FHWA-NJ-EIS-07-01-F
Federal Highway Administration
Region 1

Federal Project No. IM-295-2 (115)

Final Environmental Impact Statement/ Final Section 4(f) Evaluation

Borough of Bellmawr, Borough of Mount Ephraim and Gloucester City, Camden County, New Jersey

U.S. Department of Transportation
Federal Highway Administration
New Jersey Department of Transportation

Submitted pursuant to 42 U.S.C. 4332 (2) (c)
16 U.S.C. 470 (f), and 49 U.S.C. 303

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FHWA-NJ-EIS-07-01-F
Federal Highway Administration
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Federal Project No. IM-295-2 (115)

I-295/I-76/ROUTE 42 DIRECT CONNECTION PROJECT
FINAL ENVIRONMENTAL IMPACT STATEMENT/FINAL SECTION 4(F) EVALUATION

Pursuant to:

42 U.S.C. 4332 (2) (c)
16 U.S.C. 470 (f), and 49 U.S.C. 303

Prepared by:

U.S. Department of Transportation-Federal Highway Administration
New Jersey Department of Transportation

In Cooperation with:
U.S. Army Corps of Engineers

for Dennis Merida, Division Administrator, Federal Highway Administration — 12/03/08 Date of Approval

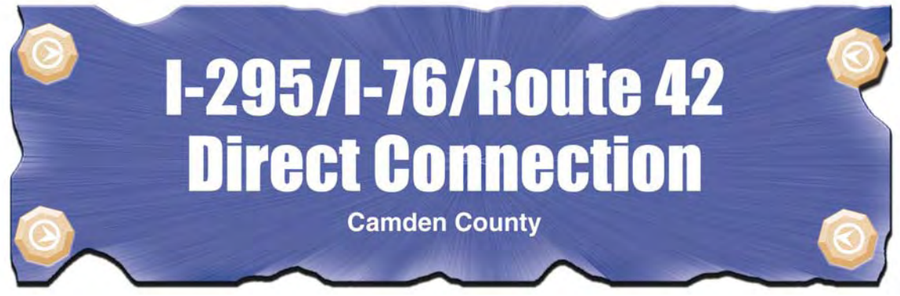
Richard Hammer, Assistant Commissioner, Capital Program Management, New Jersey Department of Transportation — 12/3/08 Date of Approval

For further information contact:

Federal Highway Administration
Mr. Roger Lall
Senior Engineer
840 Bear Tavern Road, Suite 310
West Trenton, New Jersey 08628
(609) 637-4200

New Jersey Department of Transportation
Mr. Bruce Hawkinson
Environmental Project Manager
P.O. Box 600
1035 Parkway Avenue
Trenton, New Jersey 08625
(609) 530-4272

Comments on this Final Environmental Impact Statement and Section 4(f) Evaluation are due in writing by **January 30, 2009** and should be directed to any of the individuals listed at the above addresses.



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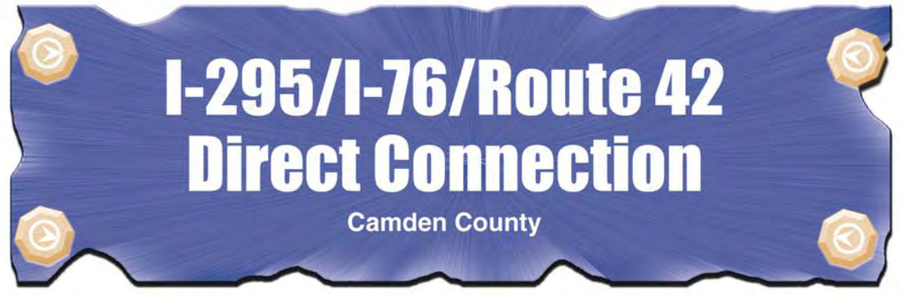


EXECUTIVE SUMMARY

The I-295/I-76/Route 42 interchange in Camden County, New Jersey experiences congestion and has an accident rate that is more than seven times the statewide average due to high volumes of traffic, complex lane configuration, and through-traffic weaving movements. The traffic problems of the interchange negatively affect the quality of life in the surrounding communities. The New Jersey Department of Transportation (NJDOT), in conjunction with the Federal Highway Administration (FHWA), proposes to alleviate these problems through the reconstruction of the I-295/I-76/Route 42 interchange.

An Environmental Impact Statement (EIS) has been prepared in order to identify and assess potential environmental impacts that could result from the proposed project. The EIS provides the public and federal, state, and local environmental resource and regulatory agencies with documentation that environmental concerns have been evaluated and addressed. In addition, a Section 4(f) Evaluation has been prepared as a chapter of the EIS in order to evaluate feasible and prudent alternatives that would avoid and/or have the least impact upon historic sites or publicly owned resources, such as public parks, recreational areas, and wildlife/waterfowl refuges. The EIS/Section 4(f) Evaluation is supported by Technical Environmental Studies (TES) that have been conducted for the project. These TES reports include: Noise; Air Quality; Socioeconomics, Land Use, and Environmental Justice; Natural Ecosystems; Phase I/II Archaeological Investigation; Historic Architectural Resources; and, Hazardous Waste Screening. A Traffic Report, Feasibility Assessment Report, and Letter of Interpretation/Jurisdictional Determination for wetlands have also been completed. Based upon the agency and public comments received in response to the circulation of the Draft EIS (DEIS) / Draft Section 4(f) Evaluation, this Final EIS (FEIS) / Final Section 4(f) Evaluation has been prepared. The FEIS addresses the concerns raised during the comment period and documents the selection of Alternative D as the Preferred Alternative for this project.

PROJECT DESCRIPTION

In 1985, during NJDOT's design of widening improvements on Route 42, it became apparent that additional improvements, more specific to the I-295/I-76/Route 42 interchange, would be required. In 1999, a Transportation Investment Study (TIS) prepared by NJDOT, in conjunction with the Delaware Valley Regional Planning Commission (DVRPC), recommended that a project providing a full, grade-separated interchange be advanced. The project location (see **Figures ES-1** and **ES-2**) includes several residential, commercial, industrial, and public/recreational areas in Bellmawr, Mount Ephraim, and Gloucester City, Camden County.

Regulatory Framework/Streamlining

The EIS/Section 4(f) Evaluation has been prepared in accordance with the National Environmental Policy Act (NEPA), as implemented by the Council on Environmental Quality Regulations, and FHWA Procedures, and prepared pursuant to Section 4(f) of the Department of Transportation Act of 1966 and Section 106 of the National Historic Preservation Act of 1966. Impacts to wetlands and open waters were evaluated and will be permitted and mitigated according to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, administered by the United States Army Corps of Engineers (USACE), and the Freshwater Wetlands Protection Act,

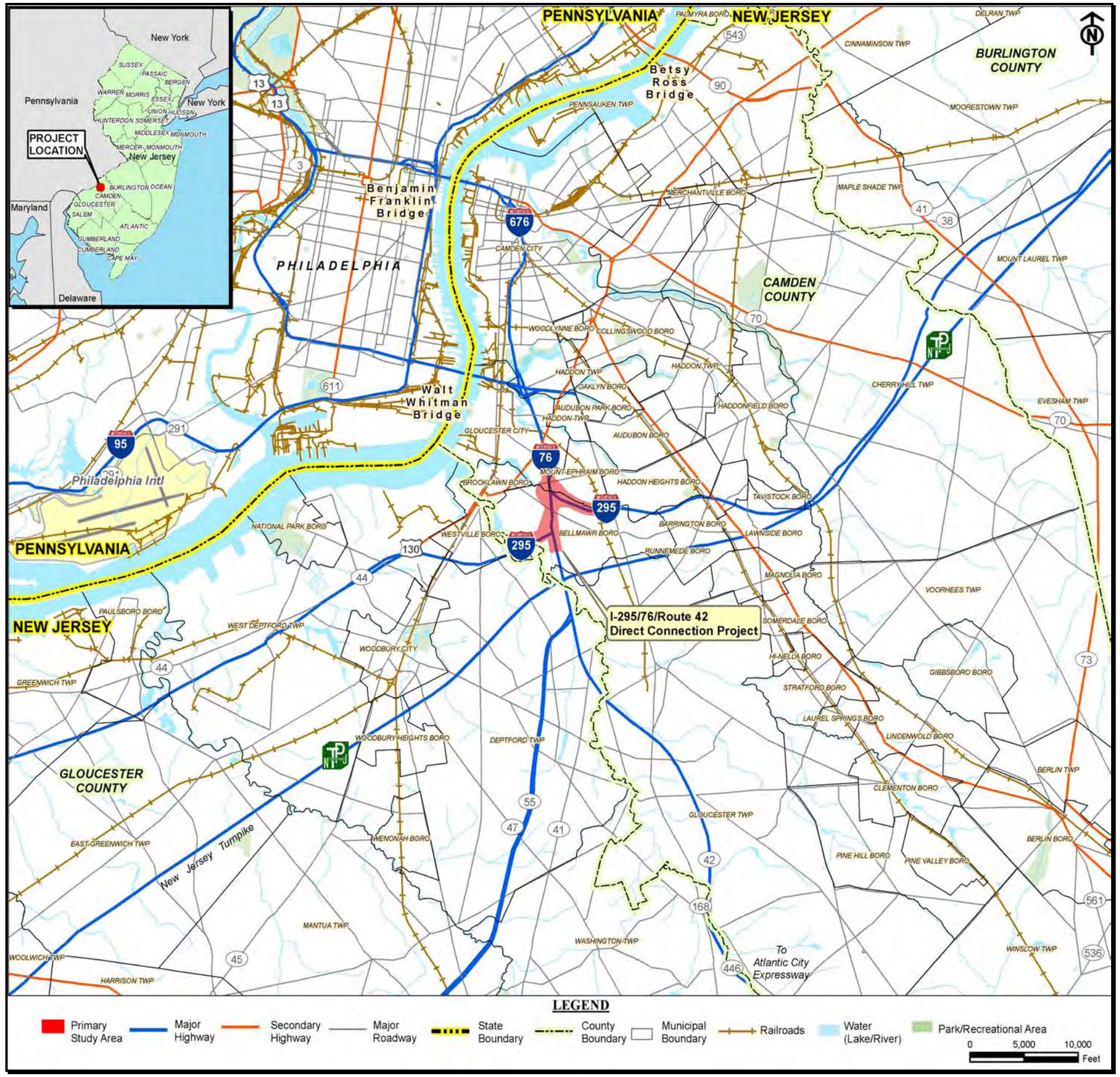


Figure ES-1: Regional Map

administered by the New Jersey Department of Environmental Protection (NJDEP).

In order to coordinate the NEPA process with the requirements of Section 404, a streamlining process was established to coordinate the permitting activities and processing requirements of not only NEPA and the USACE, but also the New Jersey Department of Environmental Protection (NJDEP), which also shares jurisdiction in the project area. The NEPA-Section 404 streamlining process coordinates project processing through the end of the EIS process, identifying and documenting impacts, and assessing ways to avoid, minimize or mitigate these impacts.

Stakeholder Groups

This process involved a significant local government and public participation component to build consensus among the stakeholders in the project area. Stakeholders were organized into committees that met regularly, and at important milestones, to foster working relationships with local leaders, and conduct the necessary public outreach to keep the affected communities apprised and involved in the project progress. Stakeholders included local and county officials, business owners, local residents, and representatives from participating public agencies, senior citizens associations, minority groups, school districts, business-development organizations, environmental groups, and religious and civic groups. The stakeholder group meetings included the Agency Coordination Meetings (ACM), project partnering sessions, Community Advisory Committee (CAC) meetings, Local Officials Briefings (LOB), and Public Information Centers (PIC).

PURPOSE AND NEED

The purpose of this project is to improve traffic safety, reduce traffic congestion (see **Photograph ES-1**) and meet driver expectations by providing the direct connection of the I-295 mainline to improve the interchange of I-295/I-76/Route 42.

The project goals and objectives are a compendium of statements made by NJDOT, FHWA, agencies, local elected officials, residents, and other stakeholders in the project. While the project may not be able to satisfy all goals and objectives listed herein, the Preferred Alternative seeks to address as many as possible. The project's goals and objectives are as follows:

- Improve safety by constructing a roadway system that meets interstate standards for geometric design.
- Provide a direct connection for through-traffic on I-295 with a design speed consistent with that of the interchange's approach roadways.
- Reduce congestion on local arterials such as Route 168 and US 130 and decrease commuter traffic on neighborhood streets, thereby improving local traffic mobility, pedestrian safety, and the level of service on I-295. In addition, noise levels would decrease and air quality would improve.
- Enhance regional economic development by increasing overall mobility. In addition, the improved roadway network conforms to state and local development plans.
- Reduce the financial burden on state and local police and emergency services by decreasing the number of vehicle accidents.

Figure ES-2: Project Location Map

- Avoid, minimize, or mitigate environmental impacts.
- Preserve the quality of life of communities by minimizing relocations and acquisitions of private and public property.
- Enhance opportunities for other modes of transportation, including bicycle and pedestrian, within the project area.
- Provide opportunities for intermodal use within the project area.

ALTERNATIVES

NJDOT evaluated 26 possible alternatives in an extensive screening process that included representatives from the NJDOT as well as stakeholder groups. All 26 conceptual alternatives were constructible and viable concepts that met the purpose and need of the project; however, not all 26 were deemed practicable. The 26 conceptual alternatives were subjected to a screening process with the objective of identifying feasible alternatives that satisfy the project need with minimal impact to the natural and built environment. After extensive community involvement and input from regulatory agencies, five build alternatives (D, D1, G2, H1 and K) and a No Build Alternative were chosen to advance for further study as part of the DEIS process.

These five build alternatives were generally found to be the most feasible with the least impacts. Based upon comments received during the alternatives screening process, the five alternatives were refined and minor alignment adjustments were incorporated into their conceptual design in order to minimize environmental impacts and to improve traffic operations. The 21 alternatives that were dismissed were generally found to result in higher environmental impacts, such as residential, wetlands, noise, and visual impacts.

All five build alternatives follow a similar alignment across the northwestern corner of New St. Mary's Cemetery. Alternative D provides a direct connection for I-295 that crosses over I-76/Route 42, eliminating Al Jo's Curve entirely. Alternative D1 is similar to Alternative D except it attempts to retain Al Jo's Curve for use as the ramp from I-295 southbound to Route 42 southbound. Alternative G2 utilizes a double-decker highway with I-295 southbound atop I-295 northbound. Alternative H1 is similar to Alternative G2 except it attempts to retain Al Jo's Curve for use as the ramp from I-295 southbound to Route 42 southbound. Alternative K provides a direct connection for I-295 that crosses under I-76/Route 42, eliminating Al Jo's Curve entirely.

POTENTIAL ENVIRONMENTAL IMPACTS

The TES reports and engineering studies included three major tasks: inventory/data collection, field reconnaissance, and assessment of potential impacts to the built and natural environment for the No Build Alternative and each of the five build alternatives. Detailed reports were prepared for each of the subject areas discussed below.

Traffic and Transportation

The traffic analysis indicates that overall traffic flow conditions under any of the five build alternatives will be relatively similar. Against the No Build Alternative, any of the build alternatives will deliver better overall traffic operations because they will separate through-traffic on I-295 from those on I-76/Route 42. Average speeds will be higher and average delay per vehicle will be lower on the I-295 mainline and the I-76/Route 42 mainline for all build alternatives compared to the No Build Alternative.

Where I-76 northbound (or Route 42 northbound) intersects with I-295 southbound (Ramp B) will continue to be a bottleneck; however, the expected average speeds will double from 10 miles per hour (mph) for the No Build to 20 mph for the build alternatives. No capacity improvement to I-295 is assumed under this project. The vast majority of travel time savings occur during regular weekday, peak commuting periods, with much of the savings being realized on local roads within the towns of Mount Ephraim and Bellmawr, along with the adjacent towns such as Brooklawn and Runnemede.

Considerable reductions in traffic volumes on the local arterial system within the project area can also be anticipated because drivers will stay on the highway.

Photograph ES-1: Congested Traffic Along I-295

Traffic studies indicate that all of the build alternatives will reduce the number of annual crashes that result in injuries and fatalities by 70% at the interchange. Most of these crash reductions will be realized because all build alternatives will physically separate the major traffic flows on I-295 from those on I-76/Route 42, as well as from the construction of highway facilities that meet current design standards.

Noise

Under the No Build Alternative, a total of 269 residential units, including the Mount Ephraim Senior Housing building, are predicted to possess noise levels that approach or exceed the applicable Noise Abatement Criteria (NAC). Alternatives D and D1 would result in impacts to 155 to 156 residences; Alternatives G2 and H2 would result in impacts to 215 to 216 residences; and Alternative K would result in impacts to 145 residences. Under the build alternatives, eight building acquisitions would be necessary under Alternatives D, D1 and K and three would be necessary under Alternatives G2 and H1. In addition, several segments of existing noise walls would require removal to accommodate the designs. These building acquisitions and noise wall removals were taken into account as part of the noise modeling.

Similar to the existing conditions, one cemetery, two recreational facilities, two schools, and two church buildings would possess noise levels that approach or exceed the NAC for the No Build Alternative. Under each build alternative, two cemeteries, three recreational areas, three schools, and two church buildings are predicted to possess noise levels that approach or exceed the applicable NAC. Under Alternatives D1 and H1, two additional recreational areas would be impacted.

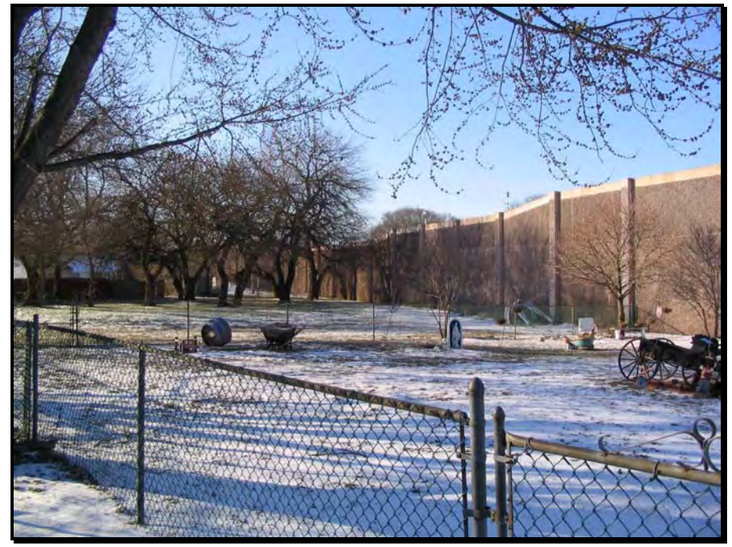
Noise walls are effective means of mitigating exterior noise impacts adjacent to roadways (see **Photograph ES-2**). When feasible, new and replacement noise walls are proposed in areas impacted by noise under each build alternative. Construction of new and replacement noise walls for each build alternative will reduce the number of impacts, when compared to the No Build Alternative. In areas where noise walls would be displaced, "in-kind" replacement walls are proposed that will provide noise levels for the build alternatives that are comparable to noise levels under existing conditions.

