in terms of frequency-weighted scales (A, B, C, and D). The A-weighted scale is used almost exclusively to describe traffic noise because its quantities correlate well with the subjective response of people to the magnitude of a sound level. Sound levels measured using an A-weighted decibel scale are typically shown as 'dBA' and are expressed as dBA Leq(h) in this section. The hourly average sound level (Leq(h)), or equivalent sound level, is the level of constant sound that in an hour would contain the same acoustic energy as the time-varying sound. In other words, the fluctuating sound levels of traffic noise are represented in terms of equivalent steady noise levels with the same energy content.

The FHWA has developed noise abatement criteria (NAC) and procedures to be used in the planning and design of highways. (A summary of the FHWA NAC for various land uses is presented in Table 3.3-1 in the DEIS). These criteria are used to determine whether highway noise levels are compatible with various land uses. This also includes thresholds of noise interference above which noise will begin to intrude on the noise environment for the corresponding land use.

All land uses evaluated in this report belong in Category B (land area include residences, a historic residence, motels, hotels, and playgrounds) and Category C (land area include commercial properties such as shops and restaurants.) The following table provides the FHWA noise abatement criteria for Category B and C land areas:

Activity Category	Threshold of Noise Interference (dBA) ¹		Noise Abatement Criteria (dBA) ²	
	L ₁₀	Leq	L ₁₀	Leq
B	58	55	70 exterior	67 exterior
C	63	60	75 exterior	72 exterior

1. Source: FHWA Report “A Field Review of the Highway Traffic Noise Impact Identification and Mitigation Decision making Processes.”
2. L₁₀ = Hourly A-weighted noise levels exceeded 10 percent of the time. Leq = Hourly A-weighted average noise level. Source: Title 23 of the Code of Federal Regulations (CFR) Part 772.

Title 23 CFR Part 772.11(a) states, “In determining and abating traffic noise impacts, primary consideration is to be given to exterior areas. Abatement will usually be necessary only where frequent human use occurs and lowered noise levels would be of benefit.”

Traffic noise impacts occur when either; a) the predicted traffic noise levels approach or exceed the FHWA NAC for the applicable Activity Category, or b) when the predicted traffic noise levels substantially exceed the existing noise levels. Noise abatement measures must be considered for receivers impacted under either case. The NJDOT guidelines state that noise levels within one decibel of the FHWA NAC are considered as ‘approaching’ the criteria. The guidelines define a ‘substantial increase’ as a 10-decibel increase over existing levels.

Leq or L₁₀ noise levels were performed using the FHWA Highway Traffic Noise Prediction model and the Stamina 2.0/Optima Prediction Model for the following cases: existing conditions, future 2024 No Build conditions, and future 2024 build conditions with each of the four project Build Alternatives. These (Design Year) noise levels were compared to existing (pre-construction) noise levels and NAC levels to determine the traffic noise impacts.

3.3.2 Existing Conditions

Existing noise levels in the project study area were measured by the NJDOT (NJDOT, 1996). Two locations were monitored for 24-hour periods during the weekday, including the Somers

Mansion historic site near the Route 52 traffic circle in Somers Point and 41 Revere Place in Ocean City. The maximum peak hourly noise levels were 65 dBA Leq. and 62 dBA Leq, respectively. There were no measurement periods at either location that approached or exceeded the FHWA NAC of 67 dBA Leq for Category B receivers. However, both sites had hourly average noise levels above the Threshold of Noise Interference. Existing noise contours from the Noise TES indicate 12 residences and one motel in Somers Point and four residences in Ocean City where noise levels currently approach or exceed the FHWA NAC for Category B receivers.

3.3.3 Impacts

The projected 2024 noise contours that were developed for the proposed widening of MacArthur Boulevard indicate that the noise levels are predicted to approach or exceed the FHWA NAC for 24 residences and one motel. Sixteen of these residences and the motel have the same or lesser predicted impacts than those modeled under the Future No Build Conditions. The eight other residences are all on the southeastern side of the road, the direction in which the widening is proposed to occur. At the Somers Mansion, the noise level is predicted to increase by about 2 dBA Leq.

Alternatives 9 consist of a causeway reconstructed along the existing alignment with high fixed bridges and slightly realigned waterways. The projected 2024 noise contours for Alternative 9-1 in Somers Point are included in the Noise TES. There are two motels and one site on the National Register of Historic Places (Somers Mansion) where the noise levels are predicted to approach or exceed the FHWA NAC. The predicted noise levels at the two motels are the same or less when compared to the modeled noise levels for the future No Build conditions.

The projected 2024 noise contours for Alternatives 9 and 9A in Ocean City are included in the Noise TES. There are 21 residences in the project area in Ocean City where the noise levels are predicted to approach or exceed the FHWA NAC under these alternatives. The traffic along Bay Avenue is the dominant noise source for these impacted residences. There is no increase in the noise levels when compared to the future No Build conditions.

3.3.4 Mitigation

When predicted noise levels approach or exceed the FHWA NAC, or when there are substantial increases in predicted noise levels over existing noise levels, noise abatement measures are evaluated. Since Ocean City residences are already impacted by traffic on Bay Avenue, which is not part of the proposed project, noise mitigation was not considered for Ocean City residences. Noise mitigation is considered for impacted receivers in Somers Point and along MacArthur Boulevard as discussed below.

The FHWA and NJDOT recognize five methods of potential noise mitigation to reduce traffic noise levels.

- a. Traffic Management Strategies - This includes implementing alternative traffic routing schemes, restricting certain vehicle classes or times of operations, and limiting speeds. However, these restrictions would be contrary to the project objectives, and therefore cannot be viable options for noise mitigation.

- b. Roadway Alignment Alterations
Various roadway alignments were considered for the project in the early stages of the planning process; however, the area outlying the roadway is highly developed, and therefore no opportunities for significant alteration of the preferred alternative presented in this report would be feasible or reasonable. Accordingly, this strategy could not be implemented.

- c. Property Acquisition
Few undeveloped or scarcely developed areas exist along the proposed alternatives where effective buffer zones could be acquired. Additionally, this treatment would not alleviate the noise impacts to existing receivers since the land separating the receivers from the proposed highway alignment already exists and fails to reduce noise levels sufficiently. Acquisition of this land, therefore, would do nothing to increase its noise attenuation capabilities.

d. Sound Proofing

Noise insulation of public use facilities and buildings can be considered for facilities affected by noise impacts; however, no such impacts occur within the limits of this project.

e. Noise Barriers

The noise models in this study predict there will be seven areas that have Category B noise impacts. The construction of noise barriers was found to be feasible in only two of these areas and not feasible in the other five. The areas in which it was not feasible to construct a noise barrier include:

- (1) East of MacArthur Boulevard between Sixth Street and Route 9;
- (2) East of MacArthur Boulevard and south of Braddock Drive;
- (3) West of MacArthur Boulevard south of Par Drive;
- (4) Somers Mansion; and
- (5) Eastern quadrant of the Route 52/Mays Landing Rd intersection.

The two areas where it may be feasible to construct a noise barrier are:

- Residences with direct access to Laurel Drive, north of Village Drive; and
- Residences with direct access to Dobbs Avenue between Fourth and Sixth Streets.

For these residences, noise barriers are predicted to provide a reduction in noise level of at least 5 dBA Leq (h). However, a more detailed study will be conducted to ascertain the practicality of a noise wall in these locations. In response to public inquiry, additional evaluation was done of a proposed noise wall between East Laurel Drive and MacArthur Boulevard. It was ascertained that a noise wall at this location would limit sight distances on MacArthur Boulevard and therefore, it was determined that additional greenery should be planted to serve as a physical separation and mitigate the visual effects.

3.4 NATURAL ECOSYSTEMS

3.4.1 Introduction/Methodology

A Natural Ecosystems TES was conducted to identify and assess potential impacts on natural resources and the ecosystem associated with the alternatives under consideration for reconstruction of Route 52. The methodology for the TES involved three major tasks: inventory/data collection, field reconnaissance, and assessment of potential impacts. Available information regarding existing conditions was assembled and reviewed to describe the study area relative to geology and soils/hydrogeology, water quality, wetlands and floodplains, aquatic ecology, and terrestrial habitats. The study area extends approximately 45 meters (150 feet) on either side of the existing Route 52 corridor and the alternative alignments, from the intersection of Route 9 and MacArthur Boulevard in Somers Point to the intersection with Bay Avenue in Ocean City.

A field investigation was conducted to evaluate wetland areas and terrestrial and aquatic communities. The wetland boundary adjacent to the existing Route 52 corridor between Somers Point and Ocean City was delineated. Available geological and geotechnical data were reviewed, and based on these data, a work plan for the preliminary subsurface exploration program was prepared, and the investigation was conducted.

Surface water bodies, channels and sewer outfalls within the study area were identified by reviewing aerial photographs, Somers Point and Ocean City sanitary and storm sewer diagrams, and by on-site inspection during the field investigation. Available existing water quality data for Great Egg Harbor Bay was obtained. The NJDEP files were reviewed, and the New Jersey American Water Company was contacted to identify water supply wells in the study area. A review of available information on shellfisheries and fisheries was also performed. Existing shellfisheries and fisheries information was supplemented with a survey/interviews of operators of commercial fishing vessels and marinas.

3.4.2 Soils and Geology/Hydrology

Route 52 crosses the Coastal Plain of New Jersey, which is underlain by a wedge of unconsolidated sedimentary deposits of Late Cretaceous, Tertiary and Quaternary age that thicken seaward from a thin veneer at the Fall Line near Philadelphia, PA, to 1800 meters thick beneath the mouth of Delaware Bay. The sediments consist of clay, silt, sand, and gravel, of both marine and non-marine origin. These sediments lie unconformably on consolidated rocks of pre-Cretaceous age (Precambrian and lower Paleozoic rocks) similar to those exposed at the Fall Line. The consolidated pre-Cretaceous rocks underlie the study area at a depth of approximately 1460 meters (4,800 feet). From the shores of Great Egg Harbor Bay at Somers Point to Route 9, there are four soil types located in the study area, and from Somers Point through Ocean City, there are three additional soil types located within the project boundaries. Soil types located within the study area are listed in Table 3.4-1 in the DEIS.

The construction of the preferred alternative will cause disturbance of subsurface materials by excavations and the deep foundations. The cuts in organic rich tidal marsh deposits may result in release of entrained methane gas and odors; however, these releases are not expected to result in significant geologic impacts. In some places, where sulfur is present, reaction of the excavated marsh materials may prevent growth of vegetation in these areas. Short-term dewatering may occur during construction where it would depress locally the water table for a short period, and induce flow toward the excavation. This impact would be temporary and would not extend beyond project boundaries. Installation of deep foundation elements such as piles may result in vibratory impacts and possibly minor short-term settlement of adjacent loose sand materials and will not result in significant geologic impacts.

Disturbance of soil materials may increase the potential for short-term erosion and sedimentation, including turbidity in adjacent surface waters. Construction activities will be conducted pursuant to an approved soil erosion and sediment control plan and, therefore, are not expected to result in significant impacts. It will include procedures such as:

- taking precautions to minimize spillage and tracking of sand and silt on the road surface and

promptly clean them up should they occur;

- completing shorter sections of the project at one time, thereby limiting the amount of ground surface exposed at one time;
- using silt fences, hay bales and stabilized entrances to construction sites, as necessary, for control of erosion and sedimentation;
- placing mulch or suitable ground cover immediately after a slope is graded;
- sodding or seeding of slopes simultaneously with roadbed construction; and using turbidity curtains, where practicable, for construction operations.

New channel dredging, excavating soil below the 100-year floodplain, and filling tidal areas may slightly alter currents, and future erosion and deposition rates and patterns, especially during flooding. These changes are minor compared to ongoing natural changes that occur in the coastal area, and are not expected to have a significant geologic impact.

Global warming and sea level rise appears to be active geologic processes. The potential impact of these processes on the derivation of design flood elevations, and the potential for significant changes in sea level during the design life of the structure to impact the operation and maintenance of the structure will be evaluated during design.

3.4.3 Groundwater

The two major aquifers in the study area are the shallower, unconfined portion of the Kirkwood-Cohansey Aquifer System and the confined “Atlantic City 800-foot Sand” in the lower Kirkwood Formation. Groundwater from the western side of Great Egg Harbor Bay ultimately discharges to either the Great Egg Harbor Bay or the Atlantic Ocean. Shallow groundwater within the barrier island flows to the west or the east depending upon which side of the groundwater divide it was located. Deeper groundwater flow patterns are most likely towards the Atlantic Ocean. Groundwater in the study area is classified as Class II-A. The primary designated use for Class II-A groundwater is potable water and conversion to potable water. Class II-A secondary designated uses include agricultural water and industrial water. The groundwater quality associated with the deeper aquifer is generally good.

The USEPA has determined that the New Jersey Coastal Plain Aquifer System is a sole or principal drinking water source that, if contaminated, would create a significant hazard to public health. Based on the information presented below, it is clear that the project will not contaminate the sole source aquifer through its recharge zone, and will not create a significant hazard to public health. The proposed project is consistent with the Safe Drinking Water Act (SDWA).

The shallow aquifer in this area is the Cohansey Sand, which is used as a water supply source on the mainland, including the Somers Point area. Deep foundations, i.e. piers or piles, for the highway structure will penetrate the sands and clays in the upper portions of this hydrogeologic unit; however, the water quality and water quantity effects of any penetrations through the sands and clays in the shallow aquifer system are expected to be negligible. The Cohansey Sand is generally considered an unconfined aquifer recharged primarily by precipitation and surface water runoff. The potential effect of increased runoff and reduced recharge on groundwater levels will be local and insignificant relative to the regional aquifer system. It is anticipated that the portion of the Cohansey Sand in the vicinity of the project naturally discharges primarily to the coastal waters. Recharge water impacted by the highway runoff could potentially impact water quality in shallow wells located close enough to the highway structure; however, the significance of the potential impacts in areas close to the shoreline are mitigated by the problem of saltwater intrusion for shallow wells installed in this unit in the coastal area.

The deeper regional aquifer in the area is the “800-foot Sand” in the Kirkwood Formation, which is the major water supply source for Ocean City. The depth of this regional aquifer and its overlying confining layers are well below the anticipated depth (and any impacts) of the piers and piles. The installation of shallow and deep foundations is not expected to result in significant impacts to water yield or quality in the “800-foot Sand” aquifer. The principal recharge area for the underlying “800-foot Sand” aquifer is located far inland. Given the thickness of the clay units overlying the deep aquifer, surface water runoff from the project area will not impact water quality of this aquifer.

Filling, excavating, and pile driving associated with the project will have no impact on the

subsurface groundwater quality. Piles driven into the subsurface will remain well above the primary aquifer [“800-foot Sand”] and its overlying confining layer. Filling and excavation activities would be limited to the onshore or embankment activities and confined to the surficial environment. Dewatering that may need to be done during the construction of the roadway would lower the water table and induce flows toward the excavations. These effects will be temporary and limited to the immediate area where construction activities are taking place.

During construction and at the completion of this project, there will be no significant new pathways created for the highway runoff to the deeper aquifers. Stormwater runoff mitigation efforts taken into consideration for the surface water quality impacts will further reduce any potential for groundwater impacts. The final highway design will include a drainage system that will improve water quality and channel runoff to pipes that will discharge into water bodies.

The potential for impacts on potable water supply wells in Somers Point is greater than in Ocean City because of the nature of the aquifers (i.e., relatively shallower and unconfined in Somers Point, and deep and confined in Ocean City); however, the project is not expected to alter groundwater recharge enough to significantly impact the quantity or quality of local public potable water supplies. Any wells within the final right-of-way will be properly sealed during project construction. Sealed wells will be replaced with new ones if they are needed.

If it is determined that excavated soil or groundwater is contaminated during initial-design investigative efforts, the contaminated material shall be properly characterized. Any remedial action required will be negotiated and settled with the property owner during the right-of-way acquisition process. If the remediation is to be conducted by the Department’s contractor, then a specification will be developed to address these concerns and included in the bid document, in accordance with the NJDOT Procedures Manual.

3.4.4 Surface Water

Based on a review of area maps, existing information, and site inspection, the only waterway within the project boundaries is Great Egg Harbor Bay and associated tidal waterways and wetlands. Great Egg Harbor Bay is a shallow, tidally influenced bay composed of large expanses of open water and scattered wetland islands that discharges into the Atlantic Ocean. Great Egg Harbor Bay is classified as a Class SE1 water. Class SE1 waters are saline estuarine waters with salinity concentrations greater than 3.5 parts per thousand at mean high tide and designated uses for shellfish harvesting; maintenance, migration and propagation of the natural and established biota; primary and secondary contact recreation; and any other reasonable uses. The general water quality of Great Egg Harbor Bay remains relatively good. There are a few parameters for which the water quality is slightly reduced due to extensive urban development and industrial activity: pH, dissolved oxygen, and fecal/total coliform.

Fishing and boating are important recreational activities along the New Jersey coastal beaches from Sandy Hook south to Cape May. Considerable recreational fishing occurs in Great Egg Harbor Bay. Some anglers park their vehicles on unpaved areas adjacent to Route 52 on the islands to fish at Rainbow Channel and Elbow Thorofare. Boaters and recreational fishermen in boats also congregate near the Route 52 bridges over Rainbow Channel and Elbow Thorofare.

Potential impacts to surface water quality relate mainly to nonpoint source stormwater runoff impacts. In addition, short term water quality impacts to Great Egg Harbor Bay can occur resulting from construction-related soil erosion that can increase turbidity and suspended solids, lower dissolved oxygen, and alter pH values. The most significant long-term impact to surface water quality associated with this project, however, will likely be sand and silt in stormwater runoff reaching Great Egg Harbor Bay and tidal wetlands.

Although the preferred alternative will result in an overall increase in impervious area and runoff, the number of vehicles traveling on the Route 52 causeway between Ocean City and Somers Point is not likely to increase significantly faster than it would on the existing facility. Therefore, the total mass load of pollutants would not increase significantly (i.e., greater runoff

volume but lower concentration of pollutants). The preferred alternative will result in a wider, more efficient roadway, allowing more unrestricted flow of traffic along Route 52 and over the bridges; reducing conditions such as stopping, idling, and delays; and resulting in less time for traffic to deposit pollutants. Additionally, the ratio of cumulative impervious roadway surface to total watershed area for the receiving waters (dilution ratio) is sufficient to protect aquatic life.