Although proposed new and replacement noise walls under each build alternative eliminate a significant number of impacts, several residential noise impacts remain. Under Alternatives D, D1 and K, the remaining residential impacts are mainly along the local roadways where noise mitigation is not possible due to driveways and intersections. Under Alternatives G2 and H1, the remaining residential impacts are along local roadways as well as areas adjacent to the I-295 double-decker roadways where cost-effective mitigation is not feasible.

Sound proofing a public-use building is an effective means of mitigating an interior noise impact. Under all build alternatives, air conditioning is recommended at the Annunciation Regional School and the Bellmawr Park Elementary School. Air conditioning is also recommended at the Bell Oaks School under Alternatives G2 and H1 only, since proposed noise walls within this area provide the required interior protection under Alternatives D, D1 and K.

Air Quality

Based on both quantitative and qualitative assessments, there is no expected carbon monoxide (CO), inhalable particulate matter smaller than 2.5 micrometers ($PM_{2.5}$) or mobile source air toxics (MSAT) impacts related to the proposed project and therefore no mitigation is necessary. Microscale CO modeling was performed for all alternatives, including the No Build Alternative. Predicted CO concentrations at each receptor are all expected to be below the National Ambient Air Quality Standards set forth for CO.



Photograph ES-2: View of Existing Noise Wall Adjacent to Project Corridor

Socioeconomics, Land Use, and Environmental Justice

The TES for this discipline evaluated potential impacts to the visual/aesthetic quality of the primary study area, as well as the costs and benefits resulting from improved safety and travel time. None of the build alternatives would result in adverse impacts related to socioeconomics, land use, zoning or environmental justice. Socioeconomic benefits for all of the build alternatives would include improved regional accessibility, reduced travel time through the interchange with annual cost savings of approximately $39 million and reduced frequency of accidents with annual cost savings of approximately $11 million.

All of the build alternatives would result in residential displacement. Alternatives D, D1 and K would result in relocation of 13 residences and Alternatives G2 and H1 would result in relocation of five residences. Five community facilities would be impacted for all of the build alternatives, but they would continue to function in their present locations. One business relocation would be required for Alternatives D, D1 and K. Alternatives G2 and H1 would not require any business relocations. All residential relocations and project-related relocation payments and services are provided pursuant to the Uniform Relocation Assistance and Real Property Acquisition Policies for Federal and Federally Assisted Programs Act of 1970, as amended in the Federal Uniform Act Amendment, effective March 2, 1989 (Chapter 50, New Jersey Public Law of 1989).

The visual quality of the area would be changed by all of the build alternatives. Alternatives D, D1 and K would require the construction of a new one-level structure throughout the interchange. Alternatives G2 and H1 would require the construction of a new two-level structure throughout the interchange. Additionally, new and replacement noise walls would be

constructed on top of these structures to abate noise impacts. Alternatives D, D1 and K would require combined heights of both structures and noise walls up to approximately 55 feet. Alternatives G2 and H1 would require combined heights of both structures and noise walls up to approximately 78 feet. Due to the heights of the structures and noise walls, all of the build alternatives would create a visual impact that cannot be mitigated. However, the proposed noise walls can be considered a positive impact in that they will block the view of the high-volume roadway. Context sensitive designs, including public participation to determine architectural techniques, would be developed during the Final Design phase of the project to the greatest extent possible to preserve the aesthetic, historic, community, and natural environment. Landscaping may also be used to partially screen these structures from view. Such mitigation measures would also be incorporated during the Final Design phase of the project.

Natural Ecosystems

With all of the build alternatives, the use of retaining walls and steepened side slopes along Little Timber Creek would minimize impacts to floodplains and wetlands/open waters. This would also minimize mitigation requirements in the design phase of the proposed project. The surface water quality of the surrounding water bodies would be improved with the new stormwater treatment systems. From an ecological perspective, Alternatives D, G2 and K are preferable because all or most of the wetland mitigation could be achieved on-site. The on-site mitigation, made possible by the removal of Al Jo's Curve, would benefit the natural environment by providing a larger, more contiguous riparian corridor. The community would also benefit from the opportunities for passive recreation provided by waterfront access to the stream corridor. A monitoring and maintenance plan will be written during Final Design in order to provide for the mitigation area's establishment and success into the future.

Alternative D includes reduced impacts to wetlands, open waters, and the floodplain. In addition, the opportunity for on-site mitigation is 100% with the removal of Al Jo's Curve. Alternative D will impact 2.28 acres of floodplain and 1.97 acres of wetlands/open waters. It would create the lowest acreage of total impervious coverage at 61 acres, compared to the other build alternatives.

Despite the use of retaining walls and steepening of side slopes, Alternative D1 would cause the greatest impact to the floodplain and wetlands/open waters at 4.45 acres and 3.73 acres, respectively. Since this alternative calls for Ramp C in the vicinity of Al Jo's Curve, it would not provide waterfront access to the public. In addition, it would have the smallest opportunity for on-site wetlands mitigation at only 10% of the total required and would result in the second highest total impervious coverage of 65 acres.

Alternative G2 represents the lowest permanent impacts to the floodplain and wetlands/open waters, with a 0.90-acre and a 0.95-acre impact, respectively. This alternative would also provide for waterfront access to the public and 100% on-site wetland mitigation opportunities with the removal of Al Jo's Curve. Total impervious coverage would be 64 acres.

Alternative H1 would cause the second highest impacts to the floodplain and wetlands/open waters of 4.26 acres and 3.15 acres, respectively. This is due in large part to approximately 250 feet of the channel of Little Timber Creek being relocated. In addition, there would be no opportunity for waterfront access and only 12% of the required wetland mitigation would be possible on-site. This alternative, along with Alternative K, would result in the highest total impervious coverage of 67 acres.

Impacts to the floodplain and wetlands/open waters for Alternative K would be 3.04 acres and 2.90 acres, respectively. As mentioned above, Alternative K as well as Alternative H1 would result in the highest total impervious coverage of 67 acres. Most of the wetland mitigation for this alternative would be possible on-site (93%), but some off-site wetland mitigation would be necessary.

Archaeological Resources

Since the project area has historically been disturbed by agricultural land use, roadway construction activities and commercial/residential development, the sites evaluated as part of the Phase I/II Archaeological Investigation were found to be ineligible for inclusion in the National Register of Historic Places, and therefore, no impact to archaeological resources would result from the proposed project.

Photograph ES-3: Bellmawr Park Mutual Housing Office

Historic Architectural Resources

Based on the findings of the *Historic Architectural Resources TES*, one historic resource is located within the Area of Potential Effect for the proposed project—the Bellmawr Park Mutual Housing Historic District.
In an August 16, 2006 letter, the New Jersey Historic Preservation Office (NJHPO) concluded that the proposed project will have an adverse effect to the Bellmawr Park Mutual Housing Historic District (see **Photograph ES-3**) under all build alternatives (see Appendix A) due to the permanent acquisition of land, demolition of contributing structures, and roadway construction within the boundaries of the historic district. NJHPO determined that Alternative K would have the least overall adverse effect to historic resources.

The introduction of a modern highway and associated highway features within or immediately adjacent to the district would result in adverse visual effects, diminishing the historic district's integrity of feeling. Noise walls have been deemed feasible, and adverse visual impacts would increase if noise walls were used for these alternatives. The visual impacts of Alternatives D and D1 on the district, with or without noise walls, would be lesser than the visual impacts of Alternatives G2 and H1, but greater than the visual impacts of Alternative K.

Under Alternatives D and D1, five contributing buildings (12 dwelling units) would be demolished, 2.11 acres (8.87% of the district's total acreage) would be acquired for right-of-way, and 32 contributing buildings would approach or exceed FHWA's NAC. Under Alternatives G2 and H1, one contributing building (four dwelling units) would be demolished, 1.05 acres (4.40% of the district's total acreage) would be acquired for right-of-way, and 38 contributing buildings would approach or exceed the NAC. Under Alternative K, five contributing buildings (12 dwelling units) would be demolished, 2.20 acres (9.27% of the district's total acreage) would be acquired for right-of-way, and 26 contributing buildings would approach or exceed the NAC. Under the No Build Alternative, 24 contributing buildings would approach or exceed FHWA's NAC by the year 2030.

As the proposed project would have an adverse effect on the Bellmawr Park Mutual Housing Historic District under all build alternatives, mitigation of adverse effects would be necessary. Potential mitigation measures may include documentation of buildings prior to demolition as well as the preparation of a National Register nomination form for the district. In addition, in an effort to assist the Bellmawr Park Mutual Housing Corporation in developing strategies to help ensure the community's cohesiveness and stability, a Conservation Plan will be developed for the archival storage of historic documentation (blueprints, maps, plans, etc.) that they have on file.

Hazardous Materials

As the proposed project would require property acquisitions and soil and groundwater management during construction, it was necessary to determine the potential for any of the properties within the study area to contain hazardous materials. The potential for soil and groundwater contamination exists at three Areas of Concern (AOCs) in Bellmawr with respect to the build alternatives. An area within the NJDOT right-of-way in the vicinity of the existing Ramp C at I-295, MP 27, was identified as an AOC due to a past diesel fuel spill. This area would be impacted under all build alternatives. New St. Mary's Cemetery was identified as an AOC due to the presence of an underground storage tank, an aboveground storage tank, maintenance equipment, and outdoor maintenance and storage space. This site would be impacted under all build alternatives. Bill Seas Towing was identified as an AOC due to the nature of operations that includes outdoor maintenance and storage space. This property would be impacted under Alternatives D, D1 and K.

These contaminated sites would not be disturbed under the No Build Alternative. However, contamination at the Area of Ramp C at I-295, MP 27 would remain. The potential for asbestos-containing building materials and lead-based paint exists on all roadway bridges to be replaced and all

commercial and residential buildings to be demolished for the build alternatives.

SECONDARY AND CUMULATIVE IMPACTS

Based on the analyses conducted as part of the TES reports, as well as meetings held with local officials and DVRPC, no secondary impacts are anticipated for this project.

In addition to the proposed project, the Missing Moves project, which includes a highway connection between I-295 and Route 42 south of the study area, has also been proposed; however, the Missing Moves project is currently on hold as discussions continue with local officials. The design may be modified in response to recent changes in local development plans.

The Port Authority Transit Corporation (PATCO) has proposed five Southern New Jersey alternatives for extending rail service through Camden County. While the choice of alignment for PATCO transit expansion has not yet been finalized, three of the five PATCO alternatives presently under consideration run along the I-76/Route 42 corridor and include a potential station at or near the southern edge of the I-295/I-76/Route 42 Direct Connection project area in Bellmawr at Leaf Avenue and Route 42. These alternatives have the potential to impact many of the same resources as the I-295/I-76/Route 42 Direct Connection project. The other two PATCO alternatives are located west of Bellmawr outside the I-295/I-76/Route 42 Direct Connection project area. The I-295/I-76/Route 42 Direct Connection Project and the PATCO transit expansion projects are complementary in their overall transportation improvements in this region. While the Direct Connection Project addresses safety, congestion and mobility issues, the transit expansion project provides a modal option and potentially increases the commuting capacity for the area. The cumulative benefits to the transportation system of both projects are greater than either project taken individually. The construction of the I-295/I-76/Route 42 Direct Connection project would not preclude the future construction of the PATCO rail extension through the I-295/I-76/Route 42 interchange.

TEMPORARY CONSTRUCTION IMPACTS

Construction of the proposed project is not expected to significantly impact traffic conditions in the project area, since the same number of traveled lanes as existing will be maintained during peak hours.

Throughout construction of the I-295/76/42 Direct Connection project, lanes will be maintained during peak hours. Diversions to the local arterial system will be located and timed in such a manner as to minimize the chance of overwhelming any specific location. It is expected that traffic would slow through the construction zone for each of the alternatives. However, any delays are not expected to divert a significant amount of traffic off the freeway onto the local roads (less than 25 vehicles per hour). The exception would be when a temporary weaving condition on I-76 eastbound would exist after the closure of existing Ramp G and prior to the closure of existing Ramp C. It is anticipated that this condition can be reduced or eliminated during the final design phase through the use of temporary pavement/bridges.

The temporary diversion of Browning Road would impact 30 parking spaces of the Annunciation B.V.M. Church, shown in **Photograph ES-4**. Circulation within the church parking lot would also be affected since the driveway closest to I-76 would be closed during the period when the temporary diversion road is in place. Methods of accelerating construction would be investigated during the final design phase of the Preferred Alternative. In addition, measures would be taken to assist the motorist with traveling through the construction zone.

Noise levels will increase during construction. On-site construction noise mitigation options such as mufflers, vibration dampers, and portable noise walls, can be specified to minimize construction noise impacts. Whenever possible, it is recommended that the proposed noise walls be constructed as early as feasible within the construction schedule of the project to buffer construction noise.

Photograph ES-4: Annunciation B.V.M. Church

Temporary increases in MSAT emissions, equipment exhausts, and dust may result from the proposed project. It is anticipated that the contractor will implement mitigation measures in order to minimize adverse impacts of the construction activities on residents proximate to the primary study area.

For all of the alternatives, temporary easements are required. Additional employment opportunities will be available and, with the influx of workers in the area, local retail services may see an increase in business.

Water quality impacts due to soil erosion and sedimentation during construction would be minimized through implementation of a soil erosion and sediment control plan in accordance with NJDOT standards. Erosion and sediment transport would be prevented using silt fencing, seeding, and/or topsoil stabilization matting of exposed soil slope surfaces. Turbidity of the water column would be prevented by the use of temporary floating turbidity barriers.

ALTERNATIVES ANALYSIS

The Alternatives Analysis process examined the ability of each alternative to meet the purpose and need of the proposed project while still taking practicable measures to avoid, minimize, and mitigate potential impacts to the built and natural environment. This process involved the development and evaluation of specific impact criteria that were essential to the decision-making process and the identification of the Preferred Alternative. A summary of impacts for Alternative D is shown in **Figure ES-3**.

No Build Alternative

The No Build Alternative serves as the benchmark to measure the costs and benefits of each build alternative evaluated. Since there are no changes to the interchange under this alternative, there are very few impacts, other than those that are a result of the perpetuation of existing conditions.

The No Build Alternative has no initial cost; however, there will be costs associated with scheduled pavement resurfacing, bridge redecking, and roadside maintenance. There will also be costs to the traveling public for longer commuting time, increased traffic congestion, decreased air quality, and unsafe conditions.

The existing roadway drainage along I-295/Route 42 and exterior drainage on I-76 is an umbrella type drainage system with runoff flowing into ditches that drain to culverts which flow to Little Timber Creek (see **Photograph ES-5**) and the unnamed tributary to Big Timber Creek. A limited measure of water quality and groundwater recharge is achieved for those existing areas flowing through ditches prior to discharge into closed storm sewer systems and culverts. The remaining portions of the existing ramps and I-76 interior drainage are conveyed directly into storm sewer systems, and directly to Little Timber Creek and Big Timber Creek, with no measurable groundwater recharge or water quality improvement measures.

The No Build Alternative would not meet the purpose and need of the proposed project. The deficient highway geometry and substandard stormwater drainage system would remain.

Photograph ES-5: Little Timber Creek Culvert at Bell Road

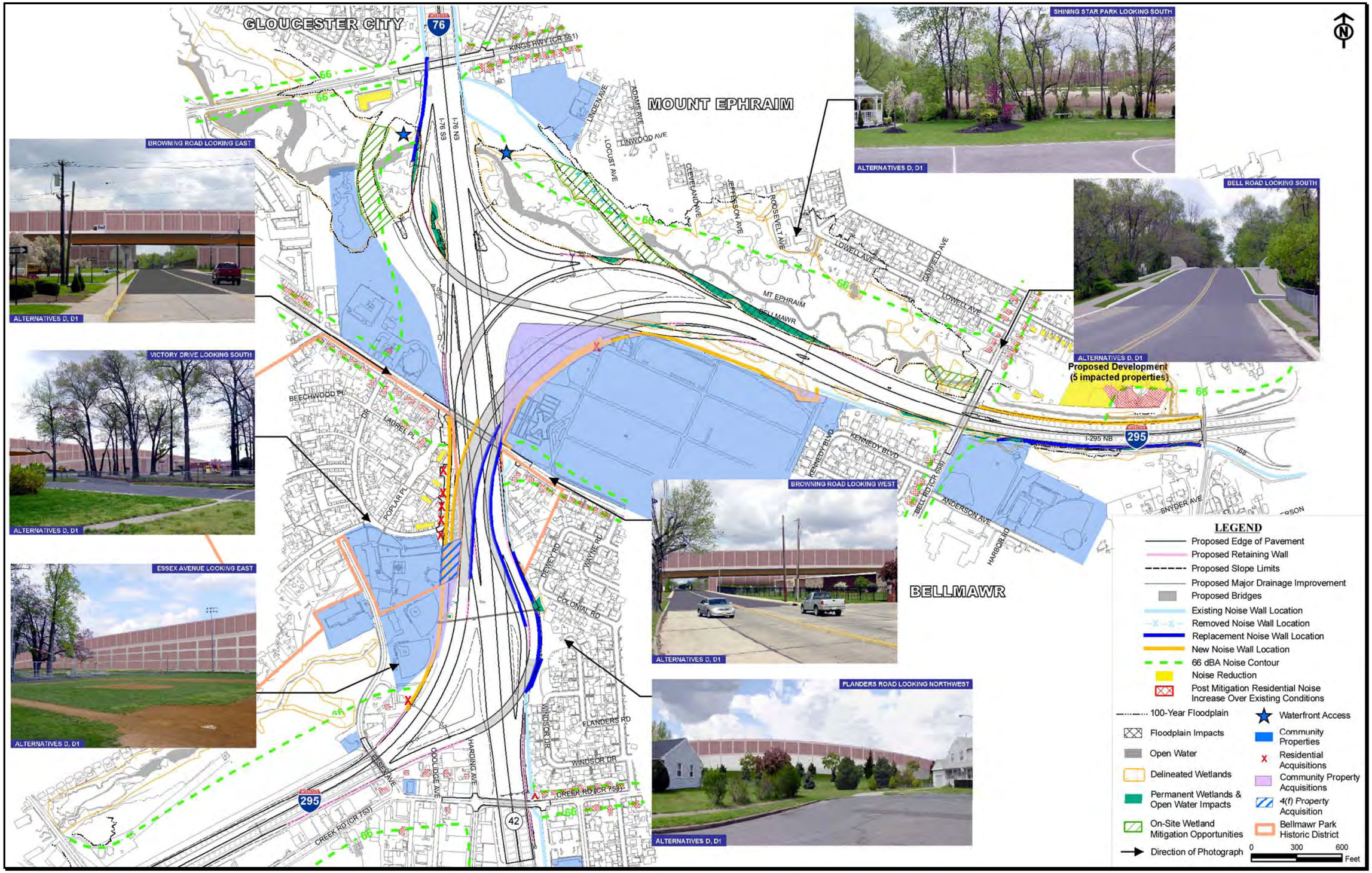


Figure ES-3: Alternatives Analysis Environmental Impact Plans (Alternative D)

Alternative G2

The construction duration for this alternative is expected to last 70 months and the temporary construction impacts would cause an inconvenience to neighboring properties for several years. These temporary impacts include the diversion of some traffic off the main highway. The length of the southbound viaduct, combined with the complex nature with which the viaduct is aligned, would result in security vulnerabilities and the possibility of multiple extreme failures of facilities with an extended duration for repair. In addition, this magnitude of viaduct would require significant maintenance. The cost to build Alternative G2 would be approximately $833 million.