Water quality impacts due to soil erosion and sedimentation will be minimized through implementation of a sediment and erosion control plan. Construction techniques, such as prefabrication, also can significantly reduce on-site construction duration and subsequent erosion and sedimentation concerns. Furthermore, pretreatment methods identified as “conditionally acceptable” will be implemented. For this project, several of these pretreatment methods may be utilized as indicated in Table 3.4-2 in the DEIS. The preferred alternative will fully comply with the Coastal Zone Management Act (CZMA) for New Jersey, which requires that federally funded projects be consistent with the policies of the state coastal zone management programs.

Ocean City

There are several stormwater catch basins that exist in the vicinity of the study area in Ocean City. These drains collect stormwater from streets adjacent to Route 52 as it enters Ocean City and deliver the water directly into Great Egg Harbor Bay. The proposed approach and roadway for Route 52 into Ocean City on 9th Street will remain within the existing curb lines and will not increase the impervious area. The existing trunk line under the roadway is adequate for the proposed condition and will be maintained. New inlets are proposed in this area. There is insufficient room to incorporate any of the conditionally approved pretreatment methods into this existing system. To improve the water quality, manufactured oil/grit separators are proposed on all new inlet connections.

Causeway between Somers Point and Ocean City

There are presently no drain systems or retention areas for runoff for the existing Route 52 bridges and causeway. Existing scuppers on the structures discharge directly into Great Egg Harbor Bay. On the east side of the causeway where it traverses the marsh islands, there are existing, wide, sandy embankment areas that provide onsite infiltration.

The low point in the profile of the preferred alternative occurs within, or close to, the limits of the tidal marsh islands bordering the causeway. Point discharge from a large pipe at the low point carrying sediment-laden runoff could concentrate the deposition of sediments on the marsh surface and have a negative impact on the vegetation. Accordingly, the runoff from the elevated structures would be dispersed through a series of scuppers that discharge directly into open water. For the preferred alternative, where the causeway structure passes over the marsh islands, the runoff would be routed through leader pipes into scour basins that detain the flow of the runoff, enhance the water quality, and minimize the potential for erosion.

Construction activities can also result in impacts to surface water. The jetting of water during pile driving invariably creates a great deal of turbidity around piles being driven in open water locations. Even the pile driving operation itself tends to create some turbidity, but to a much lesser degree. Mitigation measures will be implemented to minimize impacts during construction due to turbidity (e.g., the use of turbidity curtains). See Aquatic Ecology Section 3.4.7.

Surface water quality can also be affected by dredging, which would be required at the ICWW under Alternative 9-1. Dredging causes an increase in turbidity, which can adversely affect aquatic resources such as submerged vegetation, shellfish, and finfish habitat. Although the initial dredging may result in temporary impacts to surface water, it is not anticipated that periodic maintenance dredging will be required. High flow rates indicate that the velocity of the water surging through the channel will be sufficient to keep the channel clean. For proposed methods to mitigate such impacts from dredging, see the Aquatic Ecology Section 3.4.7.

MacArthur Boulevard: Somers Point Traffic Circle to Route 9

An existing stormwater outfall drains the area in the vicinity of the Somers Point traffic circle and discharges into the beach area beneath the World War Memorial Bridge. Most of the runoff north of the traffic circle is routed through a piping system, which is discharged north of Braddock Avenue to a channel flowing through an extensive area of tidal wetlands south of Mays Landing Road. Storm runoff from a small area near the Route 9 intersection is collected in a piping system that drains into an existing detention/infiltration basin between the west curb line of MacArthur Boulevard and the east curb line of Laurel Drive.

A preliminary watershed analysis of the MacArthur Boulevard area revealed the net increase in impervious area would be 1.00 hectare (2.46 acres). Existing flows indicate that the existing drainage system in MacArthur Boulevard is already undersized based on current NJDOT standards. The flows were also estimated for “post-construction” and are expected to further burden the system. Much of the existing drainage system, which is old and undersized, will be replaced with a new system of catch basins and piping capable of handling the flow of a 10-year frequency storm. The proposed drainage system for MacArthur Boulevard will consist of piping along the west curb line, which will route runoff to an underground detention/infiltration piping system (i.e., a grid of pipes with perforations in the bottom). This system will be located under a parking lot near the low point on MacArthur Boulevard in the vicinity of Braddock Avenue and will be designed to detain storm runoff until it infiltrates into the ground underneath. It is important that the elevation of the bottom of the detention/infiltration piping system is sufficiently above the water table to promote infiltration. An observation well will be required prior to final design to verify the groundwater elevation.

A significant drainage area exists to the east of MacArthur Boulevard; however, the runoff from this area is collected in an existing piping system and does not contribute to the MacArthur Boulevard drainage system or underground detention/infiltration system. The flow from the east is piped under MacArthur Boulevard at the low point where it will be combined with the discharge from the MacArthur Boulevard drainage system and discharge through an existing outfall. Based on current design standards, the existing outfall is already undersized for the

prevailing conditions and should be upgraded. Due to the detention capacities built into the proposed drainage design, the post-construction flows are anticipated to be less than, or equal to, the pre-construction flows.

The existing detention/infiltration basin near Route 9 between Laurel Drive and MacArthur Boulevard is a deep open ditch that will be modified and utilized to collect the flow from the northwest corner of the project. Existing pipes will be modified slightly so that all of the flow from the northwest will be routed into the new detention/infiltration basin prior to entering the MacArthur Boulevard piping system. Flow leaving this basin will ultimately be routed through the detention/infiltration piping system. The basin will remain between the west curb line of MacArthur Boulevard and the new east curb line of Laurel Drive.

The Somers Point drainage system will be replaced to accommodate the flow from the drainage area surrounding the proposed four-legged intersection. The flow from the roadway between will be collected in a new piping system along the west curb line, which will be routed through an oil/grit separator prior to discharge at the abutment of the new bridge. Runoff rainwater from the southwest quadrant of the new intersection will be detained in a depression in the traffic island prior to entering the piping system. A separate piping system in the eastern portion of the intersection will be provided to accommodate the flow from the northeast and southeast quadrants of the intersection. This flow will be discharged into a vegetated swale on the east side of the north approach of the bridge over Ship Channel prior to being discharged into Great Egg Harbor Bay.

The proposed drainage system for MacArthur Boulevard, including the upgraded piping system and new pretreatment facilities, will be a significant improvement over the existing system from the Route 9 intersection to the Somers Point traffic circle. Currently, none of the runoff is pretreated prior to discharge into Great Egg Harbor Bay. In contrast, the proposed drainage system provides for pretreatment of all runoff (other than from bridges directly over waterways) through the use of detention/infiltration facilities, oil/grit separators, and/or grassed swales.

3.4.5 Wetlands and Open Waters

The existing Route 52 bridge between Somers Point and Ocean City crosses over Great Egg Harbor Bay and three islands located in the bay. With the exception of the fill area associated primarily with Route 52 and an old trolley bed, these islands are entirely tidal wetlands. There are several other islands in the vicinity of where Route 52 currently crosses Great Egg Harbor Bay, and these islands are also entirely tidal wetlands. The USFWS (National Wetland Inventory (NWI) Map, Ocean City, New Jersey) primarily classifies these islands as estuarine, intertidal, emergent wetlands. The tidal wetland islands are generally completely vegetated with herbaceous vegetation with the exception of the unvegetated intertidal channels that cut through the island.

There are no wetlands located along the shore where Route 52 currently enters Ocean City or where the preferred alternative for Route 52 would enter Ocean City. The USFWS NWI map identified the shore area along Ocean City in the vicinity of the study area as estuarine, sub-tidal, open water.

A section of the shoreline immediately adjacent to where Route 52 enters Somers Point meets the USACOE wetland criteria. The wetland area is small [approximately 0.10 hectares (0.25 acres) in size]. With the exception of this area, there are no wetlands located along the shore where Route 52 currently enters Somers Point or where the preferred alternative for Route 52 would enter Somers Point. The USFWS NWI map classifies the Somers Point shore where Route 52 enters Somers Point as estuarine, intertidal, flat (substrate generally non-vegetated and consists of either mud, sand, organic material, cobbles/gravel). Although the USFWS classifies this area as a wetland, it is not a USACOE jurisdictional wetland since the area is not vegetated. However, the area may be considered as a special aquatic site by the USACOE, and the area is subject to regulations pertaining to the discharge of dredge and fill material into waters of the United States.

Review of the New Jersey Fresh Water Wetlands Maps indicated that, with the exception of a small area on the first island north of Ocean City on Route 52, there are no mapped freshwater

wetlands located within the study area boundaries. This wetland was classified as a freshwater palustrine emergent persistent wetland with saturated conditions. However, the field inspection confirmed that this wetland is not a freshwater wetland, but rather, a continuation of the estuarine intertidal emergent persistent marsh.

Wetland impacts associated with the preferred alternative are related to the driving of pilings into the tidal marsh, shading, the encroachment of embankment fill, and providing access to the Information Center and otherwise enhancing recreational access. The wetlands along the north bank of the ICWW that may be impacted as the result of the realignment of the ICWW will be protected by a fender system. In addition, sheeting approximately 76 meter (250 feet) long will be provided to further prevent sloughing. (See Figure 3.4-1). Also, a small tidal wetland area would be removed west of the existing causeway where the proposed highway enters into Somers Point. In most cases, the wetlands to be affected are stands of salt marsh cordgrass that exist throughout much of the remaining islands in the vicinity of the study area.

The preferred alternative involves a causeway reconstructed largely over the existing embankment, with fixed bridges over slightly realigned waterways. Building the entire causeway supported on a viaduct-type structure involves the least impact to wetlands. The wetland impacts that are associated with the preferred alternative are primarily located immediately adjacent to the existing causeway. These wetlands act as a pollution filter for man-made debris, and they remove or partially remove and absorb sediments and chemicals generated from the road. These islands act as secondary treatment for any surface water runoff from Route 52. They further reduce nutrient and chemical levels through absorption and capture sediment in their vegetation. In this capacity they essentially act to help preserve other wetlands found within the tidal marsh. They have relatively little direct value in terms of fish and shellfish habitat, waterfowl, or other wildlife habitat. Shading created by the causeway over wetlands may inhibit the growth or displace the native wetland vegetation.

The construction of the preferred alternative will also have adverse effect to open waters.

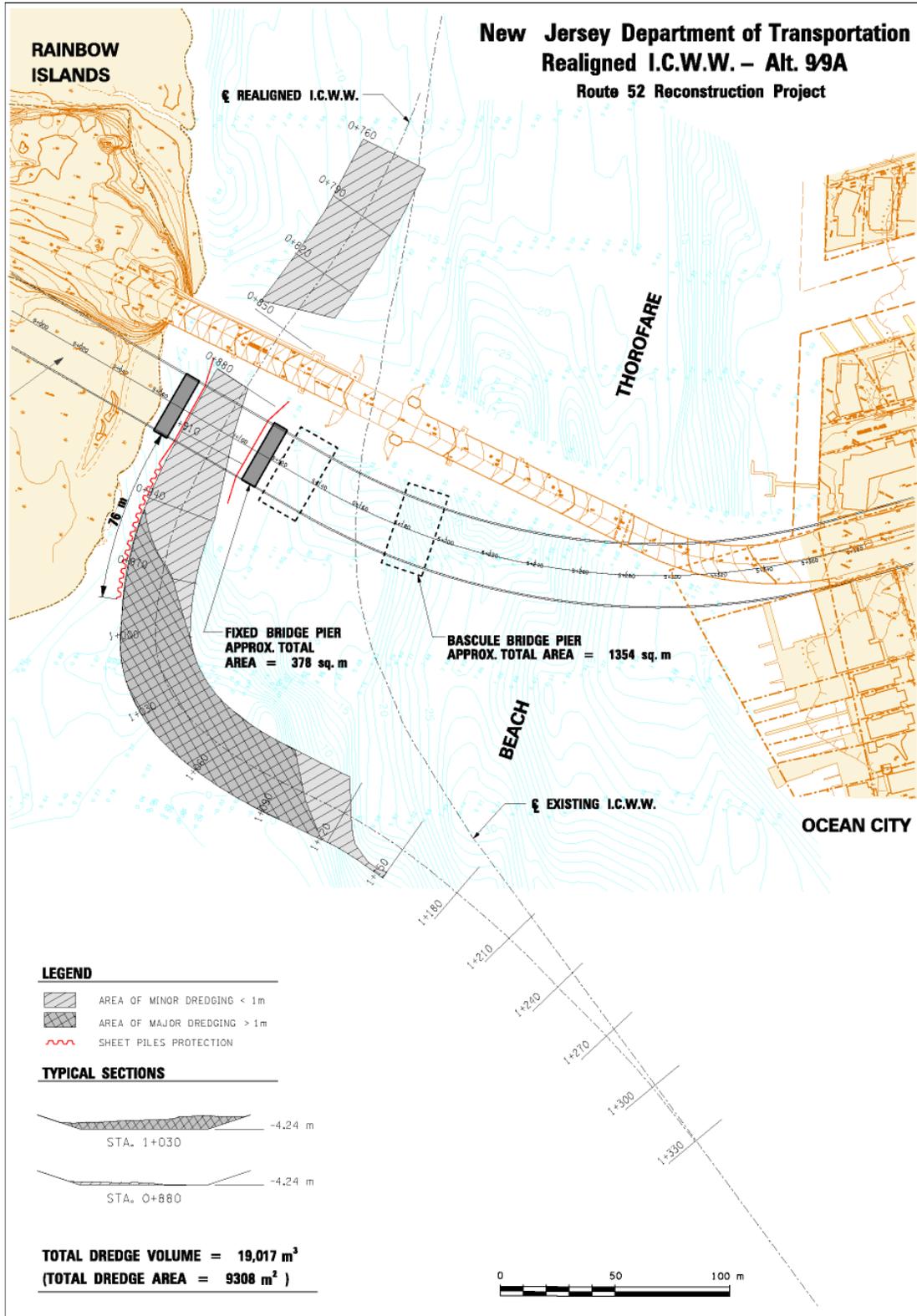


FIG. 3.4-1

The placement of piles or piers for the high fixed bridges and the installation of sheet piling to protect the wetlands along the north bank of Beach Thorofare from erosion will result in 0.16 hectares (0.39 acres) of direct open waters impact (For Alternative 9A, the impact to open water would be 0.26 hectares (0.62 acres) due to the larger piers required for a bascule bridge). However, some of the impact will be offset by the removal of the existing structure with its piles and piers.

Tables 3.4-3 and 3.4-4 in the DEIS summarize the impacts to wetlands, due to dredging and filling, and also the shading impacts for the entire wetlands areas beneath the structure. The total of 2.09 acres of shading impact and 0.23 acres of direct wetland impacts associated with the preferred alternative are small when compared to the size of the project, considering that the entire project is being constructed within a large wetland/aquatic habitat. Methods to mitigate wetland impacts include the implementation of sedimentation and erosion control plans and, to the maximum extent possible, avoidance of work or staging conducted within the wetland. The following specific mitigation measures are proposed:

- use the maximum structural span lengths economically feasible to minimize the number of piers;
- use pile foundations, rather than excavated pier foundations, so that construction disturbance is limited to the penetration of the piles themselves;
- use meadow mats, or approved equivalent, during construction in wetland areas to minimize temporary impacts, and restore wetlands, where disturbance does occur; and
- implement soil erosion control measures to minimize the deposition of eroded soils in wetlands.

After the wetland impacts have been reduced as much as practicable, adequate wetland mitigation will be provided. The USACOE and the NJDEP normally require wetland mitigation in the ratio of two acres created for each acre impacted. Potential wetland mitigation areas have been identified on the island between Beach Thorofare and Rainbow Channel east of the causeway and in the area of the existing Information Center. Under the preferred alternative, the existing Information Center will be relocated to Ocean City and the vacant lot will be expanded to include a larger parking facility for recreational access (See Figure 3.4-2).