Alternative G2 represents the lowest permanent impacts to the floodplain and wetlands/open waters, with 0.90-acre and 0.95-acre impacts, respectively. The highway design included the use of retaining walls and steepening of side slopes in order to avoid and/or minimize impacts to aquatic resources. This alternative would also provide for waterfront access to the public and 100% on-site wetland mitigation opportunities with the removal of Al Jo's Curve. However, there would be an increase of post mitigation residential noise; the viewshed of the Bellmawr Park Mutual Housing Historic District would be dominated by intrusive infrastructure at a relatively close distance; and the field of view of the local community in general would also be dominated by massive (78-feet high) intrusive highway overpass structures.

Although this alternative has the lowest impact to floodplains and wetlands/open waters, the 70-month construction duration, high cost to build, increases to post mitigation noise and visual impacts to the Bellmawr Park Mutual Housing Historic District, as well as homeland security issues, makes other alternatives more desirable.

Alternative H1

The engineering aspects of Alternative H1 concerning maintenance, temporary construction impacts, and security are similar to Alternative G2. Alternative H1 represents the highest cost to build of all alternatives at approximately $893 million and the second longest construction duration at 73 months.

Although the highway design incorporated the use of retaining walls and steepening of side slopes, this alternative would cause the second highest impacts to the floodplain and wetlands/open waters of 4.26 acres and 3.15 acres, respectively. This is due in large part to approximately 250 feet of the channel of Little Timber Creek being relocated. In addition, there would be no opportunity for waterfront access and only 12% of the required wetlands mitigation would be possible on-site. The field of view of the Bellmawr Park Mutual Housing Historic District and local community in general would be dominated by massive (78-feet high) intrusive highway overpass structures.

The high impacts to the aquatic environment, floodplain, and viewshed, high cost to build, long construction duration, coupled with the concerns over temporary construction impacts, maintenance, and homeland security issues make other alternatives more desirable.

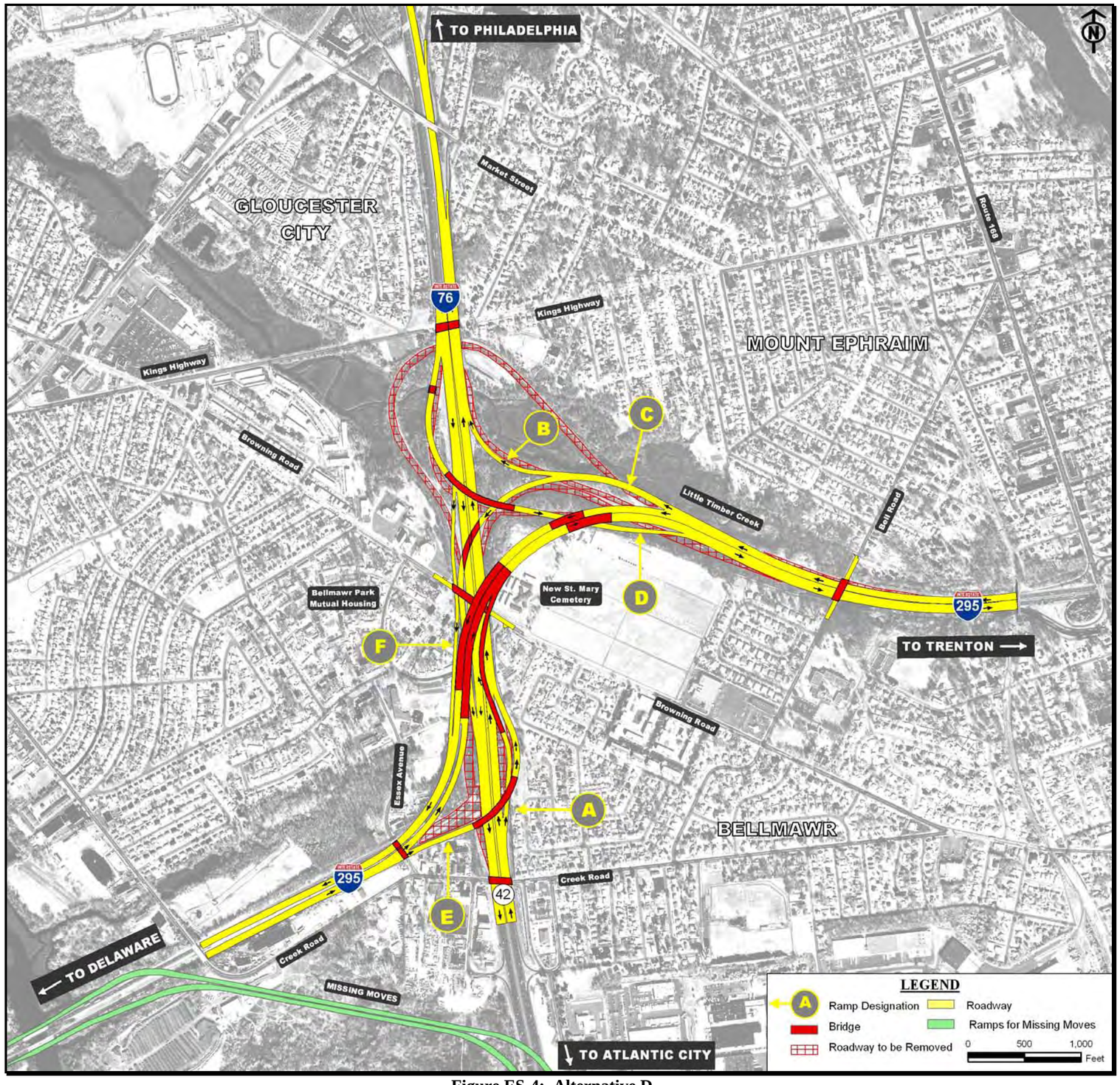


Figure ES-4: Alternative D

Alternative D1

While Alternative D1 would require the shortest duration of construction at 63 months, there would be a significant need for future maintenance of the increased highway structures. The cost to build Alternative D1 is approximately $642 million.

Despite the use of retaining walls and steepening of side slopes, Alternative D1 would cause the greatest impact to the floodplain and wetlands/open waters at 4.45 acres and 3.73 acres, respectively. Since this alternative calls for the reuse of Al Jo's Curve, it does not provide waterfront access to the public. In addition, it would have the smallest opportunity for on-site wetlands mitigation at only 10% of the total required. The high floodplain and wetlands/open waters impacts, lack of on-site wetlands mitigation opportunities and waterfront access, high requirements for the maintenance and protection of traffic during construction, and facility maintenance following construction make other alternatives more desirable.

Alternative K

Alternative K would make I-295 a continuous direct-through alignment in the form of a tunnel beneath I-76/Route 42. This tunnel design not only presents logistical problems for local police, fire, and rescue crews during emergencies, but also creates significant vulnerabilities in the security of the interchange. There would be a need for significant maintenance in the future with a tunnel. The cost to build Alternative K is approximately $822 million.

The impacts to the floodplain and wetlands/open waters for this alternative would be 3.04 acres and 2.90 acres, respectively. The highway design incorporates the use of retaining walls and steepening of side slopes in order to avoid and/or minimize impacts to aquatic resources. The highest reduction of residential noise impacts and lowest visual impacts would result from this alternative. However, during the long construction duration (88 months), the cut-and-cover operations of tunnel construction would cause a temporary disruption to the community.

The concept of a tunnel had initially received some support from the public due to a large portion of the interchange being relocated underground. However, the high cost, temporary construction impacts and disruption to commuters caused by the 88-month long construction of this alternative made this alternative less attractive. In addition, the existence of a tunnel in the area would present security vulnerabilities and logistical problems for local emergency personnel and result in high maintenance and operations needs.

Alternative D (Preferred Alternative)

As with all of the other proposed alternatives, Alternative D would cause inconveniences to neighboring properties in the form of noise, dust, and/or visual impacts. Some traffic would be diverted off the mainline for Alternative D and construction duration is expected to last 64 months. However, compared to Alternative K, the tunnel alternative, construction time and costs are decreased and potential breaches in security are not considered to be as significant. The maintenance needs for this alternative are the lowest for all build alternatives. Since Alternative D does not use a stacked infrastructure design, permanent visual intrusion on the community will be less of an issue as well. The cost to build Alternative D is approximately $608 million, which is more than 35% less than the cost for Alternative K. A plan view of Alternative D is provided in **Figure ES-4**.

This alternative would cause the second lowest impacts to the floodplain and wetlands/open waters at 2.28 and 1.97 acres, respectively. The opportunity for on-site wetlands mitigation is 100% with the removal of Al Jo's Curve. This alternative would result in the lowest acreage of total impervious coverage at 61 acres compared to the other build alternatives.

Alternative D meets the purpose and need of the proposed project. It will improve traffic safety, reduce traffic congestion, and utilizes design speeds consistent with that of the interchange's approach roadways. Based on the Alternative Analysis, Alternative D was recommended as the Preferred Alternative and is preferred by the local community, government officials, environmental agencies, NJDOT and FHWA.

SECTION 4(F) EVALUATION

A Draft Section 4(f) Evaluation was prepared as a chapter of the DEIS. This evaluation was prepared pursuant to the finding that the proposed project will have an adverse effect on the Bellmawr Park Mutual Housing Historic District.

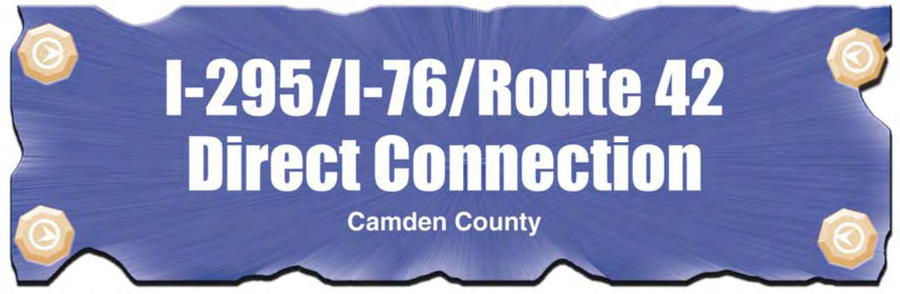
As all build alternatives use Section 4(f) resources, such that there are no feasible and prudent alternatives that avoid Section 4(f) resources, the impacts to both Section 4(f) and non Section 4(f) resources were evaluated in order to select the prudent and least overall harm alternative. Although Alternative D has slightly higher Section 4(f) impacts than Alternative K, there are additional important environmental impacts associated with Alternative K that Alternative D does not have. Therefore, it is more prudent to choose Alternative D.

CONSULTATION AND COORDINATION

As part of the proposed project, extensive public consultation and coordination took place. The proposed project involved significant local, state, and federal government coordination in collaboration with public participation in order to build consensus among stakeholders in the project area. Public involvement occurred during the project scoping, development, and conceptual design process.

The public hearing for the DEIS was held on January 30, 2008. Comments received in writing during the DEIS comment period and at the January 30, 2008 public hearing were considered both individually and collectively. There were no modifications to alternatives, including the proposed action. Substantive comments have been incorporated into the FEIS.

Since the circulation of the DEIS and receipt of comments, additional analysis has been performed on the selected alternative in order to prepare a more detailed cost estimate. The cost estimates used as the basis for the Alternative Analysis were based on 2006 data with escalation capped at 20%. A Cost Estimate Review (CER) workshop was conducted by FHWA in October 2008 to verify the accuracy and reasonableness of the total cost estimate and to develop a probability range for the cost estimate that represents the project's current stage of design. Based on the results of the CER workshop, the 2008 construction cost estimate for Alternative D is $902 million in year of expenditure dollars, which reflects an 80% confidence level that the cost estimate will not be exceeded. In addition, the 2008 construction cost estimate includes costs for breaking the project into four construction contracts, adding incentives to promote accelerated construction, traffic mitigation during construction to help minimize impacts on motorists, and reflected cost increases for materials, labor and Right of Way.



CHAPTER 1: INTRODUCTION

For residents and commuters in New Jersey, traffic congestion is a common everyday experience. When aging roadways also pose safety concerns, it is important to consider improvements. Traffic congestion and safety have been public concerns at the interchange of Interstate 295 (I-295), Interstate 76 (I-76) and New Jersey State Route 42 (Route 42) within the Boroughs of Bellmawr and Mount Ephraim, and Gloucester City in Camden County, New Jersey. In response to this need, the New Jersey Department of Transportation (NJDOT), in conjunction with the Federal Highway Administration (FHWA), proposes to design and construct a direct connection on I-295 through the interchange.

Presently the I-295, I-76 and Route 42 interchange does not provide a direct connection for I-295 through-traffic, as shown on an aerial photograph of the region (see **Figure 1.1-1**). The existing interchange requires motorists to reduce speed in both directions of I-295 so that they can safely negotiate highway ramps at 35 miles per hour (mph) speed limits to remain on the interstate (**see Photograph 1.1-1**).

Photograph 1.1-1: Ramp Showing Merging Traffic

Exacerbating the problem is the fact that drivers traveling through the interchange on I-295 must also contend with vehicles entering from Route 42 and I-76, necessitating dangerous weaving movements. As a major carrier of Philadelphia commuter traffic via the Walt Whitman Bridge and a connection to the southern New Jersey shore via Route 42 and the Atlantic City Expressway, this interchange is the busiest in the region. High volumes of traffic, the complex configuration of the interchange, and the weaving movements combine to cause a high incidence of motor vehicle accidents. The Delaware Valley Regional Planning Commission (DVRPC) has identified this interchange as a high priority regional need within its 2020 Long Range Plan due to its deficiencies in highway safety, geometric and operational constraints, and urban mobility.

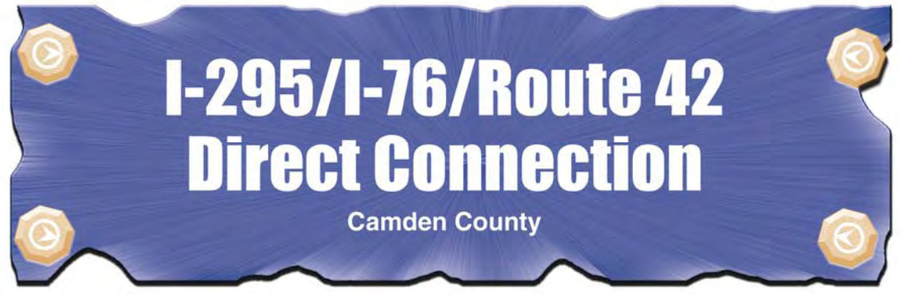
As the proposed roadway improvements would require funding from FHWA, NJDOT is conducting an environmental review of the proposed project pursuant to the National Environmental Policy Act of 1969 (NEPA). Under NEPA, environmental documentation must be prepared for federally funded projects with anticipated environmental impacts. The I-295/I-76/Route 42 Direct Connection project is classified as a Class I action pursuant to the Code of Federal Regulations (23 CFR 771.115), for which further study in the form of an Environmental Impact Statement (EIS) is required. The proposed project's Notice of Planned Action (NOPA) is provided in Appendix A of this document, along with the project's listing on the Statewide Transportation Improvement Program (STIP).

A Draft Environmental Impact Statement (DEIS) was prepared in order to identify and assess potential environmental impacts that could result from the proposed project, known as the I-295/I-76/Route 42 Direct Connection project. The DEIS provided the public and federal, state, and local environmental resource and regulatory agencies with documentation that environmental concerns have been evaluated and are considered in the evaluation of project alternatives. In addition, a Draft Section 4(f) Evaluation was prepared to evaluate prudent and feasible alternatives that would avoid and/or have the least impact upon publicly-owned resources, such as public parks, recreational areas, wildlife/waterfowl refuges, or historic sites.

The DEIS/Draft Section 4(f) Evaluation were supported by Technical Environmental Studies (TES) that have been conducted for the project. These TES reports include: Noise; Air Quality; Socioeconomics, Land Use, and Environmental Justice; Natural Ecosystems; Phase I/II Archaeological Investigation; Historic Architectural Resources; and, Hazardous Waste Screening. A Traffic Report, Interstate Access Report, Feasibility Assessment Report, and Letter of Interpretation/Jurisdictional Determination for wetlands have also been completed.

Based upon the agency and public comments received in response to the circulation of the DEIS/Draft Section 4(f) Evaluation, this Final EIS (FEIS) has been prepared. The agency and public comments received generally supported the selection of Alternative D as the Preferred Alternative as recommended in the DEIS. The FEIS addresses the concerns raised during the comment period and documents the selection of the Preferred Alternative.

Figure 1.1-1: Aerial Photograph



CHAPTER 2: PROJECT DESCRIPTION

The I-295/I-76/Route 42 Direct Connection project involves the reconstruction of I-295, I-76, and Route 42 and affected roadway segments traversing the Boroughs of Bellmawr and Mount Ephraim, and Gloucester City, Camden County. The existing interchange is insufficient to accommodate current traffic volumes and travel speeds safely, resulting in an accident rate that is more than seven times the statewide average. Additionally, failing levels of service on the interchange ramps, combined with the congestion of local streets, adversely affect the quality of life in the surrounding communities.

Figure 2.2-1: Project Location Map

2.1 PROJECT BACKGROUND

The existing interchange is the intersection of I-295, I-76 and Route 42. Planning for I-295 began in the 1950s and the construction of the interchange portion was completed in stages between 1958 and 1961. Construction on I-76 was completed in 1957. Route 42 predated the interchange, as planning for this road began in the 1940s with right-of-way acquisition taking place in the 1950s. A section of the roadway, including the interchange portion, was completed in 1958.

In 1985, during NJDOT's design of widening improvements on Route 42, it became apparent that additional improvements, more specific to the I-295/I-76/Route 42 interchange, would be required. In response to this need, NJDOT began preliminary engineering studies to identify feasible improvements at this location. These studies, which began in 1987, culminated in the 1999 Transportation Investment Study (TIS) prepared by NJDOT in conjunction with the DVRPC. The TIS identified substandard geometric conditions and operational deficiencies due to the lack of a direct through movement on I-295. The TIS recommended that a project, known as the "Full Build Alternative," be advanced. The Full Build Alternative would provide a full, grade-separated interchange.

The subsequent project scoping process identified 26 conceptual alternatives for consideration. After extensive community involvement and input from regulatory agencies, six alternatives (five build alternatives and a no build alternative) were chosen to advance for further study as part of the EIS process. The six alternatives selected for further analysis were those that would have relatively lower impacts to both the built and natural environment.

2.2 PROJECT LOCATION

The project study area for the I-295/I-76/Route 42 Direct Connection project includes several residential, commercial, industrial, and public/recreational areas in Bellmawr, Mount Ephraim, and Gloucester City, Camden County. A Project Location Map is provided in **Figure 2.2-1**. The project limits for the I-295/I-76/Route 42 Direct Connection are as follows:

Along the Route 42/I-76 corridor, the study area extends from the southerly limit of Route 42 at Leaf Avenue, Mile Post (MP) 13.82, north to where Route 42 ends at MP 14.28 and merges with I-295 at MP 26.79. The I-295 corridor includes only a short section of I-295 roadway from MP 26.79 to MP 26.96 before I-295 continues north following Ramp A. Additionally, the I-76 section of the project begins at MP 0.00 and continues to the northerly limit just south of Crescent Boulevard (Route 130) over I-76 at MP 1.15. Along I-295, the study area extends from the southerly limit of Creek Road (CR 753) over I-295 (MP 26.03), to the merge with Route 42 (MP 26.79), and continues north to MP 28.16, where Black Horse Pike (Route 168) crosses over I-295.

2.3 DESCRIPTION OF EXISTING FACILITIES

The following is a description of the existing roadways. **Figure 2.3-1** is an excerpt from the NJDOT Straight Line Diagram which provides an overview of the interchange configuration. Interstate highways with even-number designations typically denote east-west routes; however, the portion of I-76 in New Jersey is oriented in a north-south direction. I-76 is described as being a north-south highway throughout this document.

2.3.1 Ramps

- Ramp A connects northbound Route 42 with northbound I-295.
- Ramp B connects southbound I-295 with northbound I-76.
- Ramp C connects southbound I-295 with southbound Route 42.
- Ramp D connects southbound I-76 with northbound I-295.
- Ramp E connects northbound I-295 with northbound I-76.
- Ramp F connects northbound I-295 with the I-76 northbound express lanes.
- Ramp G connects the I-76 southbound express traffic with southbound I-295.
- Ramp H connects southbound I-76 with southbound I-295.

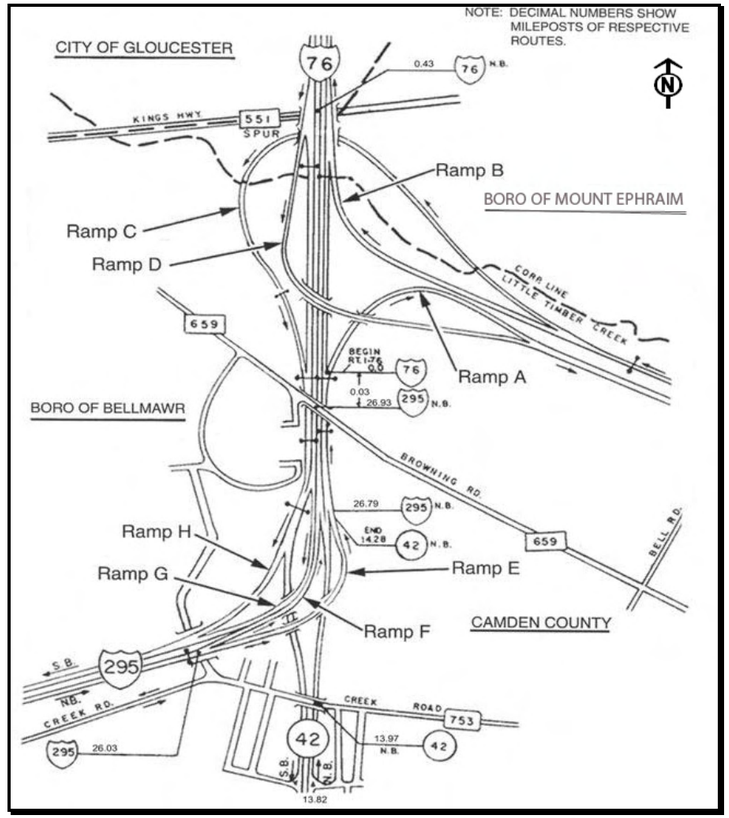


Figure 2.3-1: Overview of Existing Interchange Configuration

2.3.2 I-295/I-76/Route 42 from the Southern Project Limit

I-295 northbound consists of three 12-foot lanes with a 12-foot shoulder. There is a 50-foot-wide grass median separating the northbound and southbound lanes. The three-lane section terminates in the vicinity of the bridge over Essex Avenue in Bellmawr, and forms Ramps E and F, which lead traffic to I-76 northbound local and express lanes, respectively. Ramp E leads to Ramp A to carry I-295 through-traffic northbound. Ramp A merges with Ramp D, carrying I-76 northbound traffic onto I-295, and together re-form the three-lane section of I-295 northbound.

Route 42 northbound consists of four 12-foot lanes with a 12-foot right shoulder and a concrete median barrier curb. Route 42 ends at the merge of Ramp E carrying traffic from I-295 northbound. At this point, Route 42 becomes I-295 northbound which continues to the Ramp A gore. At the gore, I-76 northbound begins for through-traffic while traffic heading to I-295 must exit onto Ramp A. Traffic traveling from Route 42 northbound to I-295 northbound must merge across the lanes created by Ramp E to exit onto Ramp A to continue onto I-295, as the lanes of Ramp E form part of the express and local lanes of I-76 northbound.

2.3.3 I-295/I-76/Route 42 from the Northern Project Limit

I-295 southbound consists of three 12-foot lanes with a 12-foot right shoulder. Approximately 1,000 feet south of the Bell Road overpass in Mount Ephraim, the travel lanes diverge into Ramps B and C. Ramp B carries traffic to I-76 northbound lanes. Ramp C, also known as "Al Jo's Curve," carries I-295 southbound through-traffic via Ramp H, while traffic to Route 42 exits from the left lane. Ramp G, carrying I-76 and Route 42 southbound traffic, merges with Ramp H, re-forming the three-lane southbound section of I-295.

I-76 southbound consists of four 12-foot lanes with a 12-foot shoulder. Ramp D carries traffic from I-76 to I-295 northbound. At the Ramp C merge, I-76 ends, becoming I-295 southbound. Traffic continuing on I-295 southbound exits at Ramp G, while through-traffic continues onto Route 42 southbound past the Ramp G exit. Traffic traveling on I-76 to Route 42 must stay in the right lane after the Ramp C merge, then move to the left lane, across merging traffic from I-295 southbound, to continue onto Route 42. Traffic continuing to I-295 southbound exits right onto Ramp H.

2.4 REGULATORY FRAMEWORK/STREAMLINING

The I-295/I-76/Route 42 Direct Connection project is funded in part by FHWA, and is subject to review and permitting by various federal agencies. As a result of the incorporation of federal funding, this DEIS/Draft Section 4(f) Evaluation has been prepared in accordance with NEPA (42 USC 4321, et seq.), as implemented by the Council on Environmental Quality Regulations (Title 40 Code of Federal Regulations (CFR) 1500, et. seq.), and FHWA Procedures (23 CFR Part 771). This DEIS/Draft Section 4(f) Evaluation has been prepared pursuant to Section 4(f) of the Department of Transportation Act of 1966 (23 USC 138 and 49 USC 303) and Section 106 of the National Historic Preservation Act of 1966 (36 CFR Part 800).

The project area includes an estimated 50 acres of wetlands and two navigable water bodies, subject to the provisions of Section 404 of the Clean Water Act (33 USC 1251, et. seq.) and Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403), both administered by the United States Army Corps of Engineers (USACE), and the Freshwater Wetlands Protection Act (NJAC 7:7A), administered by the New Jersey Department of Environmental Protection (NJDEP).

In order to coordinate the NEPA process with the requirements of Section 404, a streamlining process was established to coordinate the permitting activities and processing requirements of not only NEPA and the USACE, but also NJDEP, which also shares jurisdiction in the project area. The NEPA-Section 404 streamlining process coordinates project processing through the end of the EIS process, identifying and documenting impacts, and assessing ways to avoid, minimize, or mitigate these impacts.

2.4.1 Streamlining Principles

Streamlining seeks to develop a process that recognizes the benefits of effective and successful coordination as a basis of improving cooperation among stakeholders, particularly amongst regulatory and permitting agencies of the I-295/I-76/Route 42 Direct Connection project. Identifying priorities, agreeing upon standards, and continuing inter-agency dialogue are just a few examples of what is expected to be achieved in the streamlining process. In short: no surprises at the end of the project.

To achieve successful streamlining, shared and agreed-upon general principles are paramount to meeting desired goals. The guiding principles upon which this process is founded include the following:

- Agencies will define their respective roles as early in the process as possible.
- Each identified agency must be respected for its role and responsibility in the process.
- Each agency should come to the table with an open mind, prepared to work to find an acceptable, though not necessarily perfect, solution that is compatible to its mission and the project's purpose and need.
- Agencies will strive to provide sufficient staffing to be an effective player in the process.
- Scoping is ongoing and continuous through the process. As such, issues should be addressed as soon as possible.
- The agencies will work expeditiously to resolve conflicts if they emerge in order to preserve the value of streamlining and the NEPA merger process.
- Agencies will work together to seek an equitable balance of impacts to all resources.
- At major process milestones, agencies will participate in a formal concurrence process, thereby ensuring mutual understanding of issues and process to date.
- After a formal concurrence, agencies agree to not revisit a milestone unless there is substantive new information that warrants reconsideration.
- Each agency recognizes that the success of the streamlining process is directly related to the level of ownership, effort, and resources provided by the agency itself.

The multi-step streamlining for the I-295/I-76/Route 42 Direct Connection project includes six steps, as shown in **Figure 2.4-1**. Several concurrence points were selected for the agency participants as part of the streamlining process. Concurrence was to be achieved for the purpose and need statement, the identification of the alternatives identified for further study in the TES reports, and finally, for the Preferred Alternative. The primary role for NJDOT is to provide agencies with information on approach, methodologies, NJDOT's project schedule, and updates on the data collected and progress, as well as to ensure that all permit and mitigation commitments are implemented. Project implementation and monitoring are also included in the last step. Although technically not considered part of the streamlining process per se, the project implementation and monitoring is, nevertheless, essential in creating a successful, buildable project, validating the process and serving as a model for the next major project.

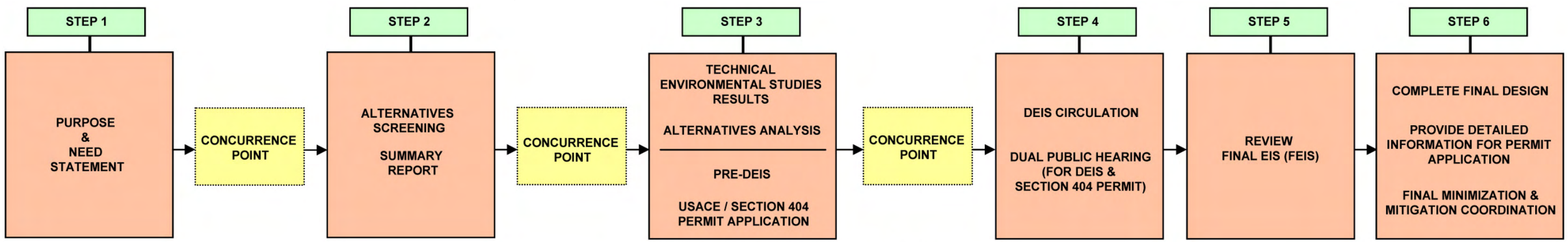


Figure 2.4-1: Streamlining/404 Merger Process

The streamlining process and framework really go beyond the EIS process of identification and documentation of impacts, but ensures the implementation of avoidance and mitigation plans.

Significantly, streamlining, combined with merging the NEPA and Section 404 processes, had never before been attempted in New Jersey, and this holistic approach, from concept to completion, was an innovation built on established and accepted streamlining processes implemented in other states.

2.5 STAKEHOLDER GROUPS

The project has involved a significant local government and public participation component to build consensus among the stakeholders in the project area. Stakeholders were organized into committees that met regularly and at important milestones to foster working relationships with local leaders, and conduct the necessary public outreach to keep the affected communities apprised and involved in the project progress. A chronological account of their work can be found in Chapter 11. The Project Flow Chart illustrates the public involvement opportunities during the project scoping, development, and conceptual design process (see **Figure 2.5-1**).

2.5.1 Agency Coordination Meetings

The Agency Coordination Meetings (ACM) bring together the participating public agencies to review the progress of the project at important milestones. Each step in the NEPA process builds on the previous step, and by meeting regularly and reaching consensus at each step, the participating agencies help move the process forward smoothly. Participating agencies include representatives from the United States Environmental Protection Agency (USEPA), the United States Fish and Wildlife Service (USFWS), USACE, FHWA, the National Marine Fisheries Service (NMFS), NJDOT, NJDEP, DVRPC, and the Delaware River Basin Commission (DRBC). The participants in the ACMs are direct participants in the streamlining process described above.

2.5.2 Project Partnering Sessions

The project partnering sessions provided a forum for meeting with a large number of critical stakeholders at the same time. Whereas the ACMs involve those agencies whose regulatory jurisdiction would affect the progress and final design of the project, the stakeholders invited to the partnering sessions included local and county officials, business owners, and members of the public who would be affected by the project, in addition to agency representatives. The main purpose of the partnering sessions was to develop working relationships, clarify goals for the project, establish communication protocols, and provide a forum for open exchange of ideas and information between all stakeholder groups.

2.5.3 Community Advisory Committee

An important component of the public involvement effort for the project is the Community Advisory Committee (CAC), consisting of approximately 40 community representatives, including local elected officials, residents, transportation agency officials, and representatives from senior-citizens' associations, minority groups, school districts, business-development organizations, environmental groups, religious and civic groups, and other stakeholder organizations. While not a decision-making body in itself, the committee helps the NJDOT project team reconcile the various community interests represented in the project area and provides NJDOT with input into the process of formulating recommendations for transportation improvements. In addition, the committee helps NJDOT set priorities and plan outreach activities.

2.5.4 Local Officials Briefings

Local Officials Briefings (LOB) are conducted as an additional method of keeping officials apprised of, and involved in, the project progress. Representatives from the study area, including the mayors of Bellmawr, Gloucester City, and Mount Ephraim, are invited to these briefings. The LOB meetings typically consist of presentations to the officials, many of whom are also participants in the partnering sessions and CAC.

2.5.5 Public Meetings and Public Information Centers

Public Meetings and Public Information Centers (PIC) are held at key milestones during the project and provide an opportunity for members of the community to ask questions and provide input and comments directly to the project team (see **Photograph 2.5-1**). These meetings are advertised in local newspapers and at civic group meetings. Members of the public are encouraged to attend each meeting, listen to presentations by individual team members, review the displays provided, ask questions, and provide input, comments, recommendations, and feedback regarding their observations and concerns.