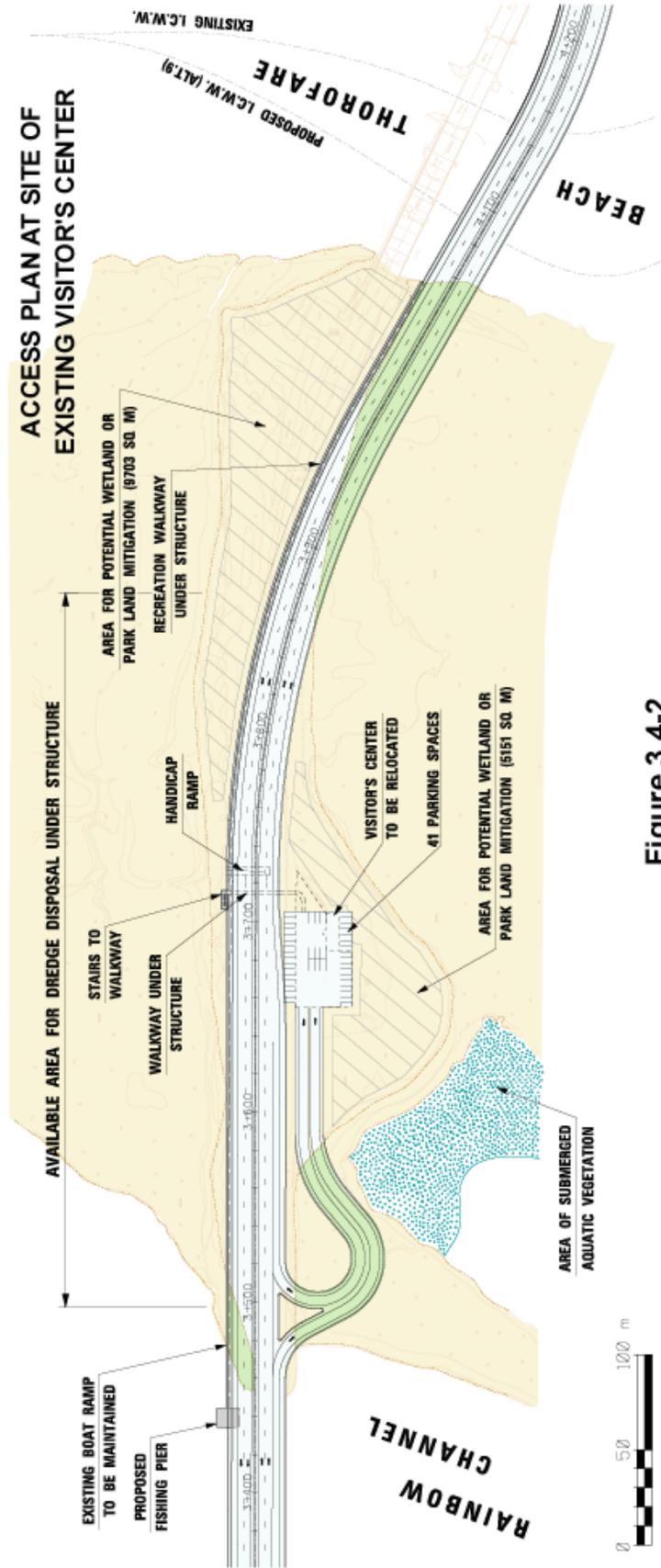
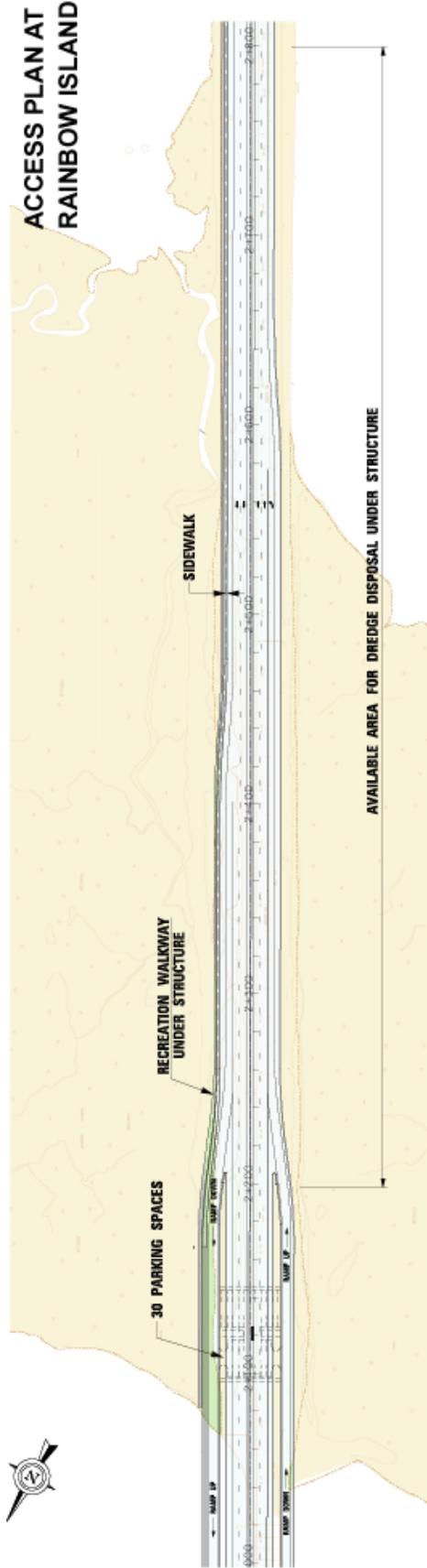


Figure 3.4-2

3.4.6 Floodplains

The Federal Emergency Management Agency (FEMA) flood insurance rate maps (FIRM) for Somers Point and Ocean City were reviewed to determine the relationship of the project to the 100-year coastal flood elevations. The City of Ocean City, Floodplain Management Plan (September 1997) was also reviewed. The height of the 100-year flood is 2.93 meters (9.62 feet 1988 NGVD) above mean sea level (MSL) for the cities of Ocean City and Somers Point. The entire study area within Ocean City is located within the 100-year flood (Zone A), and the entire barrier bar island is subject to flooding during a 100-year storm event. Some areas in Somers Point within the project boundaries are located within the 100-year floodplain. The 100-year flood boundary adjacent to Great Egg Harbor Bay does not extend to the Somers Point traffic circle. However, the majority of the area between Broadway and Mays Landing Road, located west of the Somers Point traffic circle, are within the 100-year flood boundary (Zone A5); this area extends northeast up to MacArthur Boulevard, northwest of the Somers Point traffic circle. The area of the Somers Point traffic circle and proceeding north approximately 400 meters (1,300 feet) along MacArthur Boulevard is zoned as Zone B. Zone B designates areas between the 100-year flood and the 500-year flood or areas subject to 100-year flooding with average depths less than 30 centimeter (one foot).

Subsequent studies have revealed that within Great Egg Harbor Bay during a 100-year storm, waves with a minimum height of 1 meter (3 feet) above the 100-year stillwater flood elevation, would propagate across the entire length of the harbor. Further, the entire city of Ocean City would be subject to minimum 1 meter (3 foot) high waves, above the 100-year stillwater flood elevation, propagating across the island. Some portions of the island immediately east of the study area would be subjected to wave heights in excess of 1.5 meters (5 feet) greater than the 100-year stillwater flood elevation. The preferred alternative will be constructed within the 100-year floodplain; The bottom of elevated structure will be at least 0.3 meters (1 foot) above the 100-year flood elevation. In general, filling activities within the floodplain will be related to the placement of piles used to support the structures and fill at either end of the proposed highway where the road will tie into the existing infrastructure.

The proposed floodplain crossing does not constitute a significant risk to life and property.

Furthermore, construction staging will not interrupt service by emergency vehicles or eliminate evacuation routes during flood events, since there are alternate routes, which could be used in case of an emergency. The completed project will enhance emergency access and evacuation capacity during a storm.

To comply with Executive Order 11988, entitled “Floodplain Management,” the project must be designed to avoid floodplain impacts when practicable, and to adequately mitigate unavoidable impacts. To comply with these requirements, construction in the floodplain, especially filling, has been minimized as much as practicable. The preferred alternative involves a continuous structure rather than fill, minimizing impacts to floodplains.

3.4.7 Aquatic Ecology

At the northern end of Great Egg Harbor Bay, in the vicinity of the existing Route 52 causeway, wetland islands are separated by a series of channels. Tidal shallows, comprising a sand or mud substrate, exist between the islands from either shoreline. These sandy and muddy shallows are more extensive along the northern and eastern portion of the bay in the area influenced by the Great Egg Harbor Inlet. Silt and sediment are naturally deposited in this portion of the bay as the tidal rush slows. These waters and substrate can potentially provide habitat for submerged aquatic vegetation (SAV), shellfish, and finfish.

Submerged Aquatic Vegetation

SAV is an important ecological resource in bay ecosystems for several reasons. The grasses provide food and shelter to a variety of animals. They are eaten directly by waterfowl and small mammals and they provide detritus to fish, snails and amphipods. SAV beds are also primary nursery grounds to crabs and many fish species and are responsible for the absorption of nutrients in the water column, while producing oxygen through photosynthesis. Dense SAV beds also dampen wave energy assisting in the control of erosion and turbidity.

Great Egg Harbor Bay supports limited areas of SAV. In fact, submerged vegetation is most prevalent in coastal areas north of the study area. Two areas of SAV, which have not been

delineated as to species, are mapped in the vicinity of the study area. One mapped patch of vegetation is located northwest of the Ocean City Information Center and west of the existing causeway on the opposite side of a marsh island. The second area is located east of the existing alignment in Rainbow Channel between two islands. The approximate distance of the dredging operation from these two SAV beds is 500m and 1,500m, respectively.

No areas of SAV were observed in the vicinity of the existing causeway during field investigations in October 1997. Submerged shallow water areas directly adjacent to the causeway appeared to have a sandy or mud bottom barren of vegetation.

Long term impacts to SAV could result from the placement of fill materials and/or the placement of piers or piles to support the structure, which could permanently affect the soils and substrate conditions and exclude colonization of those areas by SAV. However, the preferred alternative will not be routed through the known areas of SAV, and no construction-related activity will take place in any SAV area.

Shellfish

The location of the existing Route 52 study area includes shellfish habitat classified as “Approved Area” with the exception of sections within the ICWW and the Ship Channel, which have a “Seasonal Area” classification. The “Seasonal Areas” are approved for the harvesting of shellfish only from November 1st through April 30th and are so designated typically due to the reduction of oxygen levels near the bay bottom adjacent to the urban areas during the warmer months. Bottom habitat is important to other marine organisms in addition to shellfish. These organisms do not have a strong commercial value themselves, but they are a vital food source for fish and crustaceans that are commercially important. These organisms, which live either on or within the bottom substrata (sediments, debris, macrophytes, filamentous algae, etc.) for at least part of their life cycle, are known as benthos. The most common groups of benthos include insects, clams, snails, worms, and crustaceans.

Shellfish habitat will be temporarily affected by construction activities, which will generate suspended sediments, create turbidity and lower oxygen levels in the immediate project vicinity.

In addition, dredging to realign the ICWW will temporarily disrupt limited areas of shellfish and benthic habitat, but will not cause a change in the substrate composition. It is not anticipated that periodic maintenance dredging will be required. Therefore, these impacts are temporary, and it is anticipated that shellfish beds would become re-established after construction and/or dredging disturbances end, and that benthic organisms would also recolonize the affected areas. These impacts are not considered significant, since the total area of impact is very small relative to the total extent of shellfish beds in Great Egg Harbor Bay. Where viable, turbidity barriers will be employed during construction in order to minimize impact caused by the resuspension of sediments. These barriers should be positioned around the area of disturbance to minimize suspended particle drift during tidal fluctuation.

Long term impacts to the benthic substrate and shellfish beds are possible from the placement of piers or piles to support structures. Both would permanently affect the benthic substrate and exclude colonization by shellfish of those areas occupied by the piles. These piers will provide a beneficial impact by increasing habitat for juvenile fish species and encrusting shellfish like the blue mussel. The removal of portions of the existing causeway bridges including numerous pilings that would represent a navigational hazard can produce minor temporary impact to finfish habitat through displacement.

To mitigate for the loss of bottom habitat in the footprint of support structures, transplanting shellfish has been considered. In an attempt to investigate the possibility of mitigating for loss of shellfish habitat by transplanting, several experts in the field of aquaculture or shellfish research were contacted to determine their professional opinion of the success and or failures associated with shellfish transplants. In general, experts are unaware of any precedent that involved the seeding or transplantation of clams to areas where they were not already successful. Most have had poor success in growing clams where they were not already established. Apparently, the key to success in the maintenance of shellfish areas is the balance or control of predation at all levels of development.

Finfish Habitat and Migratory Pathways

The study area supports an array of commercial and recreational finfish, which use the estuaries for spawning in April and May and continue to feed in the bay until the fall migration back to the

ocean. Great Egg Harbor Bay serves as a wintering area for several finfish species and other commercially important species including winter flounder, striped bass, and blue claw crabs. These species are expected to utilize Great Egg Harbor Bay, including the study area, during the winter months. In addition, marine turtles typically utilize New Jersey waters for periods ranging from May through November. Table 3.4-5 in the DEIS presents a list of species that are expected to be present near the study area.

Short term impacts to wintering grounds and utilization of the study area by these finfish, crabs, and marine turtles are possible during construction due to sediment resuspension, increased turbidity, and lowered oxygen levels. However, wintering areas for crabs and fish should not experience permanent adverse effects. Short-term impacts may also result from the proposed dredging.

Short term impacts to finfish migratory pathways are possible during construction of support structures and dredging for channel realignments. Turbidity caused by resuspension of sediments could act as a temporary barrier to finfish passage. Similarly, turbidity and sediment deposition will temporarily displace wintering finfish species and crabs. Temporary impacts could also result from the use of turbidity barriers, sheet piles, cofferdams, and similar structures that could physically inhibit the movement of fish through an area. These impacts are temporary, and it is anticipated that alternative pathways would be used during construction and that the finfish migratory pathways would be re-established after construction disturbances end.

The removal of portions of the existing structure, including the existing piers, may produce minor temporary impacts to finfish habitat through displacement. During final design, a decision will be made whether to leave the existing pilings in place below customary navigational draft depths. However, the construction of new pilings/support structures will provide additional habitat for finfish and some species of encrusting shellfish like the blue mussel. It is expected that concrete pilings function similarly to artificial reefs and that fixed and shaded artificial structures would provide significant habitat for many species of larval fish.

In order to mitigate the temporary impediments to migratory finfish pathways, construction

techniques that interfere with the movement of fish along finfish migratory pathways should be avoided. Construction techniques that create a physical or biological barrier to the movement of fish along finfish migratory pathways should not be employed, unless acceptable mitigating measures are used. The following mitigation measures are proposed:

- implement a phased approach to the construction effort to limit impacts to discrete sections of the highway at any one time, so as not to create a continuous barrier along the entire length of the project;
- if practicable, use turbidity barriers (silt or sediment curtains) around pier bents and to confine dredging operations so as to limit the areas where turbidity could become a problem, but keep as much of the waterway section unobstructed as possible at all times;
- to the extent possible, recycle construction materials from the demolition of the four existing causeway bridges into artificial reefs to create habitat in mitigation for habitat lost in pile areas;
- if explosives are required for demolition of the existing bridge, detonate small initial warning charges prior to blasting in order to scare off any marine life in the immediate area; and use demolition containment techniques to minimize the scattering of debris.

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (the Act) as amended in 1996 strengthened the ability of the NMFS and the eight regional fishery management councils to protect and conserve the habitat of marine, estuarine, and anadromous finfish, mollusks, and crustaceans. This habitat is known as the essential fish habitat (EFH) and is defined by the Act as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.”

The Act requires the regional fishery management council to identify EFH for all managed species, to specify actions to conserve and enhance EFH, and to minimize adverse effects on EFH. Fish may change habitats with changes in life history stage, seasonal and geographic distributions, abundance, and interactions with other species. The *Guide to Essential Fish Habitats in the Northeastern United States* provides a geographic species list of EFH

designations and was utilized to determine the species and life stages (i.e., eggs, larvae, juveniles, adults) of fish, shellfish, and mollusks for which EFH has been designated in the vicinity of the Route 52 project. The EFH Assessment for the Route 52 project is provided in Appendix A of this report, and the conclusions are summarized below.

A number of construction and long-term issues associated with the proposed Route 52 modifications were identified and may have impacts to EFH in Great Egg Harbor Bay, including impacts to surface water, wetlands, and aquatic resources. Pile-driving and construction-associated dredging may increase sediment input into the bay. However, due to water velocity in the area, maintenance dredging is not anticipated. An increase in impervious area associated with road upgrades is mitigated through the proposed use of oil/grit separators, an improved detention/infiltration system and a new stormwater piping system, improving the stormwater treatment in the area of road improvement.

Dredging associated with the realignment of the ICWW will affect shellfish and benthic habitat. Since these activities are expected to be associated only with construction activities, it is anticipated that affected benthic areas will recolonize with time. The required dredging will be done in compliance with the Biological Opinion issued by NMFS on November 26, 1996, as discussed in detail in Section 3.4.9. The phased construction approach will allow finfish to avoid construction operations. Though bottom habitat decreases with piling installation, these same pilings and the existing causeway materials (anticipated to be used in the artificial reef program) will provide additional fishery habitat. Also, federally managed species in the area of dredging are already adapted to pre- and post-dredge depths; therefore, impacts to these species due to depth change are not anticipated.

The NMFS provided habitat conservation recommendations upon review of the EFH Assessment in a letter dated January 18, 2002 (copy attached in Appendix C). The recommendations included proposed seasonal restrictions for dredging as follows:

- For the protection of the early life stages of winter flounder (*Pseudopleuronectes americanus*), a seasonal restriction on dredging from January 1st until May 31st of any year would minimize impacts on this species.
- Female blue crabs (*Callinectes sapidus*) form overwintering aggregates in the project area.

These crabs burrow into the sediment, become lethargic, and are vulnerable to dredging activities. For the protection of this resource, we recommend a seasonal restriction from December 1st through March 31st.

NJDOT intends to abide by these restriction and will determine if it is practicable for the construction contractor to perform all dredging needed in one season in compliance with this restriction and any other that may apply (e.g., during the summer boating season). During the design phase of the project, if it is found that it is not practicable to complete the required dredging in one season with all applicable time restrictions in place, NJDOT will re-establish consultation with the NMFS to resolve the issue.

Based on the scope and nature of impacts expected from the project and the proposed seasonal time restrictions and other mitigation measures, it was determined that there will be minimal adverse individual or cumulative effects on EFH in the project area.

Removal of the Existing Causeway

NJDOT will remove some or all of the existing Route 52 structures/causeway once the highway and bridges have been reconstructed. The bridges and concrete pavements would generate a large quantity of debris, which poses disposal concerns. Consideration has been given to incorporation of recyclable construction materials and portions of demolition materials into the artificial reef program sponsored by the NJDEP. These efforts will help to minimize impacts involving the disposal of construction materials and would mitigate habitat loss within the project area through the creation or enhancement of new, offsite marine habitats. Disposal of materials as artificial reefs is subject to State and Federal approval. The NJDEP has indicated willingness to incorporate these materials into the artificial reef program as long as the material meets the following conditions:

- the material consists of concrete, steel or rock;
- there is no wood or other floatable debris;
- the material is inspected by NJDEP personnel;
- the material is placed in either the Great Egg or Ocean City reef sites, each located approximately 7 miles from the Great Egg Inlet; and

- deployment at sea is observed by NJDEP personnel.

The removal of the existing granular embankment material should be performed prior to the demolition of the four existing structures so that the material can be hauled off by truck. Very likely, it can be used as beach replenishment material in Ocean City, or as select granular fill for other construction projects. During these earth-moving operations, it will be important to install and maintain approved soil erosion control devices.

3.4.8 Terrestrial Ecology

The majority of the land within the project boundaries in both Somers Point and Ocean City is highly developed with a mixture of commercial and residential use. The project corridor does not pass through any wildlife refuges, forests, or game management areas. There are no undeveloped areas representative of quality terrestrial wildlife habitat located within the project boundaries. There will be no significant impacts to terrestrial ecology due to the preferred alternative; therefore, no mitigation is proposed.