Photograph 2.5-1: Public Meeting

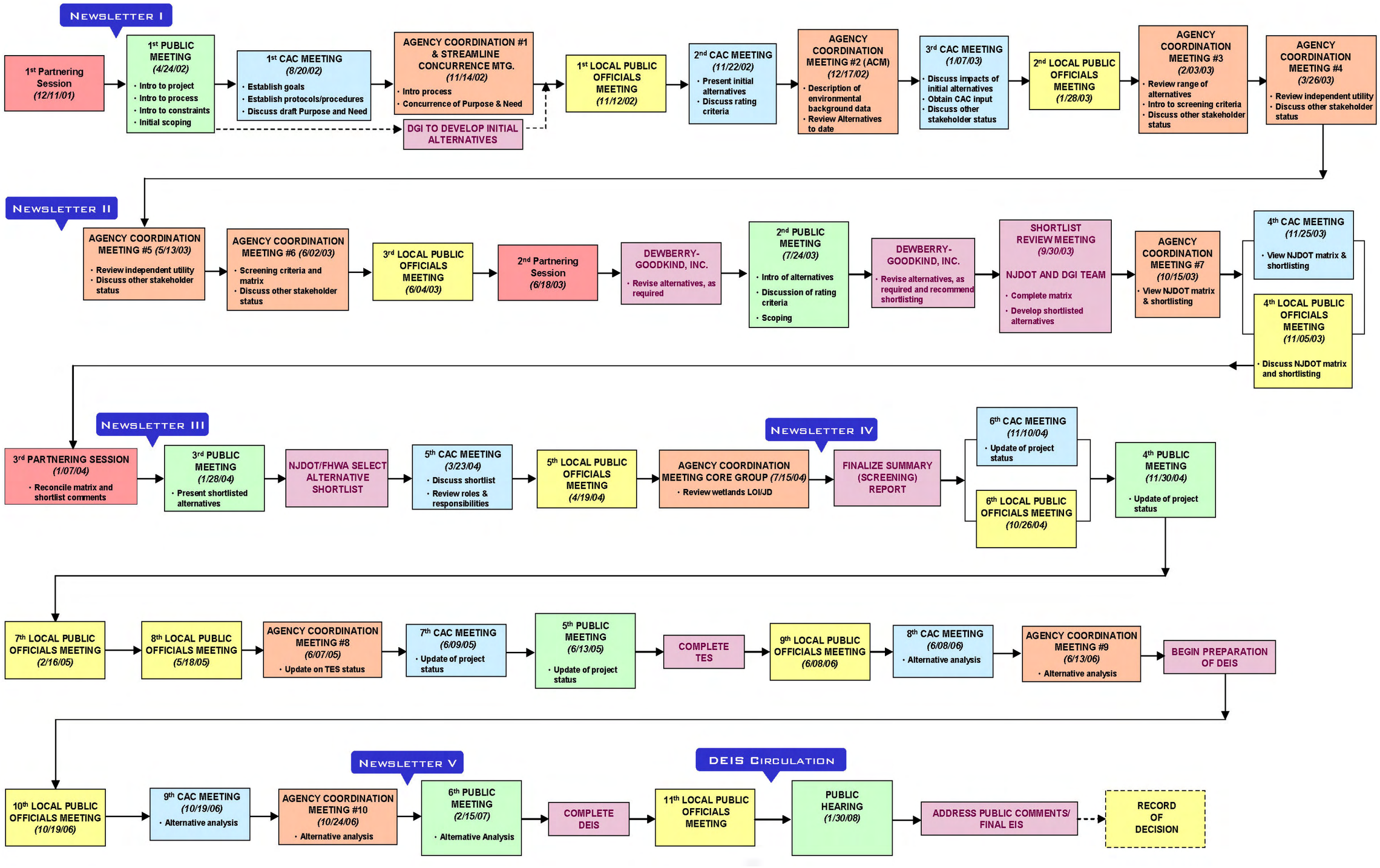
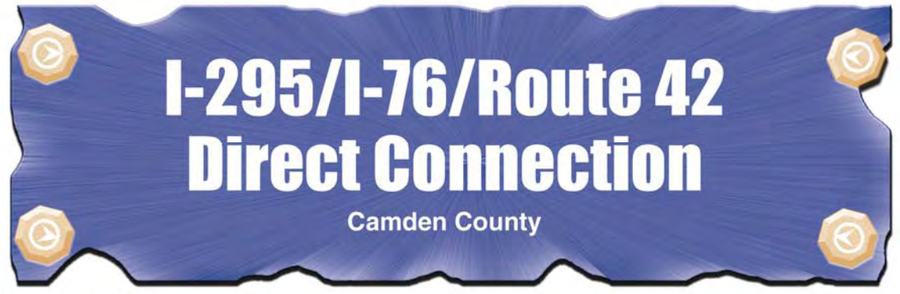


Figure 2.5-1: Project Flow Chart



CHAPTER 3: PURPOSE AND NEED

A purpose and need statement is a fundamental requirement when developing a proposal that requires NEPA documentation. In addition, other federal processes, such as the Section 404 Permit process and the Draft Section 4(f) Evaluation, also require the generation of a purpose and need statement. Clarity of purpose and confirmation of need are in themselves sound practices when developing large-scale proposals requiring public expenditure. The purpose and need statement for the I-295/I-76/Route 42 Direct Connection project was developed through a comprehensive process that involved stakeholders at each level of project development, from technical design staff to community representatives, to members of the general public, as described in Chapter 11.

3.1 PURPOSE

The purpose of this project is to improve traffic safety, reduce traffic congestion and meet driver expectations by providing the direct connection of the I-295 mainline to improve the interchange of I-295/I-76/Route 42.

3.2 NEED

There is a significant accident history at the interchange. The interchange's existing roadways include a number of geometric deficiencies that can be considered contributing factors to the high number of accidents. The deficiencies were identified from NJDOT's record construction drawings and Structural Inventory and Appraisal Sheets.

3.2.1 Improve Safety

Accident data for the years 1995 through 2000 were reviewed. Since statewide accident rates were available for 1995, 1996, and 1999, a comparison of the accident rates on I-295, I-76 and Route 42 for these years was made with the statewide average, as depicted in **Figure 3.2-1**.

During the 1995 to 1999 period, the I-295 roadway segments from MP 26.4 to MP 28.2 had accident rates over seven times the statewide average. Of these segments, MP 26.4 to 27.6 and MP 28 to 28.2, lengths that encompass the area of the interchange with Route 42 and I-76, had a substantially higher number of accidents than sections of I-295 immediately north and south of the interchange. For example, in 1995, MP 26.4 to 27.0 had almost seven times more accidents than the statewide average, while MP 26.8 to MP 27.1 had the most accidents in each of the analyzed years.

All six segments of Route 42 (from MP 13.2 to MP 14.28) had accident rates in excess of the statewide average. In 1996, four segments (from MP 13.45 to MP 14.28) had accident rates, per million vehicle miles, greater than the statewide average. In 1999, four segments (from MP 13.44 to MP 14.28) had accident rates, per million vehicle miles, greater than the statewide average. In the years 1995, 1996, and 1999, one segment had an accident rate four times the statewide average.

I-76 accident rates were similar to those of I-295 and Route 42 in the 1995-1999 time frame. For 1995, four segments (from MP 0.0 to MP 0.8) had accident rates which exceeded the statewide average. One segment had an accident rate twice the statewide average. In 1996 five segments (from MP 0.0 to MP 0.8) had accident rates greater than the statewide average, with one segment being three times the statewide average. On I-76 in 1999, three segments (from MP 0.0 to MP 0.53) had accident rates in excess of the statewide average. In 1999, one segment had an accident history four times greater than the statewide average. Segments that were over-represented, in all three years that were compared with statewide averages, were MP 0.0 to 0.3 and 0.3 to 0.5. These segments mainly encompass the area in which I-76 is combined with I-295.

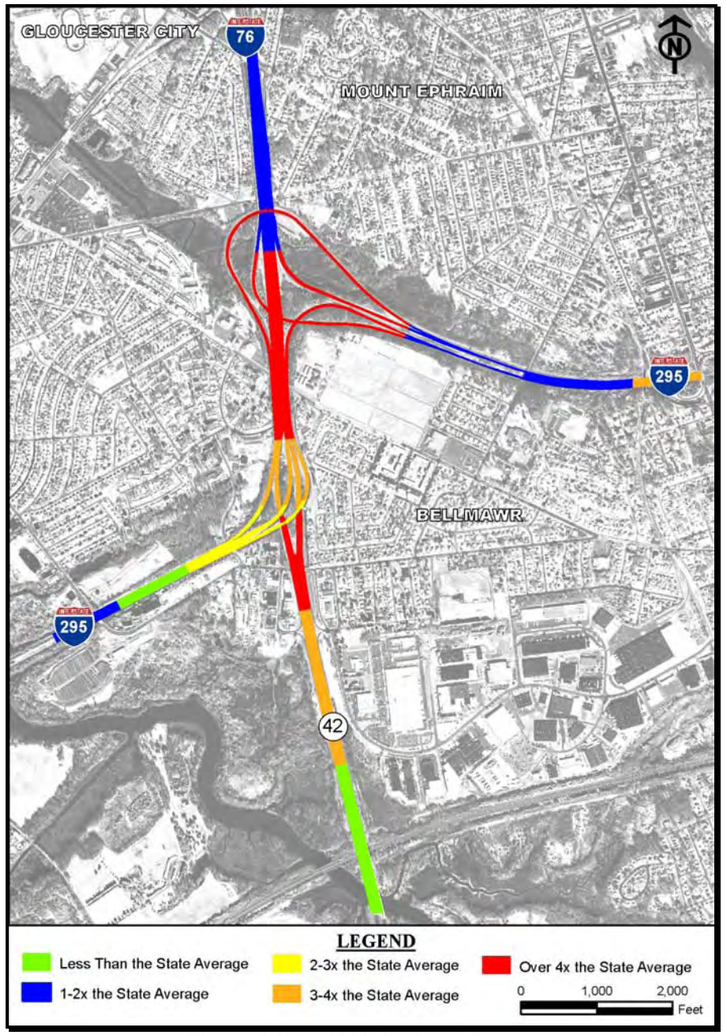


Figure 3.2-1: 1999 Accident Rates

3.2.2 Geometric and Structural Deficiencies

The existing interchange has numerous substandard geometric design elements. These include horizontal curvature, stopping sight distance, superelevation, shoulder widths, and acceleration and deceleration lane lengths. These are present along I-295, I-76, Route 42, and ramps at various locations. Since a majority of the improvements will be on new alignments, these substandard features will be addressed as part of the project.

In addition to the geometric deficiencies noted above, several bridges within the interchange have been identified as structurally deficient or functionally obsolete due to substandard vertical and horizontal clearances (see **Photograph 3.2-1**). Once again, since a majority of the improvements will be on new alignments, these structures will be replaced as part of the project.

3.2.3 Driver Expectations

While there is a definite need to correct the geometric deficiencies in the existing ramps and structures, driver expectations also play a large role in the high accident rates at the interchange and necessitate improved safety. The posted speed limits on the existing ramps that serve the through-traffic on I-295 are inconsistent with typical operating speeds on an interstate highway. The posted speed limit on all of the highway approaches to the interchange is 55 mph. The 20 mph discrepancy between the posted speed limits (and higher operating speeds) on the approach highways and the 35 mph speed on the ramps can be considered a contributing factor in the interchange's overall poor accident record.

Photograph 3.2-1: Overpass at Creek Road

3.2.4 Operational Deficiencies

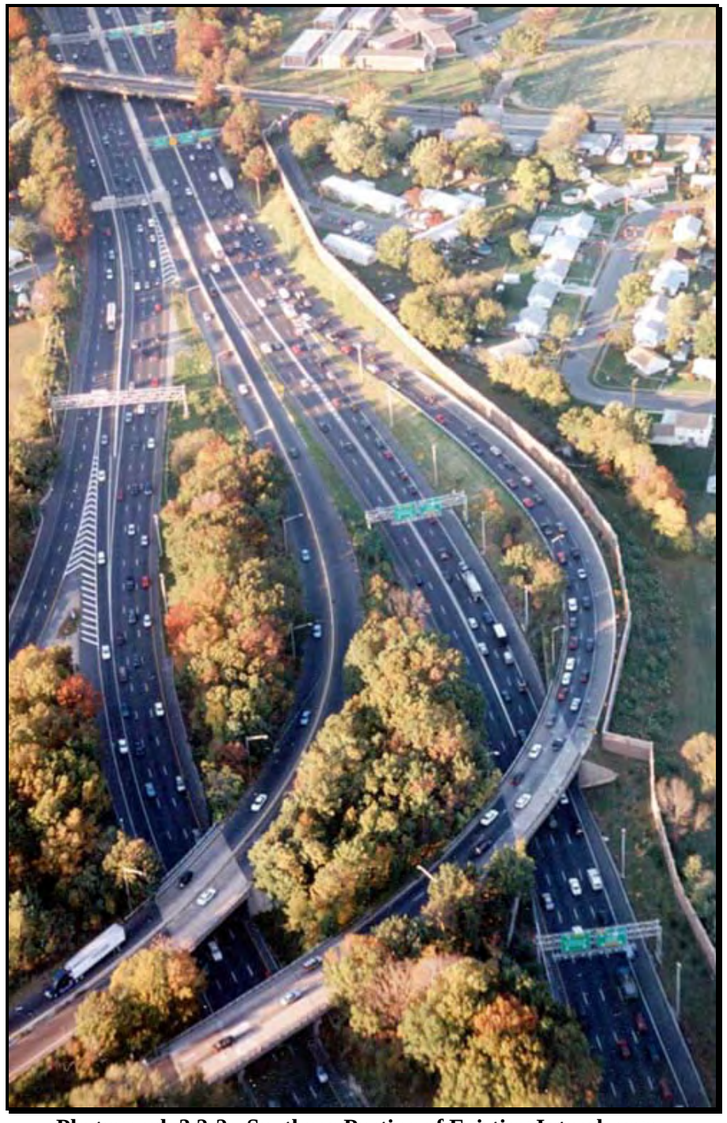
The lack of a direct connection for through-movement on I-295, significant weaving problems, deficient connecting ramps, and high volumes of traffic, all result in operational deficiencies (or congestion) within and near the interchange. The operational deficiencies on I-295, I-76 and Route 42, particularly the queuing of traffic and poor Levels of Service (LOS) that cause excessive delays, impact not only regional traffic and commuters using the highways, but local arterials and neighborhood streets as well. Excessive delays at the interchange result in highway traffic exiting onto surrounding local arterials, thereby further adding to congestion in the region. The diverted traffic, in turn, causes congestion on local roads, compromises traffic and pedestrian safety, increases noise levels, and lowers air quality in the community, all of which disproportionately taxes the capacity and life of local roadways.

ROADWAY/RAMP	PEAK HOUR LEVEL OF SERVICE	
	AM	PM
I-295 - Northbound		
South of Interchange	D	C
North of Interchange	D	**E**
I-295 - Southbound		
South of Interchange	**E**	**E**
North of Interchange	C	C
I-76 - Northbound		
South of Interchange	n/a[1]	n/a[1]
North of Interchange	**E**	C
Express Lanes	D	B
I-76 - Southbound		
South of Interchange	n/a[1]	n/a[1]
North of Interchange	C	**E**
Route 42 - Northbound		
South of Interchange	D	C
North of Interchange	n/a[1]	n/a[1]
Route 42 - Southbound		
South of Interchange	B	D
North of Interchange	n/a[1]	n/a[1]
Ramp A	**F**	**F**
Ramp B	**E**	B
Ramp C	**F**	**F**
Ramp D	B	C
Ramp E	**E**	**E**
Ramp F	**E**	**E**
Ramp G	B	C
Ramp H	C	B

[1]Section of roadway does not exist (see **Figure 2.3-1**).

Table 3.2-1: Existing Level of Service

The effective operation of any roadway network, be it highway, local arterial or street intersection, is measured by the LOS categories ranging from A to F. LOS A represents the most favorable operating conditions with little or no delay. LOS F is the worst operating condition occurring when demand volume exceeds the capacity of the roadway, resulting in severe congestion. Specific sections of the interchange that experience a poor LOS (LOS E or F) are highlighted in **Table 3.2-1**. Of the eight ramps studied in detail, five operate at a LOS E or worse for at least one of the two peak hours (AM and PM). In addition, a weaving condition exists on I-76/Route 42 between Ramp E and Ramp A. Traffic on Ramp E wishing to proceed north on I-76 must weave with traffic from northbound Route 42 proceeding north on I-295. Due to the volumes of traffic involved in this section of the interchange (specifically the high volume of traffic from Ramp E proceeding to Ramp A) this section of the roadway experiences failure. It should be noted that the traffic exiting Ramp E (see **Photograph 3.2-2**) and proceeding on Ramp A is "through" traffic that could be expected to stay on mainline I-295 if a mainline section of the highway were available.



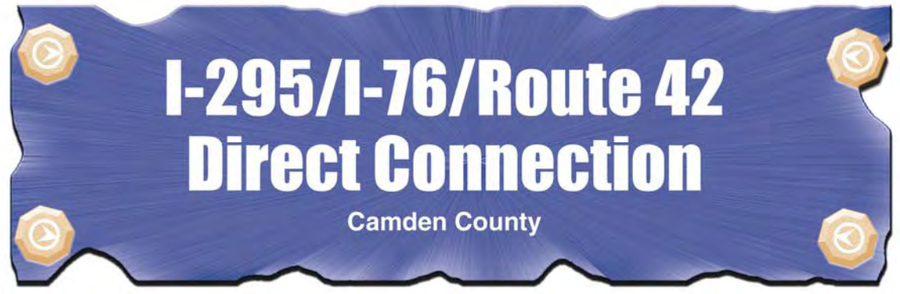
Photograph 3.2-2: Southern Portion of Existing Interchange

3.3 GOALS AND OBJECTIVES

A set of project goals and objectives has been developed based on the project's purpose and need described above, findings from previous studies, and goals developed during the partnering meetings on December 11 and 12, 2001. The goals and objectives are a compendium of statements made by NJDOT, FHWA, agencies, local elected officials, residents, and other stakeholders in the project. As such, the goals and objectives are wide-ranging and represent different levels of priority for each stakeholder.

While the project may not be able to satisfy all goals and objectives listed herein, the Preferred Alternative seeks to address as many as possible. The project's goals and objectives are as follows:

- Improve safety by constructing a roadway system that meets interstate standards for geometric design.
- Provide a direct connection for through-traffic on I-295 with a design speed consistent with that of the interchange's approach roadways.
- Reduce congestion on local arterials, such as Route 168 and US 130, and decrease commuter traffic on neighborhood streets, thereby improving local traffic mobility, pedestrian safety, and the level of service on I-295. In addition, noise levels would decrease and air quality would improve.
- Enhance regional economic development by increasing overall mobility. In addition, the improved roadway network conforms to state and local development plans.
- Reduce the financial burden on state and local police and emergency services by decreasing the number of vehicle accidents.
- Avoid, minimize, or mitigate environmental impacts.
- Preserve the quality of life of communities by minimizing relocations and acquisitions of private and public property.
- Enhance opportunities for other modes of transportation, including bicycle and pedestrian, within the project area.
- Provide opportunities for intermodal use within the project area.



CHAPTER 4: ALTERNATIVES

NJDOT began preliminary engineering studies to identify feasible improvements to the I-295/I-76/Route 42 interchange in the late 1980s that led to the preparation of the TIS by NJDOT and DVRPC in 1999. This chapter will summarize the numerous early concepts and strategies that were identified in those preliminary engineering studies, some of which evolved into the conceptual alternatives evaluated as part of the EIS process, and some of which were dismissed as unfeasible. The alternative screening process, criteria, and methodology that yielded those alternatives advanced for further study in this DEIS will then be described in detail.

4.1 DEVELOPMENT OF CONCEPTUAL ALTERNATIVES

As part of the preliminary engineering studies, a series of alternatives were developed that placed I-295 in both direct and indirect alignments through the interchange. The indirect alignments placed I-295 on the west side of I-76. These alternatives involved various loop and flyover ramp designs. New weaving sections, poor operational safety, and severe right-of-way acquisitions on both sides of I-76 in Bellmawr would have resulted from these alternatives.

Several alternatives were developed that maintained the I-295 mainline on the existing ramps, which would be widened to three lanes. Although virtually no new roadway would have to be constructed, these alternatives provided poor overall operational safety. One option included the addition of a parallel collector-distributor road for the Route 42 traffic; however, it provided poor operational safety improvements as well.

Alternatives for a standard directional interchange with modifications were investigated. There were no weaving situations, or express lane exits, providing excellent operational safety; however, the right-of-way acquisitions were extensive, especially in the New St. Mary's Cemetery. Another alternative provided a new I-295 alignment with a directional interchange relocated to the south near the New Jersey Turnpike. Drawbacks included high right-of-way acquisitions and the possible need for relocation of the existing Route 168 interchange.

A Congestion Management Study performed as part of the 1999 TIS identified substandard roadway geometric conditions including poor sight distance and inadequate bridge clearances. The TIS also identified operational deficiencies due to the lack of a direct connection for I-295 through movements and existing geometric deficiencies. The strategies investigated as part of the TIS incorporated alternatives proposed in the preliminary engineering studies. The improvement strategies evaluated as part of the TIS are summarized below.

- **High Occupancy Vehicle Lanes (HOV)** – The addition of HOV lanes to segments of the interchange was found to not be feasible.

- **Supporting Measures/Strategies** – This low cost alternative would have included a commuter-based/van pool program and various Intelligent Transportation Systems applications; however, analysis showed that it would not adequately address the interchange's traffic congestion.

- **Express Bus/Park and Ride** – New park and ride lots would be constructed and express bus service expanded under this alternative. While there was a market for this alternative, it would have done little to improve the interchange.

- **Rail Transit** – A new light rail transit line from Glassboro to Camden would be constructed under this alternative. While there were regional benefits with this alternative, it did not solve any problems with the interchange.

- **Turnpike Alternatives** – A series of alternatives were conceived that also involved improvements to the New Jersey Turnpike. These improvements included the widening and the addition of a new interchange to the Turnpike. While both would have produced significant regional benefits, neither would have addressed any of the problems with the interchange.

- **Missing Moves** – The missing ramps from I-295 northbound to Route 42 southbound and Route 42 northbound to I-295 southbound would be constructed under this alternative. This alternative served its own market, would improve the interchange, and could be implemented independent of the I-295/I-76/Route 42 Direct Connection project.

- **Missing Moves and I-295/I-76/Route 42 Direct Connection** – The Missing Moves ramps plus a full, grade-separated connection for I-295 traffic through the interchange would be constructed under this alternative. It was determined that the greatest benefit to the interchange and to the region would be realized by this alternative. In addition, it was the only alternative that addressed all of the study problems.

The TIS concluded that improvements must be made to the interchange to correct the deficiencies identified and recommended that the I-295/I-76/Route 42 Direct Connection build alternative be advanced. The TIS also recommended that the Missing Moves ramps be constructed, as a separate project. Each project has its own independent significance and utility that will not be addressed by construction of the other project. The construction of the Missing Moves project will provide the connector ramps between Route 42 northbound and I-295 southbound, as well as between I-295 northbound and Route 42 southbound, but will not address the safety, geometric, operational, and various other deficiencies associated with the Direct Connection project. The I-295/I-76/Route 42 Direct Connection project will provide the direct "through" route on the interstate highway system that has been lacking in this interchange, but will not address the current lack of a connection south of the interchange between Route 42 and I-295.

Discussions regarding the development of a Turnpike alternative continued during the scoping process for the I-295/I-76/Route 42 Direct Connection project. One such alternative involved constructing an I-295 Bypass Expressway, with the alignment adjacent to the New Jersey Turnpike from Woodcrest Station to Route 42, in lieu of reconstructing the I-295/I-76/Route 42 interchange. It was determined that almost 40% of the I-295 traffic would not be served by such a bypass and would still need to utilize the interchange. This alternative was ultimately dismissed during the scoping process.

Following the development of the TIS, the New Jersey Turnpike Authority (NJTA) identified three alternatives that, along with improvements to the I-295/Route 42 Interchange, would improve traffic flow in the region. One of these alternatives would add a new Turnpike interchange at Route 42 and remove the existing Turnpike Interchange 3. Another alternative would be a connection between Route 168 (Black Horse Pike), which is accessed via Turnpike Interchange 3, and Route 42. The third alternative would have been a combination of the first two alternatives, providing both a new Turnpike Interchange with connection to both Route 168 and Route 42. These alternatives were dismissed by NJTA due to major impacts to the built and natural environment of the area.

Additional alternatives were also conceptualized and studied, utilizing the basic footprint of some of the above alternatives as a model. Alignments were shifted to comply with federal and state design criteria, and to avoid and/or minimize impacts to the built and natural environment. The recommendations of the studies led to the development of a total of 26 initial alternatives. In order to reduce impacts to the community, most alignments were constricted to remain close to the existing highways.

The purpose and need prepared for the I-295/I-76/Route 42 Direct Connection project identified critical geometric, structural, and operational (level of service) deficiencies that affect safety, increase congestion and affect driver expectation when moving through the interchange. As described in the following section, 26 alternatives were generated through a collaborative effort similar to the one that resulted in the development and endorsement of the purpose and need to address these deficiencies. All 26 conceptual alternatives were viable concepts that met the purpose and need of the project. These 26 conceptual alternatives were subjected to a screening process with the objective of identifying feasible alternatives that satisfy the project need with minimal impact to the natural and built environment. Potential impacts that may result from these proposed alternatives were then studied further as part of the EIS process.

4.2 DESCRIPTION OF PROPOSED CONCEPTUAL ALTERNATIVES

The following section provides a summary description of the 26 conceptual alternatives for the I-295/I-76/Route 42 Direct Connection project.

4.2.1 Alternative A

Alternative A begins between Bell Road and the existing interchange with Route 168. Northbound and southbound I-295 are shifted north using a curve to the right with a radius of 1,400 feet (see **Figures 4.2-1 and 4.2-2**). This curve is followed by a 1,200-foot long tangent after which, the northbound and southbound roadways adjoin and curve to the left using a 1,400-foot radius. Within this curve, the roadway elevates to a third-level viaduct to cross over Browning Road and I-76/Route 42. A 600-foot tangent along the western or southbound side of I-76/Route 42 then follows. The alignment curves to the right with a 1,400-foot radius curve to meet the existing I-295 pavement north of the Creek Road overpass.

Ramp A would have a radius of 700 feet. The new Ramp D alignment would also have a radius of 700 feet. Southbound I-295 traffic heading to I-76/Route 42 would exit left from I-295 near Bell Road.

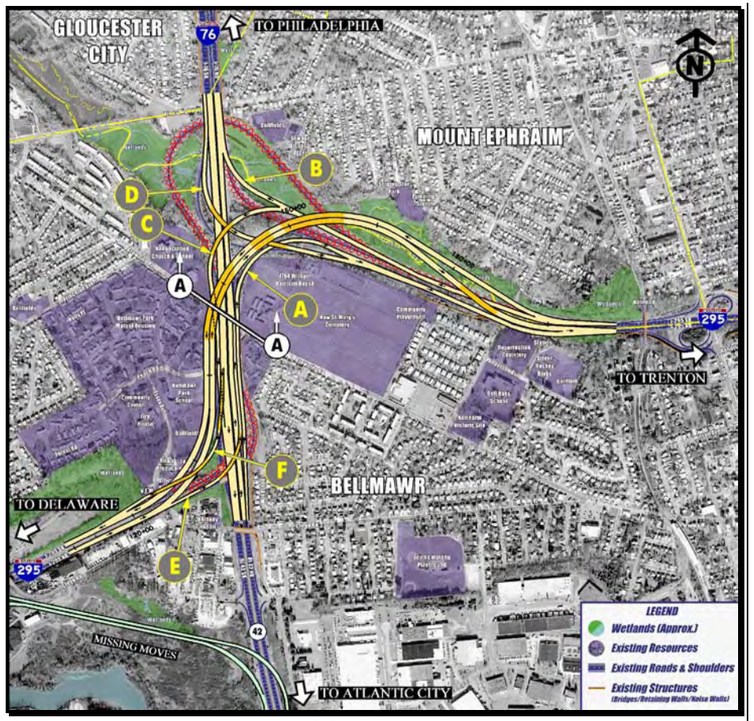


Figure 4.2-1: Alternative A

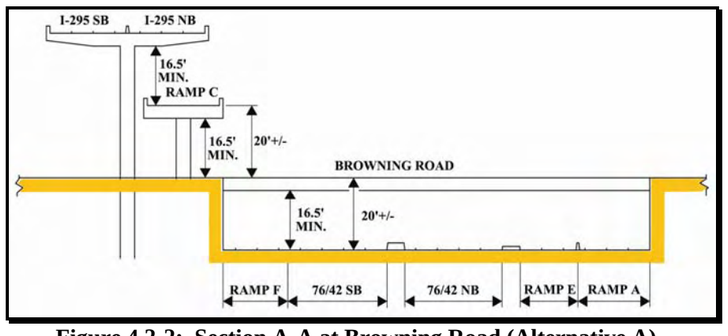


Figure 4.2-2: Section A-A at Browning Road (Alternative A)

Mainline I-295 would utilize a second-level viaduct to cross over Ramps B and C and Little Timber Creek. A third-level viaduct would be used to cross over Ramp D. The Bell Road Bridge would need to be reconstructed to accommodate the proposed improvements.

Vehicles on Route 42 whose destination is I-295 northbound, would exit on Ramp A, and be separated from, but parallel to Route 42. This ramp configuration, in conjunction with the new I-295 mainline alignment, eliminates the current substandard weaving condition at this location. Ramp A would cross under Browning Road and Ramp D and then join the Ramp D alignment. Ramp D is the move for I-76 southbound to I-295 northbound.

This ramp, after passing under I-295 northbound, would split with Ramp C to the left for Route 42 southbound and Ramp B on the right for I-76 northbound.

Ramp E would merge onto I-76 from I-295 northbound in a configuration similar to the existing except that the weaving traffic from Ramp A would be removed as explained above. For I-76 southbound traffic wishing to proceed north on I-295, Ramp D would exit to the right much the same as it currently does. This ramp would cross over I-76, under Ramp C, and over Ramp A before passing under I-295 to join Ramp A.

I-76 southbound traffic could utilize Ramp F to exit to I-295 southbound. This Ramp would cross over Ramp C and the I-295 mainline. Existing Ramp H would be eliminated.

4.2.2 Alternative A1

Alternative A1 is almost identical to Alternative A. The primary difference is the configuration of Ramps B and C (see **Figures 4.2-3 and 4.2-4**). Southbound I-295 traffic heading to I-76/Route 42 would exit left from I-295 near Bell Road. This ramp, after passing under I-295 northbound would split with Ramp C to the right for Route 42 southbound and Ramp B on the left for I-76 northbound. Ramp B would follow the existing Ramp B alignment. Ramp C would follow the existing Ramp C configuration underneath I-76 and then merge with Route 42 southbound. The substandard radius on the existing Ramp C is replaced with a 700-foot radius.

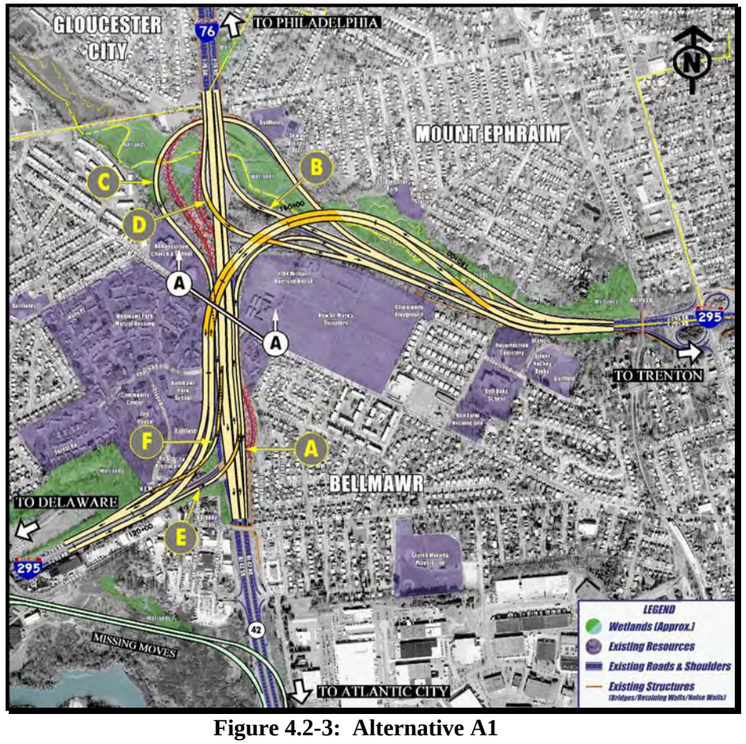


Figure 4.2-3: Alternative A1

4.2.3 Alternative A2

Alternative A2 is almost identical to Alternative A. The primary difference is the configuration of Ramps B and C (see **Figure 4.2-5**). Southbound I-295 traffic heading to I-76/Route 42 would exit right just before I-295 curves to the left. This ramp would split with Ramp C to the left for Route 42 southbound and Ramp B on the right for I-76 northbound. In Alternative A2, Ramp A/D will follow the configuration of the proposed I-295 and merge with I-295 northbound north of Bell Road.

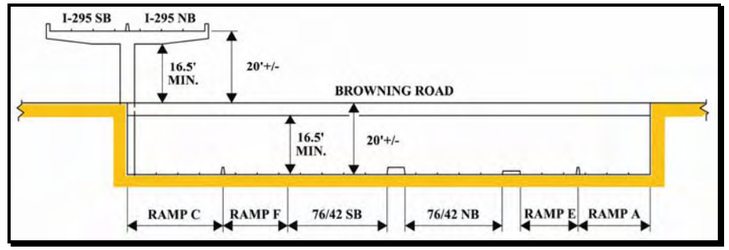


Figure 4.2-4: Section A-A at Browning Road (Alternative A1)

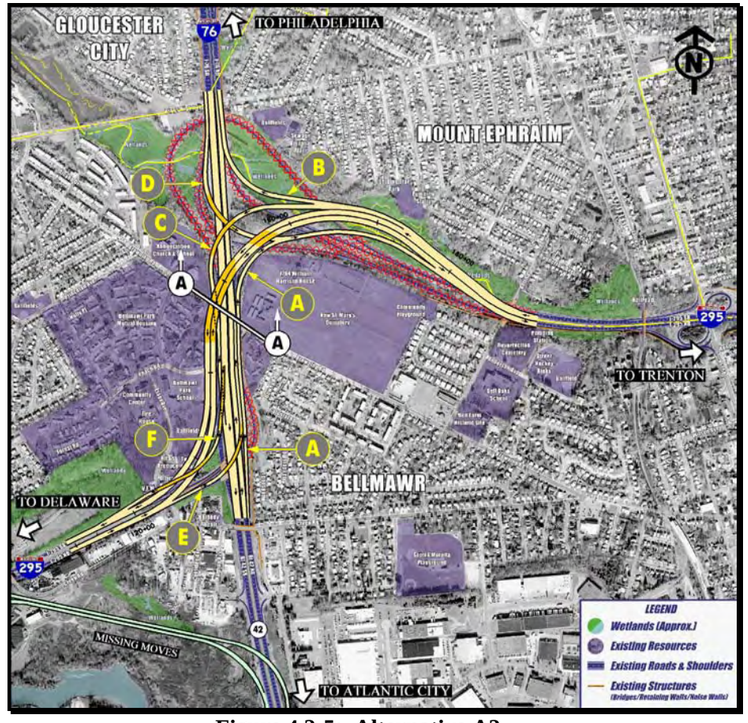


Figure 4.2-5: Alternative A2

4.2.4 Alternative B

Alternative B begins between Bell Road and the existing interchange with Route 168. Northbound and southbound I-295 are shifted north using a curve to the right with a radius of 1,400 feet (see **Figures 4.2-6 and 4.2-7**). The length and degree of curve is greater than for Alternative A. This curve is followed by a 600-foot long tangent and a curve to the left with a radius

of 700 feet after which, the roadway elevates that third-level viaduct to cross Ramps A and D. A 600-foot tangent along the eastern or northbound side of I-76/Route 42 follows with a second-level viaduct over Browning Road. The alignment then curves to the right with a 1,400-foot radius curve to meet the existing I-295 pavement north of the Creek Road overpass. This curve to the right crosses over Route 42 and Ramp E with a second-level viaduct. Mainline I-295 also utilizes a second-level viaduct to cross over Ramps B, C and Little Timber Creek. For this alternative, the structure carrying Bell Road over I-295 would need to be reconstructed to accommodate the proposed improvements.

Vehicles on Route 42, whose destination is I-295 northbound, would exit on Ramp A, which will be separated from but parallel to Route 42. This ramp configuration, in conjunction with the new I-295 mainline alignment, eliminates the current substandard weaving condition at this location. Ramp A would cross under I-295 mainline, Browning Road, Ramp D, and I-295 mainline again, before merging with Ramp D. Ramp D provides the move for I-76 southbound to I-295 northbound. Both Ramp A and Ramp D utilize a curve to the right with a radius of 700 feet. Southbound I-295 traffic heading to I-76/Route 42 would exit from I-295 near Bell Road and would follow the existing roadway alignment until the ramp passes under I-295 northbound. This ramp splits with Ramp C curving to the left for Route 42 southbound and the remaining Ramp B curves to the right for I-76 northbound.