3.4.9 Threatened and Endangered Species

With the exception of an occasional transient bald eagle (*Haliaeetus leucocephalus*) or peregrine falcon (*Falco peregrinus*), the USFWS stated that no other federally listed or proposed threatened or endangered species under USFWS jurisdiction are known to occur within the vicinity of the proposed project. The NMFS reported that various federally threatened or endangered sea turtles may occupy the inshore and coastal waters of New Jersey. The New Jersey Natural Heritage Program (NJNHP) identified two wildlife species listed as endangered in New Jersey that could possibly be found within the project site, including the piping plover (*Charadrius melodus*) and the least tern (*Sterna antillarum*). One species of vascular plant, the seaside evening primrose (*Oenothera humifusa*), is a New Jersey endangered species and was identified as potentially being found within the project boundaries. The NJNHP also reported two wildlife species listed as threatened in New Jersey that are on or in the immediate vicinity of the project site: the little blue heron (*Egretta caerulea*) and the yellow-crowned night heron

(Nyctanassa violacea).

Based on the detailed analysis presented in the Natural Ecosystems TES, the preferred alternative will have no significant impacts on wildlife species listed as endangered (piping plover and least tern) or threatened (little blue heron and yellow-crowned night heron) in New Jersey. Life histories for threatened and endangered species identified as potentially present in the area were reviewed to determine if the project activities would impact species survival or critical habitats. With the possible exception of a small area of open beach west of and adjacent to the Route 52 bridge along the Somers Point/Great Egg Harbor Bay shore line, there is no potential quality piping plover or least tern habitat located within the study area. This beach area is small, approximately 1025 square meters (0.5 acre) above the mean high tide, and is isolated from other natural habitats that the piping plovers or least terns would use for brood-rearing and feeding. Little blue herons and yellow-crowned night herons occur on Cowpens Island in a mixed species heron colony. Little blue herons may use the dense cordgrass to stalk prey and may also utilize the mudflat and open areas along the channels between the islands. Additionally, yellow-crowned night herons may utilize the islands adjacent to Route 52 as foraging habitat. However, these areas do not represent high quality breeding habitat for yellow crowned night herons due to the limited extent of shrub vegetation. There will be plenty of foraging habitat left after the minor loss from this project.

The seaside evening primrose grows on dry sands, primarily on the upper zones of beaches and sand dunes. There is no high quality beach/sand dune habitat located within the study area. The only beach area is the small isolated beach located on the west side of Route 52 as it enters Somers Point. Therefore, the preferred alternative will not have an impact on the seaside evening primrose.

The preferred alternative will have no significant impacts on the loggerhead sea turtle (*Caretta caretta*), a federal threatened species, the federal endangered species Kemp's Ridley (*Lepidochelys kempii*), the green sea turtles (*Chelonia mydas*), or the federal listed endangered leatherback sea turtle (*Dermochelys coriacea*), which may occupy the coastal waters of New Jersey from late spring to mid-fall. Decline in Kemp's Ridley sea turtle is related primarily to over harvesting of both eggs and adults and drowning when inadvertently caught in shrimp nets.

The presence of this species in the study area would be extremely limited and restricted to possible use of the Great Egg Harbor Bay for foraging. The greatest cause of decline in green turtle populations is commercial harvest for eggs and food and development of beachfront nesting habitat. The use of Great Egg Harbor Bay by these turtles would consist of possible foraging and resting habitat. However, the habitats in the study area are not critical habitats. The decline in the leatherback sea turtle populations is related to over harvesting of eggs and adults. Their presence in the study area would be rare and the habitats in the vicinity of the study area are not critical habitats. Loggerhead sea turtle populations along U.S. coasts have been affected by increased development and human use of coastal beaches and drowning related to incidental capture in shrimp trawling nets. It is possible that loggerheads could be found feeding in the aquatic habitats in Great Egg Harbor Bay. The habitats in the vicinity of the study area are not critical habitats for any of these turtle species, and no long-term impacts are anticipated. However, the potential exists for a temporary disturbance to foraging sea turtles due to sediment disturbances resulting from construction activities.

The realignment of the ICWW under the preferred alternative will require dredging in Beach Thorofare and will be done in full compliance with the Biological Opinion issued on November 26, 1996, by the NMFS. This act, issued to the USACOE for Dredging Activities within the Philadelphia District under the authority of Section (7) (a) (2) of the Endangered Species Act (ESA), lists species under the jurisdiction of the NMFS that may be affected by proposed dredging activities. These include the shortnose sturgeon, loggerhead sea turtle, Kemp's Ridley sea turtle, green sea turtle, leatherback sea turtle, northern right whale, and humpback whale.

If blasting is required to remove the old bridge piers, NJDOT will coordinate with the Protected Resources Division of the NMFS during the design phase of the project. Endangered sea turtles may be present in the project area from June 1st to November 30th, and the NMFS recommends blasting outside of this time frame.

Use of a turbidity barrier for construction operations in Great Egg Harbor Bay is recommended to minimize temporary impacts due to sediment disturbances to foraging sea turtles. As no significant adverse impacts to threatened and endangered bird species have been identified, no other mitigation is proposed.

Based on the above discussion, there will be minimal or no adverse effect to federally listed threatened or endangered species in the project area or its immediate vicinity. The USFWS concluded in its letter of November 22, 1996, that no further consultation pursuant to Section 7 of the Endangered Species Act is required by the service. The NMFS, in its letter of January 18, 2002, stated that if dredging activities comply with their Biological Opinion of November 26, 1996, as modified on May 25, 1999, that included all dredging activities in the Philadelphia Army Corps of Engineers' District, then further consultation with NMFS under Section 7 of the Endangered Species Act will not be necessary. In Section 3.14 (Environmental Mitigation), page III-106, we have committed to full compliance with the above cited NMFS Biological Opinion. This concludes the Section 7 Consultation.

3.5 CULTURAL RESOURCES

3.5.1 Introduction

Cultural resources studies of the project area were done to locate and evaluate any existing, significant architectural or archaeological resources, as defined by the criteria for inclusion on the National Register of Historic Places, that could be affected by the construction of the proposed alternatives for the Route 52 causeway between Somers Point and Ocean City. Areas of Potential Effect (APE) for the surveys were developed for both the Somers Point and Ocean City portions of the project study through consultation with NJDOT cultural resources staff and representatives of the New Jersey State Historic Preservation Office (NJSHPO).

3.5.2 Archaeological Resources

A review of available documentation was performed to identify any archaeological resources that have already been recorded either within or in the general vicinity of the Route 52 project APE. This background research did not identify any previously documented archaeological sites within the proposed project area. A detailed, systematic field inspection and archaeological survey of the Route 52 project APE was conducted in the fall of 1997 and consisted of subsurface test excavations and pedestrian surveys. All areas within the APE were examined with the primary objective of locating archaeological sites and collecting data that would assist in assessing the integrity of any archaeological resources contained in the Route 52 project APE. Few artifacts were recovered from the excavations and pedestrian surveys in Somers Point, Rainbow Islands, and Ocean City, other than various examples of modern debris, such as asphalt, styrofoam, caulk, cardboard, machine-manufactured bottle glass, plastic, shoe fragments and ceramic shards. An underwater survey was also conducted to locate potential archaeological deposits within area of the Route 52 Causeway replacement. Both sites identified by the underwater archaeological survey were concluded to be of modern origin due to their distinctive signatures and profiles.

Based on the results of the Phase I Archaeological study, it has been concluded that no undisturbed or significant prehistoric or historic archaeological resources are contained within the limits of the proposed Route 52 project APE. Therefore, no mitigation measures are warranted.

3.5.3 Historic Architecture Resources

3.5.3.1 Introduction/Methodology

An historic architectural survey was conducted in portions of the City of Somers Point and Ocean City. A significant part of the APE – Historic Architecture for Somers Point has been previously addressed in an historical architectural survey conducted in 1995 for a previous NJDOT project referred to as the Route 52/Somers Point Circle Project. Since this survey was relatively recent, this portion of the APE was not resurveyed. Additional areas deemed to be within the Route 52 APE were, however, surveyed for historic architectural properties.

To be eligible for inclusion in the National Register of Historic Places, historic properties must possess “the quality of significance in American History, architecture, archaeology, engineering, and culture [that] is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

- (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
- (b) that are associated with the lives of persons significant in our past; or
- (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components lack individual distinction; or
- (d) that have yielded, or may be likely to yield, information important in prehistory or history.”

Historic properties determined to be eligible for the National Register (or listed on the National Register) were assessed for effects by the proposed project by application of the Criteria of Effect and Adverse Effect. Adverse effect(s) are not limited to properties that will be physically

destroyed or damaged by the proposed project and include:

- (a) An undertaking has an effect on an historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the National Register.

- (b) An undertaking is considered to have an adverse effect when the effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.
 - 1) Physical destruction, damage, or alteration of all or part of the property;
 - 2) Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register;
 - 3) Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
 - 4) Neglect of a property resulting in its deterioration or destruction; and
 - 5) Transfer, lease, or sale of the property.

- (c) Effects of an undertaking that would otherwise be found to be adverse may be considered as not being adverse for the purpose of these regulations:
 - 1) When the historic property is of value only for its potential contribution to archaeological, historical, or architectural research, and when such value can be substantially preserved through the conduct of appropriate research, and as such is conducted with applicable professional standards and guidelines;
 - 2) When the undertaking is limited to the rehabilitation of buildings and structures and is conducted in a manner that preserves the historical and architectural value of affected historic property through conformance with the Secretary's "Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings";
 - 3) When the undertaking is limited to the transfer, lease, or sale of an historic property, and adequate restrictions or conditions are included to ensure preservation of the property's significant historic features.

3.5.3.2 Somers Point

Six historic resources within the present project area were noted during the 1995 survey, and three of them are eligible for or are listed on the National Register of Historic Places, including the World War Memorial Bridge, the Somers Mansion, and the Bay Front Historic District. Additional survey done for the Reconstruction of Route 52 found no additional properties that met the 50-year age criterion. In addition the areas along the south side of the Bay Front, the traffic circle, and MacArthur Boulevard were surveyed. These areas consist of mid-to-late twentieth century residential and commercial development, with the exception of the aforementioned Bay Front Historic District. Anticipated impacts to historic properties in Somers Point are summarized in Table 3.5-1 in the DEIS.

World War Memorial Bridge: The preferred alternative would remove the eligible World War Memorial Bridge. According to Criterion (b)(1) for the Criteria of Effect and Adverse Effect, this action would cause an adverse effect to the eligible World War Memorial Bridge. Mitigation for the World War Memorial Bridge could include one or more of a combination of different options, including recordation to standards set by the Historic American Engineering Record (HAER), attempt to reuse or market parts of the bridge structure, and interpretative displays and/or educational materials to be produced as a supplement to the HAER recordation. Retaining the World War Memorial Bridge in its present location to avoid adverse effects to the Bay Front Historic District is not a reasonable alternative. The bridge is structurally deficient and requires major rehabilitation work. Furthermore, the extent of the work required on the bridge would likely alter its basic appearance and it would lose its historical character.

Somers Mansion: According to Criterion (b)(3) of the Criteria of Effects and Adverse Effects, the preferred alternative would introduce new visual and audible elements that differ from the historic resource's present setting. The proposed high bridges would be fundamentally different from the existing structure. The preferred alternative would minimally alter the historic character and setting at the Somers Mansion, which is approximately 213 meters (700 feet) from the proposed bridges. However, the Somers Mansion's eligibility relates primarily to Eligibility Criterion (a), Patterns of History. This historic site is not eligible for the National Register

because of its setting, which is now much smaller than it was originally. Consequently, the removal of the World War Memorial Bridge and the construction of new bridges would cause no adverse effects to the Somers Mansion.

Bay Front Historic District: According to Criterion (b)(3) of the Criteria of Effects and Adverse Effects, the preferred alternative would introduce new visual and audible elements that differ from the historic resource's present setting. The proposed high bridges would be fundamentally different from the existing structure. The preferred alternative would alter the historic character and setting at the Bay Front Historic District, which comes up to the water's edge and approximately 152 meters (500 feet) from the proposed bridges. The Bay Front Historic District is eligible under Eligibility Criterion (a) because of its importance in the development of Somers Point and New Jersey as a resort area. It is also eligible under Eligibility Criterion (b) because it is a cohesive group of buildings built in the style and types that were popular between 1890 and 1935. Its orientation on the bayfront was essential in attracting tourists. Since the bayfront alignment is so important to this district, the preferred alternative would cause adverse effects to the Bay Front Historic District. Mitigation for the Bay Front Historic District could include design treatments for the new bridge(s) that reduce visual impact, and add aesthetically pleasing landscaping treatments. See Section 3.5.4, "Section 106 Coordination".

3.5.3.3 Ocean City

The survey of historic buildings for Ocean City was designed to locate and identify all significant historic properties contained within the APE. Since Ocean City's streets are densely built up, a careful street-by-street APE was drawn to include only those areas where effects would be likely. Current plans do not indicate that any historic properties in Ocean City will be taken, isolated, or otherwise physically altered as a result of this project. A total of three historic properties in the Ocean City portion of the project APE were recommended as eligible for listing on the National Register of Historic Places, including the Dockside Cafe/Marina, the Tabernacle Baptist Church, and the Bayside Center. All of these resources are significant under Eligibility Criterion (c).

Inventory No. 16 Dockside Cafe/Marina: According to Criterion (b)(3) of the Criteria of Effects

and Adverse Effects, the preferred alternative would introduce new visual and audible elements that differ from the historic resource's present setting. The proposed structures would be higher than the existing crossing with different bridge designs. The preferred alternative would alter the historic character and setting at Inventory No. 16, which is at the bay's edge and is approximately 140 meters (460 feet) from the proposed ICWW bridge crossing. Demolition of the existing crossing and construction of the preferred alternative would cause adverse effects to Inventory No. 16. Possible mitigation options could include design treatments for the new bridge(s) that reduce visual impact, and add aesthetically pleasing landscaping. See Section 3.5.4, "Section 106 Coordination".

Inventory No. 79 Tabernacle Baptist Church: Inventory No. 79 at the corner of West Avenue is approximately 457 meters (1,500 feet) from the bay and approximately 520 meters (1,706 feet) away from the proposed bridge structures. The preferred alternative might be seen in the background from Inventory No. 79; however, the location of the Tabernacle Baptist Church behind other streets and buildings largely shields it from visual, noise, or other impacts. According to the Criteria of Effects, the preferred alternative would not alter characteristics of the property that may qualify the property for inclusion in the National Register and, consequently, would have no adverse effects on Inventory No. 79.

Inventory No. 83 Bayside Center: According to Criterion (b)(3) of the Criteria of Effects and Adverse Effects, the preferred alternative would introduce new visual and audible elements that differ from the historic resource's present setting. The proposed structures would be higher than the existing crossing, with different bridge designs, and could potentially alter the historic character and setting at Inventory No. 83, which is at bay's edge. However, the property is located some distance away at approximately 457 meters (1,500 feet). Although the preferred alternative would be seen and traffic would possibly be heard from the Bayside Center, it is sufficiently remote so as not to change those characteristics that make the Bayside Center eligible for National Register listing. Due to the relatively distant location of this historic resource from the proposed bridge crossings, the preferred alternative would cause no adverse effects to Inventory No. 83.

3.5.4 Section 106 Coordination

Section 106 coordination for the Route 52 Project has consisted of consultation among technical staff at the NJDOT, FHWA, NJSHPO, and the public through three means: 1) partnering workshops, 2) project-specific site meetings and public meetings, and 3) on-going coordination, both verbal and written. The coordination meetings are summarized in Section 4.0.

These consultations were pursuant to regulations in order to determine the APE of the project. A Memorandum of Agreement (MOA) between FHWA, NJDOT, and NJSHPO (see Appendix B) specifies that the replacement of the Route 52 Causeway shall be implemented in accordance with stipulations outlined in the MOA and signed on January 28, 2002 in order to take into account the effect of the proposed undertaking on historic properties. These stipulations include the following:

- Ensure the proper documentation to HAER standards prior to the demolition of any elements of the bridge over Ship Channel.
- Produce an interpretive display as a supplement to the HAER recordation to be placed at the acquired Gulf Gasoline Station in Somers Point adjacent to one of the historic resources. A duplicate version could possibly be displayed at the Ocean City Visitor's Center.
- Develop materials used to produce the cultural resource survey reports and the HAER documentation.
- Continue review of offers from potential recipients to ensure that the integrity of the bridge will be maintained at the new location.
- Develop design review process to ensure the replacement bridge reflects the project area setting and history.
- Ensure that all stipulations are executed in accordance with all appropriate guidelines and regulations.

3.6 SOCIOECONOMICS AND LAND USE

3.6.1 Methodology and Existing Conditions

A Socioeconomics and Land Use TES was conducted to evaluate the social, economic and land use impacts associated with the alternative under consideration for reconstruction of Route 52.

The methodology used in the evaluation involved three major tasks:

1. Inventory/data collection of population, land use, zoning, and the economy provided by numerous Federal, state, regional, county and local agencies covering the project area
2. Field survey depicting existing condition land use and zoning for the businesses, residential development, open space, and community facilities within the primary impact area
3. Assessment of potential impacts on socioeconomics and land use with particular emphasis on cohesive communities, displacement of residences, accessibility to community facilities, business displacement and associated impacts to business activities and employment, local economy, construction, land use and zoning, and regional community plans and growth.

In Somers Point, the community facilities within or in close proximity to the primary impact area include the boat launch facilities, bait and fishing tackle shops (Dolphin Dock), and the public beach on Bay Avenue; the Somers Mansion Historic Site on the Somers Point traffic circle; the Atlantic County Historical Society on Shore Road behind the Somers Mansion; and the Kids Point Pre-school on MacArthur Boulevard. The nearest hospital and Somers Point City Fire Department facility are located outside of the primary impact area. Land use within the primary impact area in Somers Point is generally consistent with current zoning, with properties on either side of Route 52 and the Somers Point traffic circle being commercial and/or historic commercial. Most of the area beyond those properties is residential use (single-family structures). According to the Somers Point Planning and Zoning Office, there are no proposed/planned development projects within the primary impact area.

In Ocean City, the community facilities within or in close proximity to the primary impact area include the islands in Great Egg Harbor Bay over which Route 52 passes (specifically, the Ocean City Information Center on the first island outside of Ocean City) and the Macedonia United Methodist Church at the intersection of Simpson Avenue and 10th Street. There are no pedestrian or bicyclist facilities on the Route 52 causeway over the islands in Great Egg Harbor Bay. However, the causeway is used by recreational fishermen to access Elbow Thorofare and Rainbow Channel for fishing.

The nearest hospital (in Somers Point) and Ocean City Fire Department facility are located outside of the primary impact area. Route 52 is the most direct link between Ocean City and the Shore Memorial Regional Hospital. Route 52 is also the primary route for fire-fighting vehicles and EMS vehicles coming from Somers Point and Longport in support of emergencies in Ocean City. Route 52 is a designated emergency evacuation route and a part of the Coastal Evacuation System. During severe storms, evacuation from Ocean City to the mainland may be needed, depending on the severity of storm event.

Land use within the primary impact area in Ocean City is generally consistent with current zoning, and is of mixed-use character, primarily consisting of residential and commercial/office uses, with some public and quasi-public land uses and private undeveloped land. With the exception of two condominium complexes on either side of Route 52 as it enters Ocean City, all of the properties abutting 9th Street have a commercial or office land use. Most of the remaining area is residential use (single family or two-family structures). Environmentally sensitive lands encompass parkland and open space, including Section 4(f) properties. In Ocean City, these areas include the islands in Great Egg Harbor Bay over which Route 52 passes, which also includes the Ocean City Information Center on the first island outside of Ocean City.

3.6.2 Somers Point

3.6.2.1 Social Impacts

Impacts on Community Cohesion

Cohesive communities are self-contained areas in which residents share common population characteristics such as age, racial composition, income, and housing. Potential impacts on community cohesion from a highway project include changes in a community's physical boundaries, access to services, or its socioeconomic character. They can include direct or indirect impacts on the community due to construction or increased traffic, or potential impacts on the stability of the community due to the proximity of the highway.

The preferred Alternative 9-1 does not propose any changes to the physical boundaries of the community and will not result in any loss of access to services or impact the socioeconomic character of Somers Point. The touchdown point of the new road would be a new four-way intersection with traffic lights and pedestrian crossings built in the area of the present Somers Point traffic circle. This would not adversely affect community cohesion, as the traffic circle is currently a busy, two-lane traffic circle inaccessible by pedestrians.

There will be minor, short-term impacts during construction, and some vehicles may elect to use alternate routes to and from Ocean City and the businesses on Bay Avenue and MacArthur Boulevard. To mitigate potential construction-related impacts, construction activities adjacent to the existing traveled way should be minimized during the busy summer tourist season.

In response to comments by local residents a study was made to assess the feasibility of using Mays Landing Road as a main connecting route between the Garden State Parkway and Ocean City, thus eliminating the need to alter MacArthur Boulevard. It was concluded that this bypass corridor would involve a grade-separated interchange to connect to Garden State Parkway. Also, there would be a significant impact on the community since large areas of land and property would need to be acquired adjacent to the existing Country Club, the Golf Course and many

Town Houses to accommodate the widening of the road.

Residential Displacement and Community Facilities Impacts

With the proposed Alternative 9-1 no residential households will be displaced, and no minority, elderly, or low-income groups will be affected. One residential property (SP-41, at the intersection of Braddock Drive and MacArthur Boulevard) may be impacted during construction. The preferred alternative will have an impact on the open space properties in Great Egg Harbor Bay. Refer to the plans entitled “Green Acres Impacts” and “Plans, Profiles and Typical Sections” for Alternatives 9/9A in Appendix A of the DEIS.

Recreational Fishing Access

Currently, recreational fishermen are able to access the shores of all of the tidal marsh islands along the causeway from the low-level shoulders adjacent to Route 52 where they customarily park their vehicles.

The preferred alternative ensures angler access to the most popular fishing spots along the Route 52 causeway. A ramp from the northbound and southbound direction will provide access to the Island situated between the Rainbow Channel and Elbow Thorofare. A parking facility that will accommodate up to 30 vehicles is proposed underneath the structure. On the island situated between Beach Thorofare and Rainbow Channel, a new fishing pier is proposed at the south bank of Rainbow Channel. An enlarged parking facility to accommodate up to 41 vehicles is proposed at the site of the current Visitor’s Center, which will be relocated to Ocean City. A path underneath the structure will connect the east and west sides of that island. The preferred alternative also proposes a pedestrian ramp (ADA compliant) and a stair tower on the south bank of Rainbow Channel opposite the site of the existing Visitor’s Information Center. This stair tower is proposed to allow for pedestrian access from the structure’s sidewalk to this location. Access to the south bank of Elbow Thorofare is available to pedestrians through the use of the structure’s sidewalk, which ramps down to ground level at that location. (See Figures 3.6-1 and 3.6-2).

To provide additional access to fishermen, the existing boat ramp on the south bank of Rainbow Channel will be enhanced, and the piles of the existing roadway structure will be cut off below the water to remain as a habitat for fish to the extent compatible with navigational needs. However, due to safety reasons, the preferred alternative will not provide access to the island situated between Elbow Thorofare and Ship Channel.

Somers Point Mansion

The preferred alternative does not take any portion of the Somers Mansion property, and it is not anticipated that there will be any significant adverse impacts to the Somers Mansion property. During construction, there may be some inconvenience to people wishing to access the Somers Mansion.

MacArthur Boulevard

The preferred alternative will ultimately improve the traffic flow on MacArthur Boulevard and in Somers Point by decreasing the amount of traffic that backs up into adjacent roads. This will improve access to Shore Memorial Hospital by emergency vehicles coming from Ocean City, Beesleys Point and other areas to the south, and areas of Somers Point to the south. During construction, there may be some inconvenience to people wishing to access the Kids Point Pre-school on MacArthur Boulevard

Environmental Justice Considerations

The Environmental Justice directive (72 FR 18377) adopted in 1997, USDOT by an Executive Order promotes the principles of environmental justice. Planning and programming activities that have the potential to have a disproportionately high and adverse effect on human health or the environment must include consideration of the effects on minority populations and low-income populations as defined in the FHWA Environmental Justice Order signed on December 2, 1998.

In Somers Point, the proposed preferred alternative is in an area where it is not inhabited predominantly by minority or low-income populations. Therefore, the proposed improvements will not have a disproportionately high impact on minority or low-income populations. For details, see Section 3.6.3 of the DEIS.

3.6.2.2 Economic Analysis

The existing economic conditions were analyzed with respect to business disruption/displacement; local fiscal resources; recreational fishing, commercial shellfishing, and crabbing; and construction-related economic impacts. The contribution of recreational fishing to the local economies of the coastal communities of Somers Point and Ocean City is addressed in the Socioeconomics and Land Use TES. General information is available regarding the value of recreational fishing in New Jersey, but no specific information is available regarding the contribution of recreational fishing to the local economies of the coastal communities of Somers Point and Ocean City.

Business Displacement/Disruption

The Somers Point economy is primarily based on tourism. Key employers, in addition to the local businesses that cater to local people and to tourists, are the hospital and government institutions.

There will be some short term impacts to businesses around the Somers Point traffic circle, radiating streets, and along MacArthur Boulevard during construction (Refer to Table 3.6-1 in the DEIS). These include the temporary loss of parking spaces during the installation of the proposed detention/infiltration piping system. (A permanent drainage easement will be necessary for the parking lot area immediately above the detention/infiltration piping system). Confining most of the construction work to the off season can alleviate these impacts. Long term effects on accessibility that could occur after the traffic circle is replaced by a four-way, signalized intersection; will be mitigated with the use of left turn lanes. The Gulf station in the southeast

quadrant of the traffic circle will be acquired due to the lack of safe and adequate access in and out of that station as a result of the proposed project. Also the horizontal alignment improvement proposed for the preferred alternative requires that the NJDOT parking area south of the circle be eliminated and a strip of the Circle Liquors parking area be acquired, eliminating five of the present parking spaces.

Highway access to business along MacArthur Boulevard will be modified as per the New Jersey State Highway Access Code. Final impacts will be determined upon implementation of the preferred alternative.

Local Fiscal Resources

The primary local fiscal impact of a transportation improvement project is through tax revenue losses due to right-of-way acquisition of taxable property. However, if a transportation improvement project improves access to certain areas of a municipality, it may encourage the redevelopment of some parcels and increase business activity within the municipality.

Based on current (1998) tax rates, approximately \$14,000 in annual revenue would be lost in Somers Point. There would also be a loss of sales tax revenue by the county, state and federal governments unless the displaced business was to be relocated and continue in business.

Only one entire property will be taken for the proposed project: the Gulf Station on the Somers Point traffic circle. In 1997, it had an assessed valuation of \$223,400. The taking of this property will result in an annual loss of approximately \$13,550.00 based on 1998 property tax revenues. This amount would have a minuscule impact on the property tax revenues of the city, as it represents approximately 0.08% of the total taxes collected in 1998. In addition, the loss of tax revenue for the county, state, and Federal governments from the sale of gasoline by the station. may be offset by increased sales at other gasoline stations in the area; however, it cannot replace the loss of property taxes to the City of Somers Point.

Approximately 2500 square meters (3000 square yards) of property will need to be acquired

from the Circle Liquors Store. However, this acquisition may be partially compensated for granting to the property over 1000 square meters (1200 square yards) of area adjoining the property at another location. Also, new parking configuration will result in a net gain of 13 parking spaces for the store. Less than 500 square meters (600 square yards) of property will also need to be taken from the State of New Jersey. Minor takings will also be acquired from the Pearl Restaurant and Bar [~150 square meters (~180 square yards)] and the Point Partners, LLC [~7 square meters (~8 square yards)]. The taking of the area of the Pearl Restaurant will be more than compensated for granting 175 square meters (210 square yards) at another location adjoining the property. This will result in a net increase of their property. The loss in tax revenue generated has not been determined at this time.

Recreational Fishing, Commercial Shellfishing, and Crabbing

Contacts were made with the NMFS, New Jersey Sea Grant, the NJDEP, and the New Jersey Marine Sciences Consortium, and a review of a variety of reports was conducted in an effort to obtain relevant socioeconomic data on recreational and commercial fishing. In addition, a survey was conducted to obtain additional information regarding commercial shellfishing and crabbing in Great Egg Harbor Bay, and informal personal interviews were conducted with recreational fishermen and commercial shellfishermen. The responses to the survey and personal interviews revealed that most people believe the disturbance caused by the relocation and construction of a new causeway would be temporary, and that an improved roadway would increase their access to Somers Point or Ocean City. There was a strong desire for a new roadway, with little concern over issues regarding detrimental impacts to the Bay.

Clearly, recreational fishing plays an important role in the State's economy. In 1991, about 950,000 people spent more than \$630 million fishing in New Jersey's waters, generating more than \$44 million in state sales tax, resulting \$400 million in earnings, and supporting 16,750 jobs. According to a 1996 study, over one million anglers went fishing in New Jersey during 1996 and spent over \$1,025,230,000 for goods and services. The economic impact of these expenditures totaled nearly \$2,029,864,000, improving the economy and generating sales and income taxes that benefited government agency programs. Coastal communities depend upon

fishing to support local economies, and in many small communities, angler expenditures are central to economic health and growth. Recreational fishermen incur certain costs, which can include expenditures at sporting goods or specialty fishing stores, bait shops, lodging expenditures, travel expenditures, and boat fees. The economic effects of angler expenditures ripple throughout local, state and national economies, sustaining existing jobs and creating new jobs.

No specific information is available on the contribution of recreational fishing to the economy of Somers Point and Ocean City. It is apparent from field observations and discussions with community members that many local residents are active recreational anglers, and that tourists visit the Somers Point and Ocean City area, at least in part, due to the marine recreation fishing opportunities available. A number of anglers fish along the Route 52 causeway either from shore or in boats, although there are also many other locations in the vicinity that are used by anglers. Similarly, no specific information is available on the contribution of commercial shellfishing to the economy of Somers Point and Ocean City.

It is also difficult to quantify the economic value of the recreation fishing, commercial shellfishing, and crabbing along the Route 52 causeway. If recreational fishermen were prevented from fishing along the Route 52 causeway, they would likely go to one of the many nearby fishing locations. The proposed alternative insures angler access to the most popular fishing spots along the Route 52 causeway, as discussed in detail in Section 3.6.2.1.

Construction-Related Economic Impacts

Construction-related economic impacts can be both positive and negative. The negative economic impacts generally relate to losses to businesses near the construction zone that may experience a temporary loss of customers during construction because of decreased accessibility. Construction related employment is a positive economic impact that results from a proposed project. It is estimated that the Route 52 causeway project would generate approximately 200 to 250 jobs, creating a positive economic benefit in the local area for approximately four years. There will be additional economic benefits from the sale of materials and supplies and the associated multiplier effect. (For a lists the businesses that would be adversely affected by construction activities, see Table 3.6-1 in the DEIS.)

During construction, there will be minor short-term impacts to businesses around the Somers Point traffic circle and on all of the radiating streets. Businesses around the traffic circle dependent on visibility to drive-by traffic may be adversely affected due to the decline in traffic accessibility. Approximately 20 businesses in Somers Point (mostly stores, restaurants and motels) may lose some patronage because of diminished access to them during construction in the immediate vicinity of their businesses.

3.6.2.3 Land Use Impacts

Impacts were assessed in terms of compatibility with existing land use and zoning; effects on proposed development; the potential for induced development; compliance with the Farmland Protection Policy Act; and compatibility with community and regional plans (i.e., land use or transportation plans): impacts on environmentally sensitive lands (i.e., parkland and open space, including Section 4 (f) properties) are addressed in Section 4.0.

Compatibility with Existing Land Use and Zoning

The preferred alternative (Alternative 9-1) is compatible with the existing land use and zoning in Somers Point and will not have an impact on proposed development in the city. There is no new development proposed for the primary impact area. Also, the preferred alternative will not have a

significant potential to induce development because this project involves the replacement of an existing facility and there is little open area that can be developed in Somers Point. Although some previously developed properties could be redeveloped, the type and size of development would be determined by the zoning code, and would not be directly affected by the project.

Farmland Protection Policy Act Compliance

The preferred alternative is in compliance with the Farmland Protection Policy Act, which requires identifying and taking into account adverse effects of federally funded projects on the preservation of farmland. Although most of the soils in the Somers Point area are considered to be Statewide Important Farmland Soils, the present development and use of the area precludes its use for farming.

The soil type of the islands in Great Egg Harbor Bay is TM, Tidal Marsh. This soil type is not classified as prime farmland, farmland of statewide importance, or as farmland of local importance. Areas of tidal marsh soils would be considered unique farmlands if they were being used for special crops. Since the soils on the islands are not being used for special crops, they are not considered unique farmland. Therefore, the preferred alternative will have no adverse impacts on federal farmland or the preservation of farmland in either Somers Point or Ocean City.

Compatibility with Community and Regional Plans

The preferred alternative (Alternative 9-1) is compatible with the 1989 Master Plan for the City of Somers Point. Which calls for a “safe and efficient movement of vehicles and pedestrians.”

Other plans include the Comprehensive Plan for Cape May County, New Jersey (Cape May County Planning Board, 1996); the Cape May County Transportation Plan (Cape May County Planning Board, 1994); and the SJTPO 2015 Regional Transportation Plan (SJTPO, 1995) and Plan Update (DRAFT). The preferred alternative is consistent with these plans. With regard to the Cape May County Transportation Plan, the preferred alternative is consistent with two of the

plan objectives (address traffic safety and reduce congestion). The plan indicated that the NJ Route 52 causeway is a congestion problem, and the preferred alternative will alleviate this situation by eliminating bridge openings and the delays to vehicles.

3.6.3 Ocean City

3.6.3.1 Social Impacts

Impacts on Community Cohesion

The preferred alternative will not affect community cohesion, as there will be no changes in the physical boundaries of the community, access to services, or in the socioeconomic character of Ocean City. However, the raised highway would block the existing access to and from Palen Avenue since the touchdown point of the preferred alternative would be at the Pleasure Avenue intersection where a one-way through street from Palen Avenue to Pleasure Avenue would be constructed. This one-way through street would not significantly affect community cohesion. Ninth Street is currently a divided road in this area, preventing vehicles exiting Palen Avenue from making left turns onto 9th Street and preventing northbound vehicles on 9th Street from making left turns to enter Palen Avenue. Similarly, the raised highway would block direct access between 9th Street and the condominium on the east side of 9th Street. Access to this condominium by vehicles would be by way of Bay Avenue, Revere Place, and the alley currently connecting Revere Place and 9th Street. During construction of the preferred alternative there will be a minor short-term impact and some vehicles may elect to use alternate routes to and from Ocean City.

Residential Displacement and Community Facilities Impacts

No residential households will be displaced, and no minority, elderly, or low-income groups will be affected by the preferred alternative. The touchdown point of the reconstructed road would be at the Pleasure Avenue intersection. The raised highway would block Palen Avenue, where a new one-way through street between Palen Avenue and Pleasure Avenue would be constructed

(extending from Palen Avenue to Pleasure Avenue, parallel to 9th Street) as discussed above. The existing sidewalks along 9th Street from Palen Avenue to Pleasure Avenue and along the east side of 9th Street will be retained, so there will be no impacts to pedestrians. In addition, the preferred alternative will have an impact on open space at the islands in Great Egg Harbor Bay. Refer to the plans entitled “Green Acres Impacts” and “Plans, Profiles and Typical Sections” for Alternatives 9/9A in Appendix A of the DEIS.

Recreational Fishing Access

The preferred alternative ensures angler access to the most popular fishing spots along the Route 52 causeway, as discussed in detail in Section 3.6.2.1. Access from the parking areas to key fishing locations, especially near the abutments of the existing structures over Rainbow Channel and Elbow Thorofare, would be over paths or boardwalks designed to minimize damage to the wetland surface.

Boaters and recreational fishermen in boats also congregate near the Route 52 bridges over Rainbow Channel and Elbow Thorofare. The preferred alternative would not affect boaters and recreational fishermen near the Route 52 bridges over Rainbow Channel and Elbow Thorofare. All the areas in the vicinity of the reconstructed highway would be useable by boaters. During the construction period boaters will not be able to come as close to the Route 52 bridges as they had in the past, but this will be a short-term impact, lasting only while construction of the new bridges is taking place. Also, when the old bridges are removed it will affect only one channel at a time.