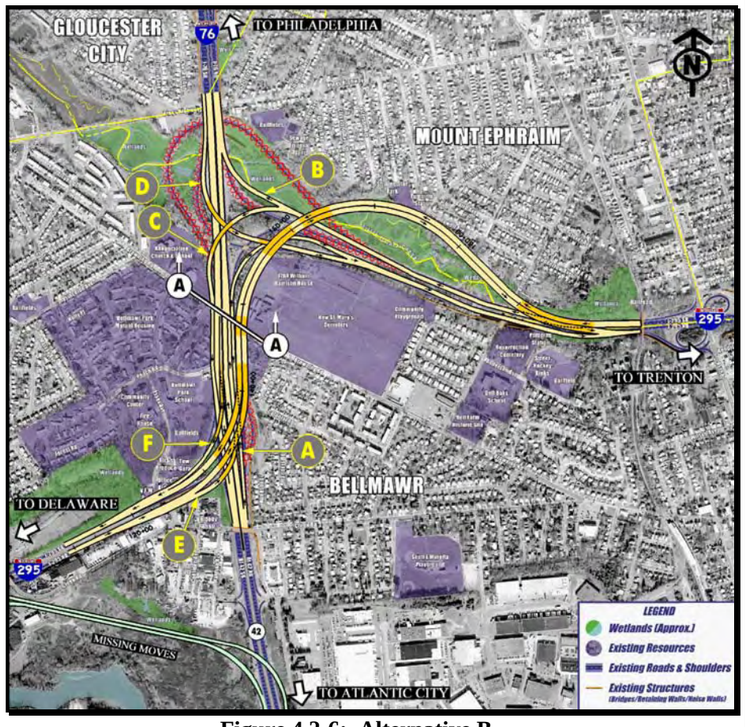


Figure 4.2-6: Alternative B

For I-76 southbound traffic wishing to proceed north on I-295, Ramp D would exit to the right much the same as it currently does. This ramp would cross over I-76 before passing under Ramp C. Ramp D would then pass over Ramp A but under I-295 prior to intersecting with Ramp A.

Ramp E will allow northbound I-295 traffic to proceed north on I-76. This ramp will follow much the same alignment as it does now. I-76 southbound traffic would utilize Ramp F to exit to I-295 southbound. This ramp would cross over Ramp C. The existing Ramp H would be eliminated.

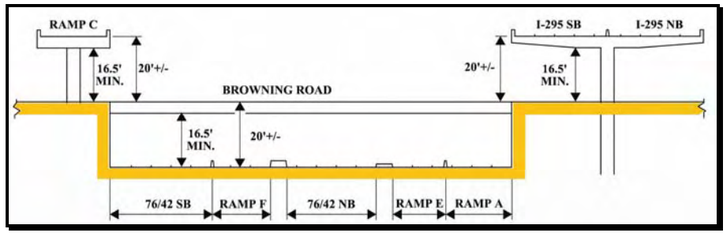


Figure 4.2-7: Section A-A at Browning Road (Alternative B)

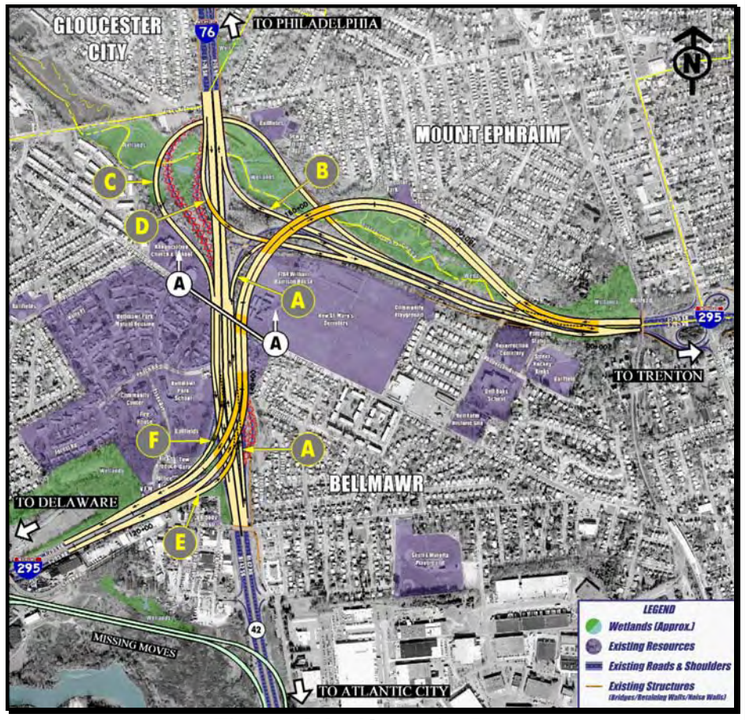


Figure 4.2-8: Alternative B1

4.2.5 Alternative B1

Alternative B1 is almost identical to Alternative B. The primary difference is the configuration of Ramps B and C (see **Figures 4.2-8 and 4.2-9**). Southbound I-295 traffic heading to I-76/Route 42 would exit left from I-295 near Bell Road. This ramp, after passing under I-295 northbound would split with Ramp C to the right for Route 42 southbound and Ramp B on the left for I-76 northbound. Ramp B would follow the existing Ramp B alignment. Ramp C would follow the existing Ramp C configuration underneath I-76 and then merge with Route 42 southbound. The substandard radius on the existing Ramp C is replaced with a 700-foot radius.

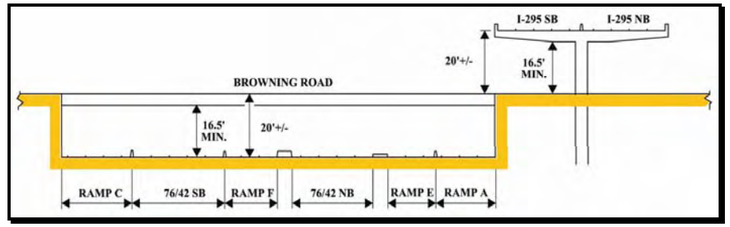


Figure 4.2-9: Section A-A at Browning Road (Alternative B1)

4.2.6 Alternative B2

Alternative B2 is almost identical to Alternative B. The primary difference is the configuration of Ramps B and C (see **Figure 4.2-10**). Southbound I-295 traffic heading to I-76/Route 42 would exit right just before I-295 curves to the left. This ramp would split with Ramp C to the left for Route 42 southbound and Ramp B on the right for I-76 northbound. In Alternative B2, Ramp A/D will follow the configuration of the proposed I-295 and merge with I-295 northbound north of Bell Road.

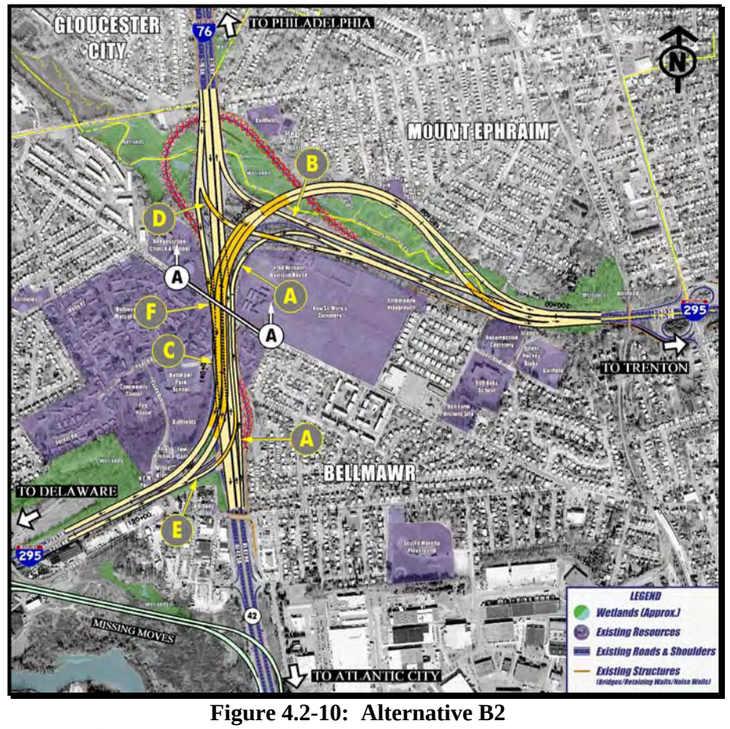


Figure 4.2-10: Alternative B2

4.2.7 Alternative C

Alternative C begins between Bell Road and the interchange with Route 168 (see **Figures 4.2-11 and 4.2-12**). The northbound and southbound lanes of I-295 split and shift north using a curve to the right of 1,400 feet.

Tangent lengths of 990 feet and 630 feet for southbound and northbound lanes, respectively, follow. The alignment converges together and curves to the left again using a 1,400-foot radius. A 1,000-foot long tangent follows, which is located above the centerline of I-76/Route 42 on a viaduct section down the median of Route 42/I-76. Afterward, the alignment curves to the right with a 1,400-foot radius to meet the I-295 pavement north of the Creek Road overpass.

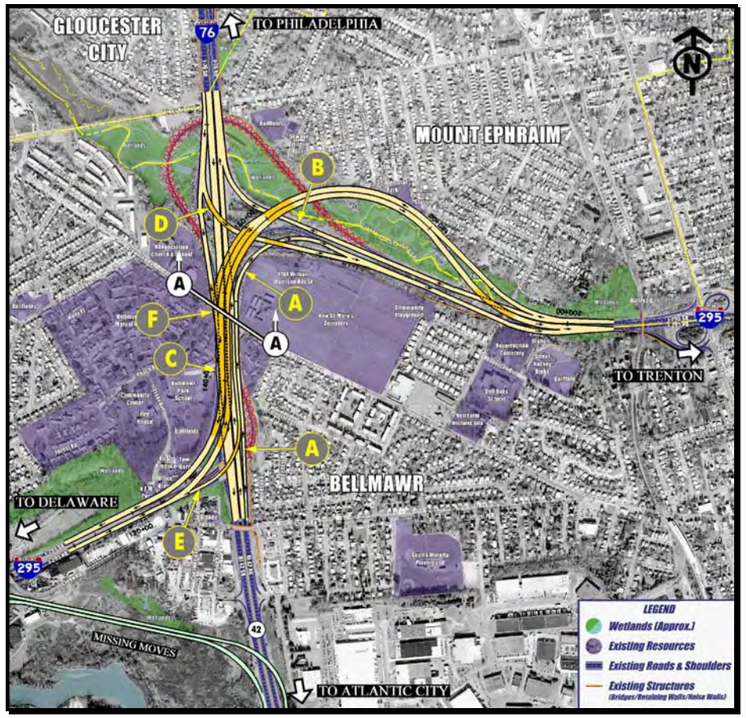


Figure 4.2-11: Alternative C

Vehicles on Route 42 whose destination is I-295 northbound, would exit on Ramp A which will be separated from, but parallel with, Route 42. This ramp configuration, in conjunction with the new I-295 mainline alignment, eliminates the current substandard weaving condition at this location. Ramp A would cross under Browning Road and Ramp D and join the Ramp D alignment. Ramp D is the move for I-76 southbound to I-295 northbound. Ramp A would have a radius of 700 feet.

Vehicles on I-295 southbound would exit on Ramp B for I-76 northbound. Ramp B exits to the left north of Bell Road and passes under the I-295 northbound roadway. Ramp B then follows its existing alignment to I-76 northbound.

Traffic on southbound I-295 proceeding to southbound Route 42 would utilize Ramp C. Ramp C exits to the right from the I-295 alignment above Ramp D and then drops down to pass under Ramp F.

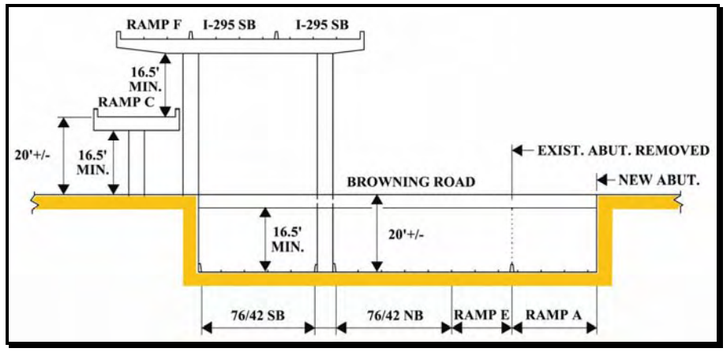


Figure 4.2-12: Section A-A at Browning Road (Alternative C)

Ramp D would provide the I-76 southbound to I-295 northbound move with a second-level viaduct over I-76/Route 42, under I-295, and over Ramp A. Ramp D would exit to the right in much the same location as it does now and then curve to the left with a radius of 700 feet. After Ramp D crosses over Ramp A, these ramps merge and follow the existing northbound I-295 alignment.

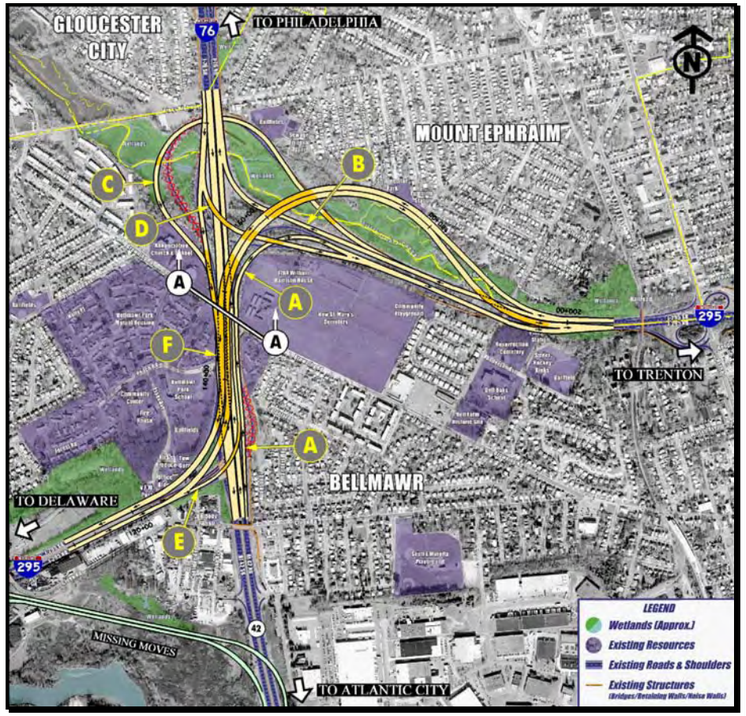


Figure 4.2-13: Alternative C1

The merged ramps cross under Bell Road and intersect with I-295 north of the Route 168 interchange. Northbound I-295 traffic heading north on I-76 will utilize Ramp E which follows essentially the same alignment as it does now. Ramp F provides the movement from I-76 southbound to I-295 southbound. Traffic will exit I-76 on Ramp D and will parallel I-76 until Ramp D curves to the left to cross I-76. Ramp F traffic will split to the right and cross over Ramp C and Browning Road to enter I-295 above Browning Road.

4.2.8 Alternative C1

Alternative C1 is almost identical to Alternative C. The primary difference is the configuration of Ramps B and C (see **Figure 4.2-13**). Vehicles on I-295 southbound would exit on Ramp B for I-76 northbound. Ramp B exits to the left north of Bell Road and passes under the I-295 northbound roadway. This ramp would split with Ramp B to the left and Ramp C to the right. Ramp B then follows its existing alignment to I-76 northbound. Ramp C would follow the existing Ramp C configuration underneath I-76 and then merge with Route 42 southbound. The substandard radius on the existing Ramp C is replaced with a 700-foot radius.

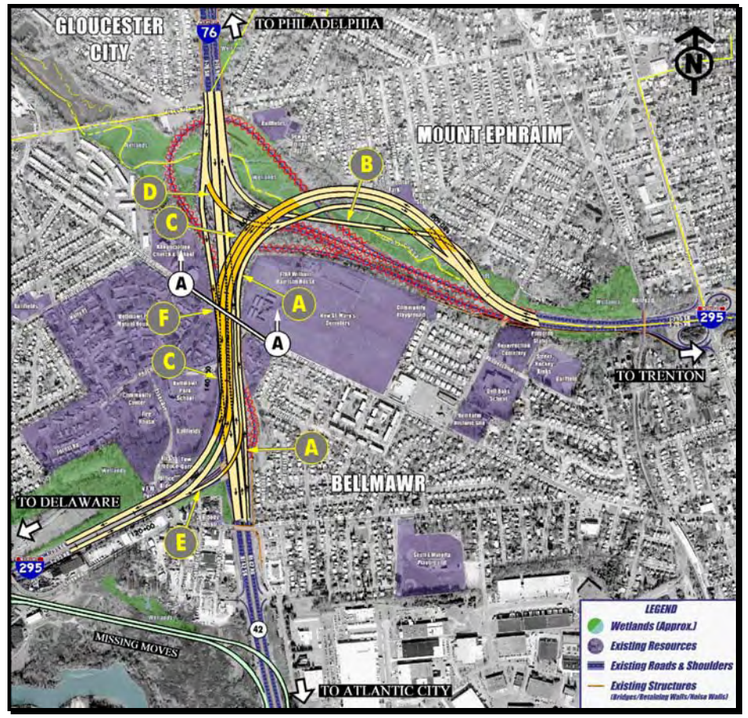


Figure 4.2-14: Alternative C2

4.2.9 Alternative C2

Alternative C2 begins between Bell Road and the interchange with Route 168 (see **Figure 4.2-14**). The northbound and southbound lanes of I-295 shift north using a curve to the right of 1,400 feet. Tangent lengths of 630 feet for southbound and northbound lanes follow. The alignment then curves to the left again, using a 1,400-foot radius. A 1,000-foot-long tangent follows, which is located above the centerline of I-76/Route 42 on a viaduct section down the median of Route 42/I-76. Afterward, the alignment curves to the right with a 1,400-foot radius to meet the I-295 pavement north of the Creek Road overpass.

The remaining configuration of Alternative C2 is almost identical to Alternative C. The primary difference is the configuration of Ramps B and D. Vehicles on I-295 southbound would exit on Ramp B for I-76 northbound. Ramp B exits to the right, north of Bell Road, and passes under the I-295 northbound roadway. Ramp B then follows its existing alignment to I-76 northbound. Ramp D would provide the I-76 southbound to I-295 northbound move with a second-level viaduct over I-76/Route 42. Ramp D would exit to the right in much the same location as it does now and then curve to the left with a radius of 700 feet. After Ramp D crosses under I-295 it merges with Ramp A and follows the I-295 alignment. The merged ramps intersect with I-295 north of Bell Road.