Ocean City Information Center

The proposed alternative will affect the existing access to the Ocean City Information Center located adjacent to the southbound lanes of the causeway on the last island before entering Ocean City. The Information Center will not be accessible from the northbound lanes, and will not be visible from the elevated roadway. Due to these effects, in consultation with Ocean City representatives, it has been decided to relocate the Information Center to the city itself. NJDOT

will acquire the existing Information Center from Ocean City at the fair market price and provide any necessary relocation assistance as required by law. Ocean City will be responsible for the actual relocation. The city officials have indicated that they believe that there are a few suitable locations for the relocation.

Pedestrian and Bicyclist Facilities

The proposed alternatives will incorporate pedestrian and bicyclist facilities to link Somers Point and Ocean City. A continuous 2.0 meter (6.5 foot) wide walkway, separated from the shoulder by a continuous concrete barrier, will be provided along the easterly side of the new structure. Additionally, benches will be provided approximately 70 meters (270 feet) on center along 4% or 5% approach gradients proposed on bridges over the ICWW and Ship Channel. The 3.0 meter (10 foot) wide right shoulder will be designed to accommodate bicycles and will be continuous between Somers Point and Ocean City.

Emergency Access

Route 52 is the most direct link between Ocean City and Shore Memorial Hospital in Somers Point, the regional hospital for the area. Bridge openings affect the ability of emergency vehicles to respond in a timely manner. Route 52 is a designated emergency evacuation route and part of the Coastal Evacuation System. During severe storms, evacuation from Ocean City to the mainland may be needed. The vertical alignment of the preferred alternative is above the 100-year flood elevation; therefore, it will alleviate flooding issues (See detail of Alternative 9 in Appendix D). Also, the preferred alternative eliminates bascule bridges, providing continuous and uninterrupted traffic flow during an emergency.

Dredged Material Disposal Facility

The proposed alignment would result in the loss of the existing dredged material disposal facility operated by the City of Ocean City. This facility is within the right-of-way for Route 52 directly across Route 52 from the Information Center. The overall impact due to loss of this dredged material disposal facility is limited, since this lot is already full to almost its capacity and the City of Ocean City has other approved/permitted facilities that it can use for dredged material disposal.

Environmental Justice Considerations

Environmental Justice Considerations were also identified for Ocean City in accordance with Executive Order (E.O.) 12898, as described in Section 3.6.2.1. In Ocean City, the preferred alternatives will not have a disproportionately high adverse impacts on minority populations or low-income populations. Although there are residential areas within the primary impact area, they are not low income or minority neighborhoods. The largest minority and/or low income residential area is between West and Bay Avenues from First Street to 8th Street. For details, see Section 3.6.3 of the DEIS.

3.6.3.2 Economic Analysis

The methodology for the economic analysis is discussed in Section 3.6.2.2.

Business Displacement/Disruption

Tourism is the basis of the Ocean City economy. Beside businesses that cater to tourists, other key employers are government and financial institutions. The businesses along 9th Street include: gasoline service stations, tourism related businesses, financial institutions, retail establishments, along with a few business offices.

Under the preferred alternative, the touchdown point of the reconstructed road would be at the Pleasure Avenue intersection. The raised highway will block direct access to Palen Avenue where a new one-way through street between Palen Avenue and Pleasure Avenue will be constructed. Two seasonally operated business properties would need to be acquired to construct the new one-way through street, including Beach Bums Limited and Dockside Cafe and Marina Speed Boat Rentals. The Bud's Outboard Marine and the Mobil Service Station would need ramps for access. The access to businesses along Palen Avenue would also change as a result of a new one-way through street. However, the one-way through street is not expected to result in a significant adverse impact, as 9th Street is currently a divided road at the intersection with Palen Avenue, preventing vehicles exiting Palen Avenue from making left turns onto 9th Street and preventing northbound vehicles on 9th Street from taking left turns to enter Palen Avenue.

Local Fiscal Resources

Based on current (1998) tax rates, approximately \$6,000 in annual revenue would be lost in Ocean City. There would also be a loss of sales tax revenue by the county, state and federal governments unless the displaced businesses were to be relocated and continue in business.

Three entire properties will likely be acquired for the proposed project: Beach Bums Limited at the corner of 9th and Palen Avenue, Dockside Cafe and Marina Speed Boat Rentals at the corner of 9th and Pleasure Avenue, and a small privately owned parcel on the first island outside of Ocean City. That parcel has an assessed value of \$200 and was assessed \$3.40 in property taxes in 1998. In 1997, Beach Bums Limited had an assessed value of \$332,500, and the two lots occupied by Dockside Cafe and Marina Speed Boat Rentals had a total assessed value of \$244,300. Based on current (1998) tax rate, the removal of these properties would result in a loss of approximately \$10,000 in annual tax revenue to Ocean City. However, this loss would have a minimal impact on the property tax revenues for the city, as it represents less than 0.02% of the total taxes collected of \$57,076,490 in 1998. In addition, Beach Bums Limited and Dockside Cafe and Marina Speed Boat Rentals also generate tax revenue for the county, state, and Federal governments from the sale and/or rental of merchandise. If these businesses would relocate elsewhere in Ocean City, there may be no loss of sales taxes; however, it will not replace the loss of property taxes to the City of Ocean City.

Recreational Fishing, Commercial Shellfishing, and Crabbing

The economic impacts on recreational fishing, commercial shellfishing, and crabbing are discussed in Section 3.6.2.2.

Construction-Related Economic Impacts

The methodology for evaluating construction-related economic impacts is discussed in Section 3.6.2.2. Table 3.6-1 in the DEIS lists the businesses in Ocean City that would be adversely affected by construction activities and briefly describes the nature and extent of the impact.

There will be minor short-term impacts during construction along 9th Street to the intersection with Bay Avenue. Some vehicles will likely use alternate routes to and from Ocean City during construction. To the extent that this occurs, businesses along 9th Street dependent on visibility to drive-by traffic (particularly service stations), both within and beyond the primary impact area may be adversely affected due to the decline in drive-by traffic.

Approximately eight businesses in Ocean City would very likely lose some patronage because of diminished access to them during staged construction on the Beach Thorofare bridge and the reconstruction of 9th Street between the bridge and Pleasure Avenue. However, access to each will be required to be maintained while construction is taking place.

3.6.3.3 Land Use Impacts

The methodology for the assessment of land use impacts is discussed in Section 3.6.2.3.

Compatibility with Existing Land Use and Zoning

The preferred alternative (Alternative 9-1) is compatible with the existing land use and zoning in Ocean City and will not have an impact on proposed development in Ocean City. There is no

new development proposed for the primary impact area.

Potential for Induced Development

The preferred alternative will not have a significant potential to induce development because this project involves the replacement of an existing facility and because there is little open area that can be developed in Ocean City. Although some previously developed properties could be redeveloped, the type and size of development would be determined by the zoning code, and would not be directly affected by the project. The City of Ocean City has indicated that current zoning has a negative impact on the investment and economic growth in the central area (3rd Street to 15th Street) of the city. The City is interested in triggering proper development, but maintaining the neighborhood charm. Better access to and traffic flow on 9th Street may help trigger proper development in this area.

Farmland Protection Policy Act Compliance

The preferred alternative is in compliance with the Farmland Protection Policy Act, as discussed in Section 3.6.2.3. The preferred alternative will have no adverse impacts on federal farmland or the preservation of farmland in either Somers Point or Ocean City.

Compatibility with Community and Regional Plans

The preferred alternative (Alternative 9-1) is compatible with the 1988 Master Plan for the City of Ocean City where Objective No. 13 is “to promote the conservation of open space through protection of wetlands, stream corridors, and valuable natural resources, and prevent degradation of the environment.” In a similar vein, land use and development Principle No. 3 states “protection of natural and environmental resources, including floodplains, wetlands, marsh and aquifer recharge areas, and areas suitable for public and quasi-public recreational activities.” The preferred alternative is consistent with other relevant plans, as discussed in Section 3.6.2.3.

3.6.4 Mitigation

To mitigate potential construction-related impacts in both Somers Point and Ocean City, construction activities along the traveled way should be minimized during the busy summer tourist season.

Somers Point

To mitigate the effects of the removal of the World War Memorial Bridge and the loss of recreational access to fishermen, a low-level timber recreation/fishing pier and a parking lot would be built at the site of the World War Memorial Bridge, with a small monument displaying a commemorative plaque. The parking lot would be located on the site of the Gulf Station currently east of the Somers Point traffic circle, and the recreation/fishing pier located immediately east of the abutment of the new bridge. This would enhance recreational fishing opportunities in the area.

The right hand turn lanes proposed for the intersection replacing the traffic circle might interfere with pedestrian crossings. However, mitigation of this issue will be addressed during final design. Additionally, On MacArthur a signal-controlled crosswalk is proposed at Braddock Avenue. This will provide a safe crossing to pedestrian destined to schools and recreation areas on the east side of the Boulevard.

The loss of sales and fuel taxes resulting from acquisition of the Gulf Station may be offset by increased sales at other gasoline stations in the area.

Ocean City

Parkland

One of the possible parkland mitigation areas has been identified on the island between Beach Thorofare and Rainbow Channel east of the causeway and in the area of the existing Information Center (See Figure 3.4-2).

Angler Access

Several measures are planned to mitigate the impacts to recreational fishing access, as discussed in Section 3.6.2.1. Under the preferred alternative, recreational fisherman will be able to access the shores of most of the tidal marsh islands along the causeway. The proposed alternative provides a recreation/fishing pier and parking lot at the site of the World War Memorial Bridge, as well as access ramps, walkways, and parking facilities at the existing Ocean City Visitor's Center and Rainbow Island.

The new embankments on the island between Elbow Thorofare and Rainbow Channel would be low enough to add a diamond interchange onto the embankment at the north end of the middle tidal marsh island. This interchange would comprise exit and entrance ramps down to grade from both the northbound and southbound lanes to a proposed 30-vehicle parking area located under the elevated structure. Once the Visitor's Center is relocated to Ocean City, an enlarged parking facility is proposed for that site to accommodate up to 41 vehicles. Walkways and pedestrian ramps are proposed to provide access from the sidewalk of the elevated structure to this location. (See Figures 3.4-2, 3.6-1, and 3.6-2).

Visitor's Information Center

Construction of the preferred alternative would affect the existing access to the Ocean City Information Center located adjacent to the southbound lanes of the causeway on the last island before entering Ocean City. Under the preferred alternative, the existing Information Center would be razed and a new Information Center would be constructed in Ocean City. The existing parking area would be expanded for recreational users, with recreational walkways extending to the ends of the island.

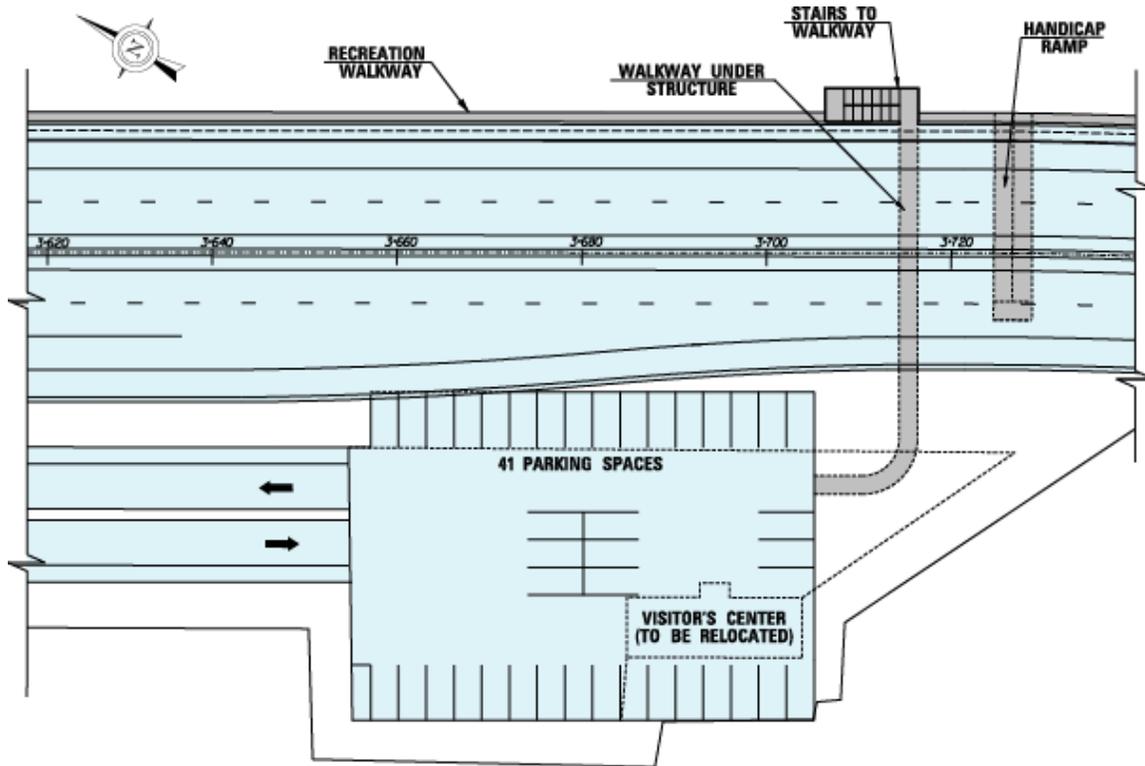


Figure 3.6-1
Detail of Parking Facilities
At Present Visitor's Center Location

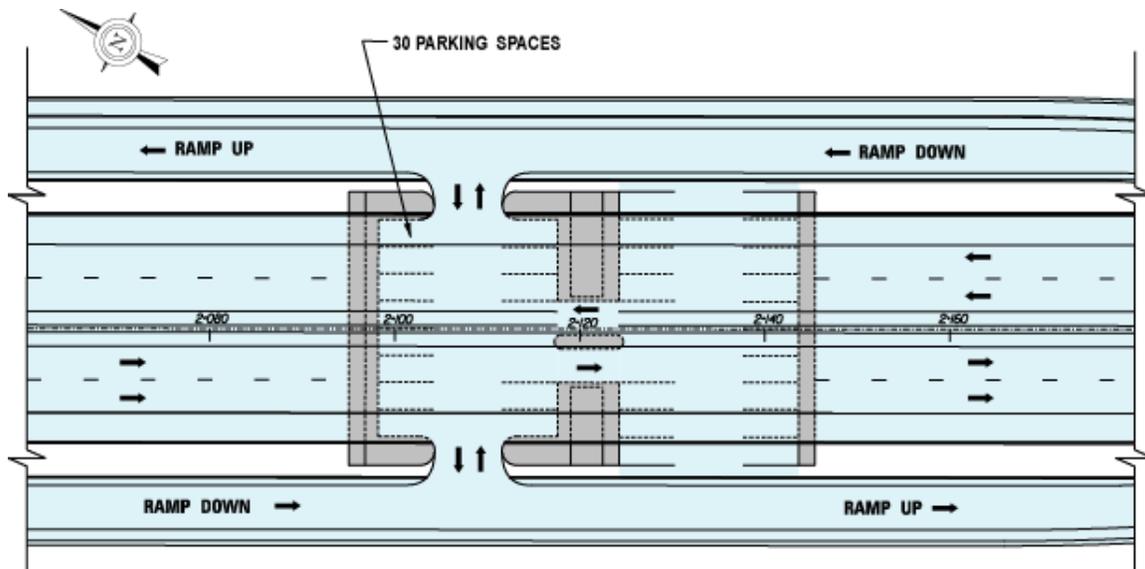


Figure 3.6-2
Detail of Parking Facilities
On Rainbow Island

3.7 VISUAL ENVIRONMENT

3.7.1 Introduction

The visual environment is an essential aspect to be evaluated. Satisfaction with the aesthetic appeal of their surroundings is an important issue for citizens, since it affects their pride in their community. There are several distinct perspectives that may be impacted visually by the proposed project:

- On or around MacArthur Boulevard,
- The approach through Somers Point,
- The view of the causeway from the mainland,
- Travelling on the causeway,
- The view of the causeway from the bay, and
- The areas outlying the entrance into Ocean City.

3.7.2 Existing Conditions

Along the east side of MacArthur Boulevard, there is a very nicely landscaped area. In addition, there is a well-landscaped area in the interior of the Somers Point traffic circle.

The existing causeway appears to be in visual repose with the flat landscape of the tidal marsh islands. For the travelling motorist, the large expanse of islands covered with vigorous cordgrass visible just a few feet below the causeway, and showing above the water, afford a variety of pleasurable visual experiences. For the boater, the low trestles over Rainbow channel and Elbow Thorofare are seen as obstructions. The rising viaducts at each end with relatively short spans and a forest of pilings are generally considered unattractive to those passing below.

3.7.3 Impacts

Under the preferred alternative, the appearance of the MacArthur Boulevard right-of-way will change significantly. The landscaped area along the east side of MacArthur Boulevard would be eliminated when that section of roadway is expanded from two lanes to either three or four lanes with an intermediate turning lane. Vegetation that screens residences on Laurel Drive, south of Route 9, and Dobbs Avenue from MacArthur Boulevard may be removed or reduced when MacArthur Boulevard is widened. Noise analyses indicate that barrier walls will be required on both the west and east sides separating the MacArthur Boulevard traffic from the adjacent parallel residential streets, Laurel Avenue and Dobbs Avenue. The appearance of these wall treatments will be important visual considerations.

Replacement of the traffic circle in Somers Point with a four-way, signalized intersection will involve the removal of the island and trees within the traffic circle. However, it will also add open land to the roadside lawns of properties such as the Somers Point Mansion. This will create opportunities for new landscaping that could more effectively screen the properties from traffic and shade the sidewalks in that area than the present traffic circle.

The proposed structures over Ship Channel and Beach Thorofare will be significantly higher than the existing structures and will be much more visually imposing when viewed from nearby on the mainland. However, because of the longer spans used in these structures and the great width of the bay, they will not appear to be excessively high proportionately. The alignment of the preferred alternative will be only slightly offset from the current alignment of the existing causeway, and will continue to cross over the middle Rainbow Island, but will be at higher elevations. The causeway between the high bridge structures will be entirely on structural viaduct. The view of the Route 52 causeway and bridges from areas along the waterfront will change when the causeway and bridges are replaced. However, this change is not considered a negative impact in most locations.

For the travelling motorists, their view of the adjacent low-lying tidal marshes on either side will be diminished but, due to the higher elevation, they will be afforded much more expansive views of the harbor waters.

For boaters, the viaduct over Elbow Thorofare and Rainbow Channel will be less obtrusive than the existing structures. Large spans, a much smaller number of large diameter piles supporting them, and the use of precast concrete components will present a much cleaner architectural appearance for those passing below.

The view of the Route 52 causeway and bridges from the Crab Trap Restaurant gazebo on Great Egg Harbor Bay will change when the causeway and bridges are replaced.

Reconstruction of Route 52 as it enters Ocean City will affect the divided roadway and landscaped area in this location, which was recently constructed by Ocean City to enhance the appearance of the “gateway” into the city. The view along 9th Street towards the bridge and along Palen Avenue towards 9th Street will change for residents and businesses. This is due to the highway entering Ocean City at a higher elevation. The approach roadway level will not meet the pavement of 9th Street until south of the Pleasure Avenue intersection. Direct access to 9th Street from Palen Avenue will be rerouted via a new one-way through street between Palen Avenue and Pleasure Avenue.

3.7.4 Mitigation

The following measures will be incorporated into the design of the project to mitigate the adverse visual effects:

- New landscape plantings will replace vegetation removed during the widening of MacArthur Boulevard adjacent to East Laurel Drive and Dobbs Avenue.
- The use of clean architectural precast concrete shapes will be considered for structures over waterways. The use of continuous box beams or precast bulb tees might further enhance this effect.

- The design of noise barrier walls along MacArthur Boulevard will include a distinctive architectural treatment, and this design will be presented to local citizens at a subsequent public meeting.
- Any of the existing Route 52 embankments that are left in place will be landscaped in a manner that will make them appear to blend visually with the marsh surrounding them.
- The divided roadway and landscaped “gateway” area entering Ocean City will be replaced.
- Use the longest spans that are economically feasible, which will minimize the visual clutter that piles usually introduce.
- Employ landscaping at the bridge touchdown areas in Ocean City and Somers Point.

3.8 HAZARDOUS WASTE

3.8.1 Introduction/Methodology

A Hazardous Waste TES was conducted to evaluate the potential presence of subsurface hazardous materials contamination along the Route 52 corridor from the intersection with Route 9 in Somers Point over Great Egg Harbor Bay to Ocean City at the intersection of 9th Street and Bay Avenue.

The study methodology involved defining the Study Area, identifying relevant properties within the Study Area, collecting property-specific and area data, conducting an historical data review and records review, conducting a site inspection of each property in search of visible signs of contamination, and ranking the properties relative to their potential for contamination. No sampling of potential asbestos-containing materials (ACM) was conducted as part of the this study. Structures constructed before 1980 are likely to have one or more building materials that contain asbestos.

The Study Area consists of a corridor centered around the existing right-of-way for Route 52, including land above mean high tide within 75 meters (about 250 feet) of that right-of-way. The relevant properties within the Study Area (referred to as Class A sites) are those sites that have or had an industrial or commercial primary use, or on which a significant discharge of a hazardous substance is known or reported to have occurred. They include relevant sites that are subject to the New Jersey Industrial Site Recovery Act (ISRA), as well as public buildings, houses of worship, marinas, and any residential site that contains more than four dwelling units.

An historical data review was conducted to identify, to the extent possible, the land use history of all relevant sites in the Study Area. Databases that identify sites of environmental concern were reviewed using a computerized search of databases of public agencies to determine if any sites in the Study Area were listed or if any listed facility was nearby the project corridor. In and near the corridor, the records of most interest relate to buried tanks and spills. Underground storage tanks (USTs) usually contain gasoline, fuel oil, or other chemicals and can contaminate

soil or groundwater if they leak. UST registration information (number, capacity, contents, and age of tank) was obtained from the NJDEP Bureau of USTs for the sites within the Study Area.

A general field reconnaissance of the Study Area was conducted in September and December of 1997, along with a more in depth site reconnaissance of each of the Class A properties. In addition, efforts were made to interview people associated with each site regarding its historic and current use (e.g., past and current owners, tenants, property managers, and neighbors).

Based on the information collected, each Class A site was assigned a relative risk ranking of low concern or high concern.

Low Concern: No visible or recorded environmental concern, or a low potential for contamination to impact the right-of-way. Properties that did not exhibit a potential environmental concern during the historical use check or field reconnaissance were classified as exhibiting a low potential for concern. Based on the review of available information, there was no reason to suspect a problem or concern with hazardous materials/contamination at these sites.

Risk factors indicative of potential for concern include the following:

- Potential for presence of soil, groundwater, or surface water contamination on the property.
- Permitted or unpermitted use, storage, transportation, discharge, or disposal of hazardous materials, including fuel and chemical storage facilities/tanks.
- Unclassified fill on the property.

Properties located outside of the right-of-way and the planned construction corridor that will not be directly affected by construction, even if they exhibit no more than one of the risk factors listed, were also classified as exhibiting a low level of concern if available information suggested that the potential to impact the right-of-way was low.

High Concern: High potential for, or verified presence of, contamination within or abutting the right-of-way. Properties that encompass a portion of the existing or proposed right-of-way, or

are adjacent to it and may be directly affected by roadway construction, and exhibit one or more of the environmental risk factors listed below, were classified as exhibiting a high potential for concern.

- High potential for, or verified presence of, soil, groundwater, or surface water contamination on the property.
- Permitted or unpermitted use, storage, transportation, discharge, or disposal of hazardous materials, including fuel and chemical storage facilities/tanks.
- Unclassified fill on the property.
- High potential for surface or subsurface migration of contamination to the property from adjoining properties for which evidence was found of a concern.

These properties may have recorded or visible environmental concerns, including evidence of use of hazardous materials either in current operations or as a release in prior operations, which could adversely impact roadway construction or ownership.

3.8.2 Existing Conditions

A total of 49 Class A sites were identified in the Study Area (33 in Somers Point and 16 in Ocean City), and a total of 67 registered USTs were identified (25 tanks at five sites in Somers Point and 42 tanks at five sites in Ocean City). In Somers Point, 16 active registered USTs were identified, and in Ocean City, 20 active registered USTs were identified. The potential for unregistered tanks was identified at three sites in Somers Point and four sites in Ocean City. In Ocean City, a number of former gasoline/service stations were present along 9th Street (some dating back to before 1937), but not all of them could be associated with a specific parcel. Therefore, it is possible that other unidentified USTs are still present along the Route 52 corridor.

3.8.3 Impacts

Based on the information collected, each Class A site was assigned a relative risk ranking of low concern or high concern. Of the 49 Class A sites evaluated, 12 sites were ranked high concern, and 37 sites were ranked low concern. In Somers Point, 6 sites were ranked high concern, and 27 sites were ranked low concern. In Ocean City, 6 sites were ranked high concern, and 10 were ranked low concern. Each Class A site, its risk ranking, and the rationale for the ranking are summarized on Table 3.8-1 in the DEIS.

3.8.4 Mitigation

For sites with a ranking of low concern, the need for additional work is a low priority, and no further NJDOT involvement is considered necessary at this time.

For sites with a ranking of high concern, the need for additional investigative work is a high priority, and further NJDOT involvement is necessary. This may include analysis of soil samples where necessary, during the design phase of the project. During construction, any excavated contaminated material will be disposed of properly or reused on the project in strict compliance with an approved soil re-use plan.

If the demolition of any structures is required, an assessment of the potential ACM should be made prior to beginning the demolition activities. If any ACM exists, specifications for the removal of such material will be incorporated into the contract plans.

3.9 CONSTRUCTION IMPACTS AND MITIGATION

3.9.1 Air Quality

Air quality impacts that arise during construction consist of construction equipment exhausts and dust generated by the movement of equipment over exposed earth. Emissions from construction equipment, which are negligible in relation to the total vehicular emissions in the project area, do not represent a significant air quality impact. However, dust generation and its ensuing dispersal by the wind can be a problem, especially in developed areas.

Mitigation measures that can be implemented during construction to ensure dust generation is kept to a minimum include the application of water or dust retardant chemicals (e.g., calcium chloride) to heavily traveled portions of the construction area. Temporary construction driveways can also be used in heavily traveled areas. These practices will be used during the proposed Route 52 reconstruction, especially in the zones near populated areas.

3.9.2 Noise

Depending on the phase of construction and the type of equipment used, the noise impacts will vary. At distances of 15-30 meters (50-100 feet), noise levels generated by construction activities can range from 70 to 97 dBA. The majority of the areas where residences or other sensitive receptors are located will be at distances greater than 30 meters (100 feet) from the construction zone for the proposed project. The notable exceptions will be the areas surrounding MacArthur Boulevard, the traffic circle in Somers Point, and the areas around the touchdown area in Ocean City. Construction noise levels for residences and other noise sensitive areas adjacent to Route 52 could be as high as 90 dBA Leq during the noisiest phases of construction.

Specific mitigation measures will be determined during the final design phase of the proposed project. At a minimum, the following measures will be taken:

- Construction equipment powered by an internal combustion engine will be equipped with a

properly maintained muffler.

- Air powered equipment will meet current USEPA noise emission standards. This equipment will be fitted with pneumatic exhaust silencers.
- Stationary equipment powered by an internal combustion engine will not be operated within 45 meters (150 feet) of noise sensitive sites without portable noise barriers placed between the equipment and the noise sensitive sites, including residential buildings, motels, hotels, schools, churches, hospitals, nursing homes, libraries, and public recreation areas. Portable noise barriers will be constructed of plywood or tongue and groove boards with a noise absorbent treatment on the interior surface, facing the equipment.
- Powered construction equipment will not be operated before 8:00 a.m. or after 6:00 p.m. within 45 meters (150 feet) of a noise sensitive area.
- Construction operations shall be restricted such that the contractor may only perform noisy operations during specific daylight hours.

The early construction of proposed permanent noise walls along MacArthur Boulevard to mitigate construction noise impacts will be evaluated during final project design.

3.9.3 Erosion and Sedimentation

Some portions of land will be stripped of vegetation and pavement during the reconstruction of Route 52. Accordingly, erosion may occur, and sediment may be generated close to the construction site. These activities may increase subsequent sediment deposition in area waterways, thereby increasing turbidity. By reducing sunlight penetration, such turbidity levels reduce the photosynthetic activity of algae and submerged aquatic plants, and thereby may reduce dissolved oxygen concentrations. Past field measurements show that the level of dissolved oxygen in Great Egg Harbor Bay has sometimes been below the NJDEP dissolved oxygen water quality standard. Therefore, sedimentation during construction could have an adverse impact on the water quality of the Bay.

To prevent adverse water quality impacts during construction, controls will be used to reduce the amount of erosion and sedimentation. Erosion controls include completion of shorter sections of

roadway at one time to limit ground surface exposure time, placement of mulch or other suitable ground cover immediately after an area is graded, as well as sodding and seeding the slopes simultaneously with roadbed construction. Along the causeway, an effective control method is the installation of silt fences just outside the limits of work. During final design, a detailed Soil Erosion and Sediment Control Plan will be developed for the proposed Route 52 reconstruction.

3.9.4 Excavation, Dredging, Disposal and Borrow Areas

The preferred alternative will require dredging of the ICWW. Shifting channel marker buoys for relocating Ship Channel, within the channel where it is currently located, will also be required; however, no dredging is necessary.

The volume of dredging required to achieve a realigned ICWW channel 100 meters (328 feet) wide and 3.6 meters (12 feet) below MLW is estimated to be 19,000 cubic meters (25,000 cubic yards). The dredging volume is relatively small since Beach Thorofare has relatively deep water.

A critical concern is disposing of the dredged material in an environmentally sound manner. Dredged material can be dried out in a 6,000 square meter (65,000 square foot) triangular area directly east of the existing causeway on the island directly north of Beach Thorofare. There are several options to dispose of the dredge material. One place for dredge disposal material is the Cape May County landfill. Dredged material could also be acceptable for use as beach replenishment material or could be sold as structural fill material. The dredge material could be disposed of under the viaduct on the island between Beach Thorofare and Rainbow Channel and the island between Rainbow Channel and Elbow Thorofare (see Figure 3.4-2).

During construction, the dredged spoil material will probably be pumped onto the existing causeway embankments. In some cases, this would only be temporary until it can be dried out and then removed. To minimize turbidity, the discharge could be made inside an impervious dike with filtered drainage outlets to prevent the escape of fines. Increased turbidity in the waters of the Bay could result from pile driving in open water sites and during dredging. In both cases, the work sites will be surrounded by turbidity curtains or barriers, if practicable, to contain

siltation.

3.9.5 Maintenance Dredging

The 30-year maintenance dredging cycle cited in the DEIS was based on an extremely conservative rate of deposition of 6 mm/year. This would result in the accumulation of 7 inches of material over a 30-year period, necessitating dredging. This is highly unlikely based on the findings of a sedimentation study of the Great Egg Harbor Bay conducted in 1993 by Rutgers University¹ and a "Feasibility Study for the Physical Relocation of the Intracoastal Waterway and Ship Channel", which is listed as a supporting document in the DEIS. These findings show:

- The natural sedimentation rates in the Great Egg Harbor Bay are very low because of the lack of sediment entering the system.
- The general rate of sedimentation in the Bay is 4-6mm/yr. Accumulation of material at this rate is about the same as the observed rate of rise of sea level in this area.
- The rate of sedimentation is related to vertical accumulation and does not account for the horizontal displacements that can transfer sediment along certain directions and produce local shoaling.
- Sediments circulate through the Bay in a counterclockwise direction. Relatively large material enters the bay on the flood tide, is transported through the existing Ship and Rainbow Channels, and is deposited in the interior of the bay. Smaller diameter particles are transported through the Beach Thorofare on the ebb tide. This material tends to be transported out of the Great Egg Harbor Bay by ebb flow. The speed of the ebb tide is high enough to prevent deposition and accumulation of this material. Thus, no maintenance dredging has been required for the ICWW in the bay area.
- The minor dredging of the ICWW associated with Alternative 9-1 will affect the flow speeds within the channel; however, the flow speed will remain sufficient for the sediments to stay in motion and flow out of the channel.

¹ Psuty, N., Guo, Q., Suk, N.S. (1993). Sediments and Sedimentation in the Proposed Intercoastal Waterway Channels, Great Egg Harbor Bay, NJ. Rutgers – The State University of New Jersey

- The ICWW will remain self-cleaning with or without the proposed dredging. Under existing conditions, particles as large as 1 mm are induced to move through the Beach Thorofare. After dredging, the flow will still be strong enough to keep particles of 0.9-mm size in suspension. The average sediment size observed in the Bay area is less than 0.5 mm. The grain size of sediment in Beach Thorofare ranges between 0.2 mm to 0.4 mm.
- Very little movement of the islands in Great Egg Harbor Bay was observed during the period 1940 to 1991.

In summary, no vertical accumulation is expected in the dredged channel due to the swift flow velocity. Over time, the contours of the dredged channel may be expected to round off due to the action of water against the cut slopes of the channel. However, the channel does not provide a natural environment for shoaling. Any small net deposition would be counteracted by the rise in sea level, resulting in no change in channel depth. The existing sedimentation rate in the ICWW is only about 3-4 mm/year and is not expected to rise significantly due to dredging. A sedimentation rate of up to 5 mm/year is completely offset by an equivalent rise in sea level. Consequently, no maintenance dredging will be required for Alternative 9-1.

3.10 INDIRECT AND CUMULATIVE IMPACTS

3.10.1 Introduction

The Code of Federal Regulations (40 CFR Chapter V § 1508.8) defines “Effects” and states that “Effects include: Direct Effects, which are caused by the action and occur at the same time and place”. Further, Section 1508.8 states that, in this context, the terms “effects” and “impacts” are synonymous. The direct effects, or impacts, of the project on environmental resources are analyzed in detail for each affected resource in the preceding subsections.

Section 1508.8 also states that effects include: “Indirect effects, which are caused by the actions and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the patten of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.”

This section also states: “Effects include ecological ..., aesthetic, historic, cultural, economic, social, or health, whether direct, indirect or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial.”

Section 1508.7 defines “Cumulative Impact” as: “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”

3.10.2 Indirect Effects

The indirect impacts of a transportation improvement project are generally seen in induced growth and sprawl as a result of changes in traffic patterns. These in turn can change patterns of land use with related effects on air, water and other natural resources, including ecosystems.

The Route 52 Reconstruction project will not materially change traffic patterns, and does not have the potential of inducing growth. The primary objective of this project is the replacement of an existing facility. The new causeway facility will be improved, compared to the deteriorated and obsolete existing facility, because it will include improved horizontal and vertical geometry, will raise the facility above flood levels and will bring the facility up to modern standards. However, the replacement is not intended, nor designed, to increase the ability of the facility to accommodate more vehicles. Moreover, changes to MacArthur Boulevard, including improvements to the intersection of MacArthur Boulevard and Route 9 and the replacement of the Somers Point traffic circle with a four-legged intersection, will also not increase capacity beyond the immediate limits of the improvement.

Both the City of Somers Point and Ocean City are already highly developed areas and the project is not expected to contribute to any increase in growth. While it is expected that these changes will make traffic flow more smoothly and reduce the number of accidents, (refer to Section 3.1) it is not anticipated that they will create a change in traffic volume. This is due to the fact that the flow is constrained at both ends of the project limits. Specifically, Laurel Drive, to the north of the project limit, will remain only one lane in each direction from Route 9 to the Garden State Parkway and 9th Street will remain unchanged from the project limit at Bay Avenue into Ocean City. Accordingly, the traffic volume is not expected to change appreciably.

Because the project is expected to smooth traffic flow and improve levels of service at the intersections it will have indirect, albeit positive, effect on traffic congestion, traffic safety, local air quality, groundwater quality, noise levels and energy consumption. Specifically, as there will be improvements to the traffic flow, it is expected that traffic congestion will reduce and traffic safety will be improved. Since the project will also reduce the vehicle delay time, air quality, groundwater quality, noise levels and energy consumption will all be reduced, since vehicles will not spend as much time idling or moving at slow speeds in the project area.

Initially, it was proposed that MacArthur Boulevard be reconstructed as a five-lane facility with two lanes in each direction and a center turning lane. The existing facility comprises only one

lane in each direction. However, at the Public Hearing held on November 15, 2000, and in subsequent correspondence from elected officials of Somers Point, concerns were expressed that such a substantial widening of MacArthur Boulevard might create a barrier between the residents of the town on the west side and facilities to the east. It might also pose a potential safety hazard to pedestrians. Accordingly, modifications to the proposed layout of MacArthur Boulevard were incorporated such that the portion of MacArthur Boulevard traversing the residential zone would be only three lanes wide (one lane in each direction plus a center turning lane) while the length through the commercial area would be widened to five lanes. In addition, to aid pedestrians wishing to cross MacArthur Boulevard, a traffic signal and a crosswalk were added at the intersection with Braddock Drive. This improvement maintains community cohesion and provides a safer crossing of MacArthur Boulevard.

The project involves the acquisition of the Gulf Service Station in Somers Point, the Beach Bums Limited beach equipment retail and rental store in Ocean City, and a boat storage area for the Dockside Café and Marina Speed Boat Rentals in Ocean City. These commercial displacements are relatively minor, and it is anticipated that they will easily be reabsorbed into the business community with no discernable changes to the economic vitality of the area, nor to the prevailing land use patterns.

3.10.3 Cumulative Impacts

To restate, cumulative impacts are impacts that result from the incremental consequences of an action (the project) when added to other past and reasonably foreseeable future actions. The cumulative effects of an action may be undetectable when viewed in the individual context of direct and even indirect impacts, but nevertheless when added to other actions may eventually lead to a measurable environmental change.

The major natural resources that are within the area of potential effects of the project include parts of Somers Point, Ocean City, the Great Egg Harbor Bay, and the barrier islands in the bay. Subsection 1.2 “Project History” of this report recounts the major past activities that have given the present shape to the human communities in the two cities connected by the Route 52 causeway. The ecosystem of Great Egg Harbor Bay has been formed over time by geological forces. The resulting ecosystem is described in detail in Section 3.4 of this report. This ecosystem is vulnerable to incremental effects. However, the Route 52 Reconstruction project, being the replacement of an existing transportation infrastructure, will not cause any major discernible shift or change in the current state of human and natural resources described above. The direct and indirect impacts of the project have been detailed in previous sections.

At this time, there are no other activities or projects that are ongoing or contemplated in this geographical area, within the life cycle of this project, that could result in additional impacts to the resources affected by the project, resulting in cumulative effects of any significance. Extensive coordination has been done with the public, the City of Somers Point Planning and Zoning, the City of Ocean City Planning Department, the Atlantic County Economic Development Corporation and the Department of Public Works, the Cape May County Planning Department and the Department of Public Works, the South Jersey Transportation Planning Organization, and State and federal agencies having jurisdiction in the area. None of the above contacts have identified any projects that could have additive, countervailing, or synergistic effects on the natural systems that will be affected by the proposed project.

3.11 ADVERSE EFFECTS WHICH CANNOT BE AVOIDED

The preferred alternative will result in the following unavoidable adverse effects:

- 3.21 hectares (7.93 acres) of Ocean City's open space inventory (Green Acres) has to be acquired for right-of-way.
- 0.85 hectares (2.09 acres) of shading impact and 0.09 hectares (0.23 acres) of direct impact to wetlands due to fill and piles
- 0.16 hectares (0.39 acres) of direct open waters impact due to placement of piles and piers.
- One or more business displacements and proximity impacts to several businesses.
- Loss of the World War Memorial Bridge.
- The views from two (2) historic architectural sites eligible for listing on the National Register of Historic Places will be affected by project's higher profile across the causeway.
- There will be some filling of wetlands and pile installation in wetlands.
- There will be some shading of tidal wetland grasses.
- Reduced access for fishermen and other recreational users.
- Probably soil erosion and siltation during construction operations in sensitive environments.
- Disruption and/or loss of habitat for finfish and shellfish.
- Permanent loss of some parking spaces along MacArthur Boulevard.
- More incidents during which the FHWA Noise Abatement Criteria are exceeded.
- At least 19,000 cubic meters (25,000 cubic yards) of material will have to be dredged to realign Ship Channel and the ICWW, creating turbidity in the open water of the bay.
- The deposition of sediment due to soil erosion during roadway and structure construction will adversely affect aquatic life in the Great Egg Harbor Bay. This impact will be mitigated through the use of proper erosion controls.
- Local shellfish populations will be reduced as a result of at least 0.07 hectares (0.17 acres) of habitat destruction.

3.12 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USE OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Reconstruction of Route 52 will result in some negative short-term impacts to the environment during construction. These include dust, additional exhaust emissions, additional noise, visual impacts, and some sedimentation and erosion. Gains to be realized immediately or soon after completion of the proposed reconstruction include:

- Delay and congestion due to bridge openings will be significantly reduced or eliminated.
- Delays and rates of accidents at the Somers Point traffic circle will be significantly reduced.
- The elimination of the traffic circle and widening of portions of MacArthur Boulevard to four lanes will eliminate bottlenecks to timely evacuation should an emergency arise.
- Travel in the corridor will become safer because of: the widening to 3.6 meter (12 foot) travel lanes, addition of 3.0 meter (10 foot) paved breakdown shoulders, the addition of a median barrier separating the two directions of travel, and the elimination of substandard horizontal and vertical geometrics.
- The causeway will be high enough to avoid flood waters coming over it in very severe storms; allowing it to function more effectively as an emergency evacuation route.
- The causeway connecting Somers Point and Ocean City will be opened up to safe access by bicyclists and pedestrians.
- Reconstruction of the causeway as a new facility with a long design life will eliminate the continual need to close lanes in the off-season for repairs to the structurally deficient structures now in place.

Traded off against the above gains are the following long-term losses associated with the preferred alternative:

- Loss of the World War Memorial Bridge.
- Displacement of one business in Somers Point.

- Adversely affecting the settings of two historic architecture sites eligible for inclusion on the National Register of Historic Places.
- Raising noise levels to approach or exceed the FHWA Noise Abatement Criteria at one motel and five residences compared to the noise levels associated with the future No Build condition.

3.13 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

In addition to the long-term environmental losses noted above, the proposed project would involve the following irreversible and irretrievable commitment of resources:

- Construction of the proposed project would result in the use of valuable energy resources.
- Construction of the proposed project would require between 800 and 1,000 person years of direct labor. Also committed to the project would be the actual construction materials and the public fiscal resources.

3.14 ENVIRONMENTAL MITIGATION

The following is a summary of mitigation measures discussed in this document:

Topic	Commitment
<i>Traffic and Transportation</i>	
Geometric and Safety Improvements	<ul style="list-style-type: none"> • A horizontal curve with a radius of at least 245 meters (800 feet) will be provided where Route 52 enters Ocean City at 9th Street. • The vertical curve over Beach Thorofare will be lengthened to provide adequate stopping sight distance at a 64 km/h (40 mph) design speed. • 3.6 meter (12 foot) wide lanes with 3.0 meter (10 foot) wide shoulders in both directions will be used throughout the entire project. • A concrete median barrier will separate opposing northbound and southbound traffic movements. • The Somers Point traffic circle will be replaced with a 4-leg signalized intersection having separate turning lanes. • MacArthur Boulevard will be widened to five lanes (two lanes in each direction plus a center turning lane) between the traffic circle and Braddock Drive and to three lanes (one lane in each direction plus a center turning lane) between Braddock Drive and Route 9.
Emergency Access and Evacuation	<ul style="list-style-type: none"> • High fixed span structures will replace the current bascule bridges. • Structures will be designed to have the bottom of the superstructure at least 0.3 meters (1-foot) above the 100-year flood level.
Pedestrian and Bicycle Safety	<ul style="list-style-type: none"> • Shoulders 3.0 meters (10 feet) wide will be available in each direction for joint use by bicyclists. • A 1.8 meter (6.0 feet) wide sidewalk will be available on one side of Route 52 separated from the shoulder by a continuous concrete barrier. • Benches will be provided approximately 70 meters (230 feet) on center along the 4% or 5% approach gradients proposed on bridges over the ICWW and Ship Channel. • A signal-controlled crosswalk will be provided on MacArthur Boulevard at Braddock Avenue.
<i>Noise</i>	
Noise Sensitive Receivers in Somers Point and along MacArthur Boulevard	<ul style="list-style-type: none"> • During final design, a detailed study will determine the feasibility of noise barriers to be placed along MacArthur Boulevard for residences with direct access to Laurel Drive (north of Village Drive) and residences with direct access to Dobbs Avenue between Fourth and Sixth Streets. • Greenery and plantings will be provided between East Laurel Drive and MacArthur Boulevard to serve as a physical separation and mitigate the visual effects.

Topic	Commitment
<i>Natural Ecosystems</i>	
Soils and Geology/Hydrology	<ul style="list-style-type: none"> • Construction activities will be conducted pursuant to an approved soil erosion and sediment control plan. • Precautions will be taken to minimize spillage and tracking of sand and silt on the road surface. • Construction staging will be utilized, thereby limiting the amount of ground surface exposed at one time. • Silt fences, hay bales and stabilized entrances to construction sites will be used, as necessary, for control of erosion and sedimentation. • Mulch or suitable ground cover will be placed immediately after a slope is graded. • Slopes will be sodded or seeded simultaneously with roadbed construction. • Turbidity curtains will be used, where practicable, for construction operations.
Groundwater	<ul style="list-style-type: none"> • Any wells within the final right-of-way will be properly sealed during project construction. Sealed wells will be replaced with new ones if they are needed. • If it is determined that excavated soil or groundwater is contaminated during initial-design investigative efforts, the contaminated material shall be properly characterized.
Stormwater	<p><i>General</i></p> <ul style="list-style-type: none"> • A storm drainage system will be designed to improve water quality and minimize impacts to surface water and groundwater. • A comprehensive sediment and erosion control plan will be implemented to minimize construction-related impacts. • Construction techniques (e.g., prefabrication) will be implemented, where possible, to reduce on-site construction duration and erosion and sedimentation concerns. • Pretreatment methods identified as “conditionally acceptable” will be implemented, where possible. <p><i>Ocean City</i></p> <ul style="list-style-type: none"> • Integrate into existing drainage system and install manufactured oil/grit separators on all new inlet connections. <p><i>Causeway between Somers Point and Ocean City</i></p> <ul style="list-style-type: none"> • Design all stormwater discharge systems to either discharge small volumes frequently through scuppers over open water, or through scuppers and leaders to scour basins in the tidal marsh surface. • Take precautions during construction to minimize spillage and tracking of sand and silt on the road surface and promptly clean them up should they occur.

Topic	Commitment
	<ul style="list-style-type: none"> • Use straw bale barriers, silt fences, and stabilized entrances to construction sites, as necessary, to control erosion and sedimentation during construction. • Use a temporary turbidity barrier for construction operations, where appropriate. • Prohibit or restrict the use of jetting during pile driving operations. • Dewater impounded dredge material properly in order to prevent the release of sediments into the bay. <p><i>MacArthur Boulevard: Somers Point Circle to Route 9</i></p> <ul style="list-style-type: none"> • Remove and replace the existing detention/infiltration basin near the Route 9 intersection between Laurel Drive and MacArthur Boulevard. • Replace the existing drainage system with a new system of catch basins and piping located along the west curb line of MacArthur Boulevard. • Provide an underground detention/infiltration piping system at the low point in MacArthur Boulevard near Braddock Avenue. • Replace the existing drainage system under Somers Point Traffic Circle with a new drainage system of catch basins and piping. • Utilize a vegetated detention basin in the southwest quadrant of the four-legged intersection proposed to replace the traffic circle. • Use a vegetated swale located directly east of the north approach of the bridge over Ship Channel, discharging into Great Egg Harbor Bay. • Integrate oil/grit separators in the new drainage system to improve water quality.
Wetlands	<ul style="list-style-type: none"> • Implement soil erosion control measures to minimize the deposition of eroded soils in wetlands. • Provide a fender system and sheeting to protect the wetlands and to further prevent sloughing along the north bank of the ICWW that may be impacted as the result of the realignment of the ICWW. • Avoid work or staging conducted within the wetland to the maximum extent possible. • Use the maximum structural span lengths economically feasible, probably 27 meters (90 feet), to minimize the number of piers. • Use pile foundations, rather than excavated pier foundations, so that construction disturbance is limited to the penetration of the piles themselves. • Use meadow mats (30 cm X 30 cm timbers lashed together), or approved equivalent, during construction in wetland areas to minimize temporary impacts, and restore wetlands where disturbance does occur.
Aquatic Ecology	<ul style="list-style-type: none"> • Construction techniques that interfere with the movement of fish along finfish migratory pathways should be avoided. • Construction techniques that create a physical or biological barrier to the movement of fish along finfish migratory pathways should not be employed, unless acceptable mitigating measures are used.

Topic	Commitment
	<ul style="list-style-type: none"> • Implement a phased approach to the construction effort to limit impacts to discrete sections of the highway at any one time, so as not to create a continuous barrier along the entire length of the project. • If practicable, use turbidity barriers (silt or sediment curtains) around pier bents and to confine dredging operations so as to limit the areas where turbidity could become a problem, but keep as much of the waterway section unobstructed as possible at all times. • To the extent possible, recycle construction materials from the demolition of the four existing causeway bridges into artificial reefs to create habitat in mitigation for habitat lost in pile areas. • Warning charges will be detonated to scare off any marine life in the immediate area should blasting be required. • Use demolition containment techniques to minimize the scattering of debris. • Comply with time restrictions for dredging and blasting.
Threatened and Endangered Species	<ul style="list-style-type: none"> • Dredging in Beach Thorofare will be done in full compliance with the Biological Opinion issued on November 26, 1996, by the NMFS. • Comply with time restrictions for blasting to protect sea turtles. • Use a turbidity barrier for construction operations in Great Egg Harbor Bay to minimize temporary impacts due to sediment disturbances to foraging sea turtles.
<i>Cultural Resources</i>	
Somers Point - World War Memorial Bridge	<ul style="list-style-type: none"> • Mitigation options could include (a) recordation to standards set by the Historic American Engineering Record (HAER), (b) attempt to reuse or market parts of the bridge structure, and (c) interpretative displays and/or educational materials to be produced as a supplement to the HAER recordation.
Somers Point - Bay Front Historic District and Ocean City - Inventory No. 16 (Dockside Café/ Marina)	<ul style="list-style-type: none"> • Design treatments for the new bridge(s) that reduce visual impact and add aesthetically pleasing landscaping treatments will be considered.
<i>Socioeconomics and Land Use</i>	
Somers Point and Ocean City – Construction Impacts	<ul style="list-style-type: none"> • Construction activities along the traveled way will be minimized during the busy summer tourist season.
Somers Point and Ocean City - Recreational Fishing Access	<ul style="list-style-type: none"> • A low-level timber recreation/fishing pier and a parking lot will be built at the site of the World War Memorial Bridge. The parking lot will accommodate about 50 vehicles and will be located on the site of the Gulf Station currently east of the Somers Point traffic circle. The recreation/fishing pier will be located immediately east of the abutment of the new bridge.

Topic	Commitment
	<ul style="list-style-type: none"> • Exit and entrance ramps down to grade from both the northbound and southbound lanes of the structure will provide access to a proposed 30-vehicle parking area located under the elevated structure on the island situated between the Rainbow Channel and Elbow Thorofare. In addition, a walkway underneath and along the new structure will provide access to the north and south parts of the island. • On the island situated between Beach Thorofare and Rainbow Channel, a new fishing pier will be provided at the south bank of Rainbow Channel. • An enlarged parking facility to accommodate up to 41 vehicles will be provided at the site of the current Visitor’s Center. A path underneath the structure will connect the parking lot to the recreational areas. In addition, a walkway underneath and along the new structure will provide access to the north and south parts of the island. • A pedestrian ramp (ADA compliant) and a stair tower will be provided on the south bank of Rainbow Channel opposite the site of the existing Visitor’s Information Center. • The existing boat ramp on the south bank of Rainbow Channel will be enhanced. • The piles of a portion of the existing roadway structure will be cut off below the water to remain as a habitat for fish concentration.
Ocean City – Parkland	<ul style="list-style-type: none"> • Possible parkland mitigation areas have been identified on the island between Beach Thorofare and Rainbow Channel east of the causeway and in the area of the existing Information Center.
Ocean City – Visitor’s Information Center	<ul style="list-style-type: none"> • The existing Information Center will be razed, and a new Information Center will be constructed in Ocean City. The existing parking area will be expanded for recreational users with walkways extending to the ends of the island.
<i>Visual Resources</i>	
Visual Effects	<ul style="list-style-type: none"> • New landscape plantings will replace vegetation removed during the widening of MacArthur Boulevard adjacent to East Laurel Drive and Dobbs Avenue. • During final design, a determination will be made to enhance architectural aesthetics using precast concrete shapes for structures over waterways. • If noise barrier walls are utilized along MacArthur Boulevard, the walls will receive a distinctive architectural treatment. • Any of the existing Route 52 embankments that are left in place will be landscaped in a manner to blend visually with the surrounding marsh. • The divided roadway and landscaped “gateway” area entering Ocean City will be replaced and enhanced. • The use of the long spans along the causeway will enhance its aesthetics. • Landscaping will be provided at the bridge touchdown areas in Ocean City and Somers Point.

Topic	Commitment
<i>Hazardous Waste</i>	
Properties of High Concern	<ul style="list-style-type: none"> • Additional investigative work will be required and may include analysis of soil samples during the design phase of the project. If any contaminated material is excavated, it will be disposed of properly or reused on the project in strict compliance with an approved soil re-use plan.
Asbestos Containing Material	<ul style="list-style-type: none"> • If the demolition of any structures is required, an assessment of the potential ACM will be made prior to beginning the demolition activities. If any ACM exists, specifications for the removal of such material will be incorporated into the contract plans.
<i>Construction Impacts</i>	
Excavation, Dredging, and Disposal	<ul style="list-style-type: none"> • Dredged material will be dried out in a 6,000 square meter (65,000 square foot) triangular area directly east of the existing causeway on the island directly north of Beach Thorofare. • Disposal of dredged material will be under the viaduct on the island between Beach Thorofare and Rainbow Channel and the island between Rainbow Channel and Elbow Thorofare or landfills in Cape May County. In addition, a determination will be made to use dredged material as beach replenishment material or structural fill material.