4.2.10 Alternative D

Alternative D begins between Bell Road and the interchange with Route 168 (see **Figures 4.2-15 and 4.2-16**). Mainline I-295 shifts slightly north using a curve to the right and a radius 2,000 feet. This curve is followed by a 630-foot-long tangent. The roadway curves to the left with a 1,400-foot radius and elevates to cross over Ramps A and D, and to a third-level viaduct over Browning Road and Route 42. A tangent length of 770 feet crosses over Ramp C as a second-level viaduct before the alignment curves to the right again with a 1,400-foot radius to meet the I-295 pavement north of Creek Road overpass. The I-295 Alternative D alignment crosses I-76/Route 42 at a skew through an unused area of New St. Mary's Cemetery.

Vehicles on northbound Route 42, whose destination is I-295 northbound, would exit on Ramp A which will be separated from, but parallel with, Route 42. This ramp configuration, in conjunction with the new I-295 mainline alignment, eliminates the current substandard weaving condition with Ramp E at this location. Ramp A would cross under I-295, Browning Road and Ramp D before joining the Ramp D alignment.

Ramp B will provide the movement from southbound I-295 to northbound I-76. Ramp C will provide the movement from southbound I-295 to southbound I-76/Route 42. Ramp B and Ramp C will exit from I-295 from the right at about the point that mainline I-295 curves to the left. Ramp B will then diverge to the right and follow its existing alignment to meet I-76 northbound. Ramp C will split to the left and cross over Ramp D and I-76 with a 700-foot radius curve to the left. Ramp C will then pass under I-295 and Ramp E to connect with Route 42 just north of the Creek Road Bridge.

Ramp D is the move for I-76 southbound to I-295 northbound. Ramp D would exit I-76 in much the same way that it does now. The Ramp D alignment would have a radius of 700 feet and would cross over I-76, under Ramp C, over Ramp A and under I-295 before merging with Ramp A. Ramp A and Ramp D would then follow the existing alignment of I-295 to merge with the I-295 mainline north of Bell Road.

Northbound I-295 traffic heading north on I-76 will utilize Ramp E, which follows essentially the same alignment as it does now.

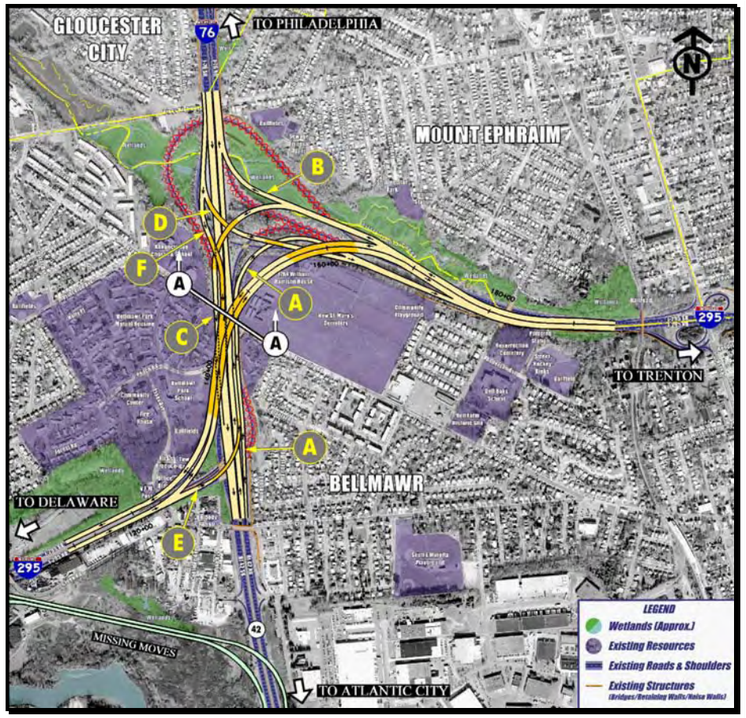


Figure 4.2-15: Alternative D

4.2.11 Alternative D1

Alternative D1 is almost identical to Alternative D. The primary difference is the configuration of Ramps B and C (see **Figure 4.2-17**). Ramp B will provide the movement from southbound I-295 to northbound I-76. Ramp C will provide the movement from southbound I-295 to southbound I-76/Route 42. Ramp B and Ramp C will exit from I-295 from the right at about the point that mainline I-295 curves to the left. Ramp B will then diverge to the left and follow its existing alignment to meet I-76 northbound.

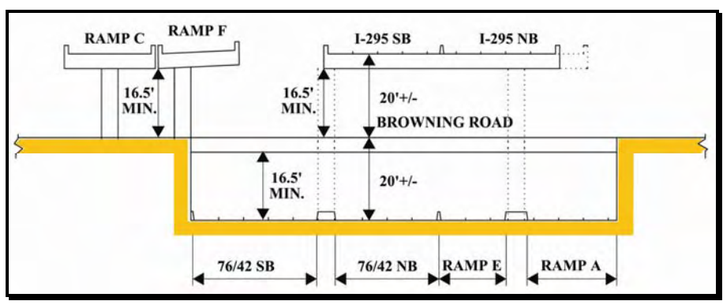


Figure 4.2-16: Section A-A at Browning Road (Alternative D)

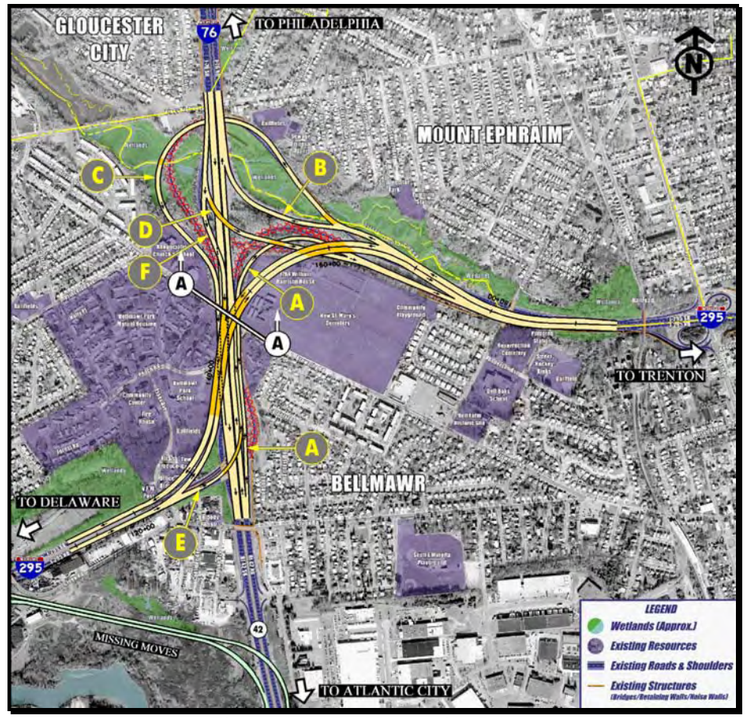


Figure 4.2-17: Alternative D1

Ramp C will split to the right. Ramp C would follow the existing Ramp C configuration underneath I-76 and then merge with Route 42 southbound. The substandard radius on the existing Ramp C is replaced with a 700-foot radius.

4.2.12 Alternative E

Alternative E begins between Bell Road and the interchange with Route 168 (see **Figure 4.2-18**). The northbound and southbound lanes of I-295 are adjacent to each other and follow the most direct route. A curve to the left with a radius of 2,000 feet begins north of Bell Road. This curve is followed by a tangent alignment that extends directly to meet the existing I-295 alignment just north of the Creek Road Bridge. Due to the lack of reversing curves, this alignment could have a posted speed limit of 65 mph instead of the 55 mph limit for all of the other alternatives.

Vehicles on Route 42 whose destination is I-295 northbound, would exit on Ramp A which will be separated from, but parallel with, Route 42. Ramp A would cross under I-295, Browning Road and Ramp D before joining the Ramp D alignment. Curve radii on Ramp A are 700 feet. From southbound I-295, the exits for Route 42 south and I-76 north use the existing alignment of I-295.

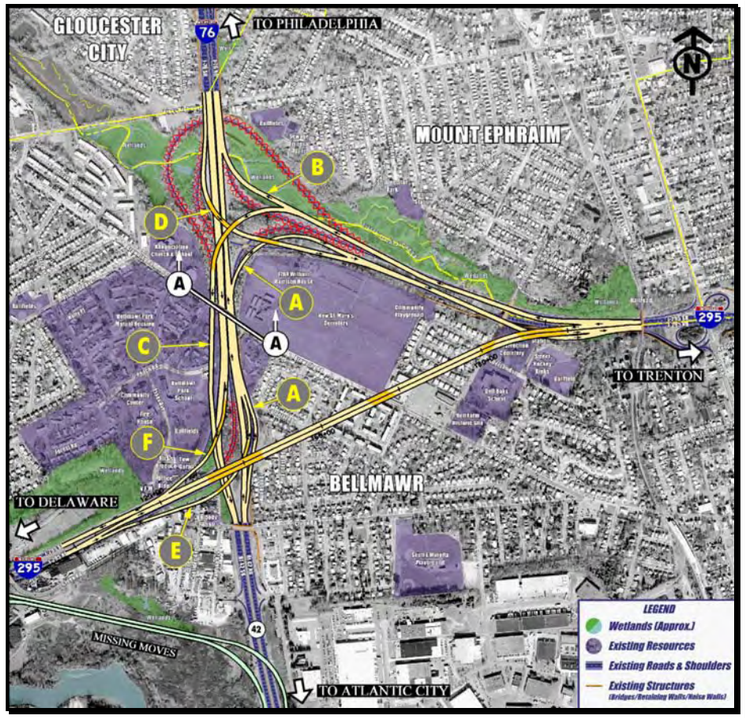


Figure 4.2-18: Alternative E

In the southbound direction Ramps B and C would be combined until they diverge before I-76. Ramp B curves to the right with a radius of 700 feet to meet I-76 northbound near Kings Highway. Ramp C curves to the left using a 700-foot radius curve which crosses over Ramp D and I-76 before a tangent section parallels I-76/Route 42. Ramp C would pass over Browning Road and under Ramp F, I-295, and Ramp E.

Ramp D is the move for I-76 southbound to I-295 northbound. Ramp D would begin and end in locations similar to its existing termini. The Ramp D alignment would have a radius of 700 feet and would cross over I-76, under Ramp C and over Ramp A. Both Ramps A and D merge before connecting with I-295 between Bell Road and the interchange with Route 168.

Northbound I-295 traffic heading north on I-76 will utilize Ramp E, which follows essentially the same alignment as it does now.

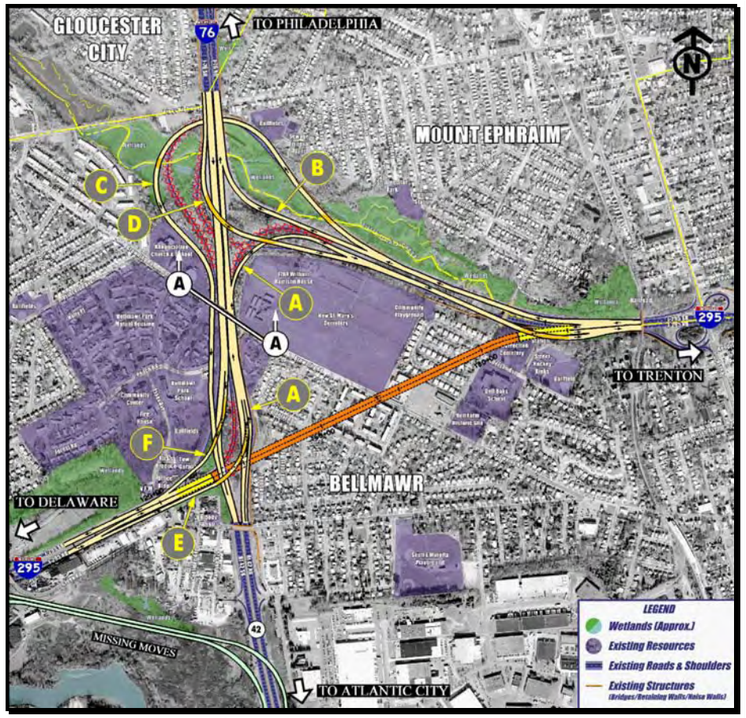


Figure 4.2-19: Alternative E2

The I-76 southbound to I-295 southbound move is Ramp F. Ramp F follows close to its existing alignment and elevates over Ramp C before connecting to I-295 southbound north of the Creek Road Bridge.

4.2.13 Alternative E2

Alternative E2 is almost identical to Alternative E. The primary difference is the configuration of Ramps B and C, and the use of a tunnel for I-295 (see **Figure 4.2-19**). From southbound I-295 the exits for Route 42 south and I-76 north use the existing alignment of I-295. In the southbound direction, Ramps B and C would be combined until they diverge before I-76. Ramp B splits to the left and then curves right with a radius of 700 feet to meet I-76 northbound near Kings Highway. Ramp C splits to the right and would follow the existing Ramp C configuration underneath I-76 and then merge with Route 42 southbound. The substandard radius on the existing Ramp C is replaced with a 700-foot radius.

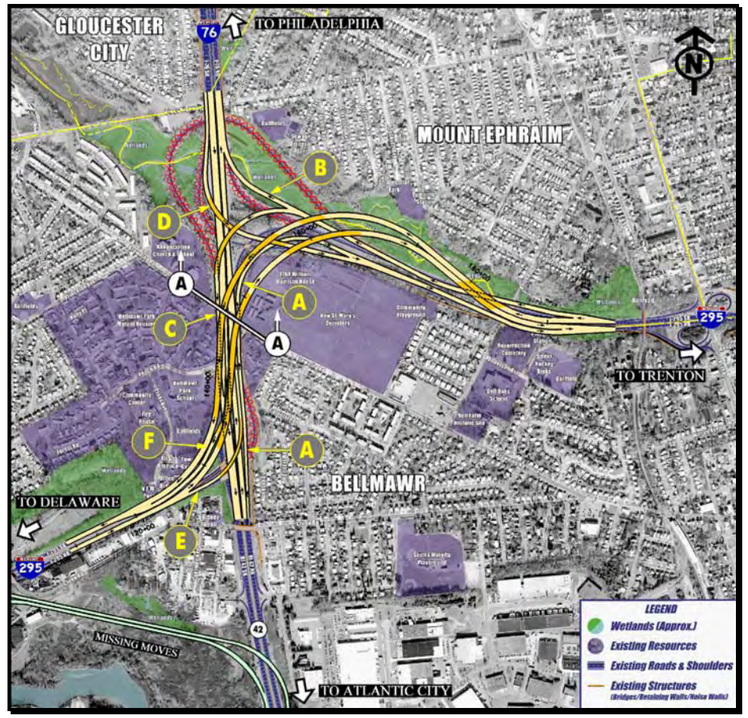


Figure 4.2-20: Alternative F

4.2.14 Alternative F

Alternative F begins between Bell Road and the interchange with Route 168 (see **Figures 4.2-20 and 4.2-21**). The northbound and southbound lanes of I-295 adjoin and shift north using a curve with a radius of 1,400 feet. This curve is followed by a 920-foot-long tangent after which the alignment diverges for the northbound and southbound lanes. The northbound and southbound alignments curve to the left using a radius of 1,400 feet. The roadway is elevated throughout this section to cross over various ramp moves as well as I-76/Route 42 and Browning Road. The I-295 northbound and southbound alignments continue with tangent lengths of 812 feet and 760 feet, respectively. This alternative allows the northbound roadway to align along the east side of Route 42 and the southbound roadway to align along the west side of Route 42. The alignment then continues with a curve to the right using a 1,400-foot radius to meet existing I-295 north of the Creek Road Bridge. I-295 southbound and, to a lesser degree northbound, will be a third-level viaduct over Browning Road and Ramps A and D.

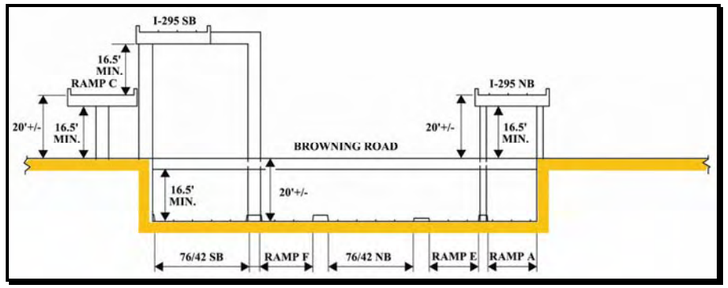


Figure 4.2-21: Section A-A at Browning Road (Alternative F)

Vehicles on Route 42 whose destination is I-295 northbound, would exit on Ramp A which will be separated from, but parallel with, Route 42. Ramp A would cross under northbound and southbound I-295, Browning Road, and Ramp D before joining the Ramp D alignment. Curves on Ramp A have a 700-foot radius.

From southbound I-295, the exits for Route 42 south and I-76 north use the existing alignment of I-295. In the southbound direction, Ramps B and C would be combined until they diverge before I-76. Ramp B curves to the right with a radius of 700 feet to meet I-76 northbound near its current location. Ramp C curves to the left using a 700-foot radius curve which crosses over Ramp D and I-76 before a tangent section parallels I-76/Route 42. Ramp C would pass under Browning Road and under Ramp F, northbound and southbound I-295, and Ramp E.

Ramp D is the move for I-76 southbound to I-295 northbound. Ramp D would begin and end in locations similar to its existing termini. The Ramp D alignment would have a radius of 700 feet and would cross over I-76, under Ramp C, over Ramp A and under I-295 northbound and southbound. Both Ramps A and D merge together before connecting with I-295 north of Bell Road.

Northbound I-295 traffic heading north on I-76 will utilize Ramp E which follows essentially the same alignment as it does now.

The I-76 southbound to I-295 southbound move is Ramp F. Ramp F follows close to its existing alignment and elevates over Ramp C before connecting to I-295 southbound north of the Creek Road Bridge. Ramp F will utilize a left hand entrance onto I-295.

4.2.15 Alternative F1

Alternative F1 is almost identical to Alternative F. The primary difference is the configuration of Ramps B and C (see **Figures 4.2-22 and 4.2-23**). From southbound I-295 the exits for Route 42 south and I-76 north use the existing alignment of I-295. In the southbound direction Ramps B and C would be combined until they diverge before I-76. Ramp B splits to the left

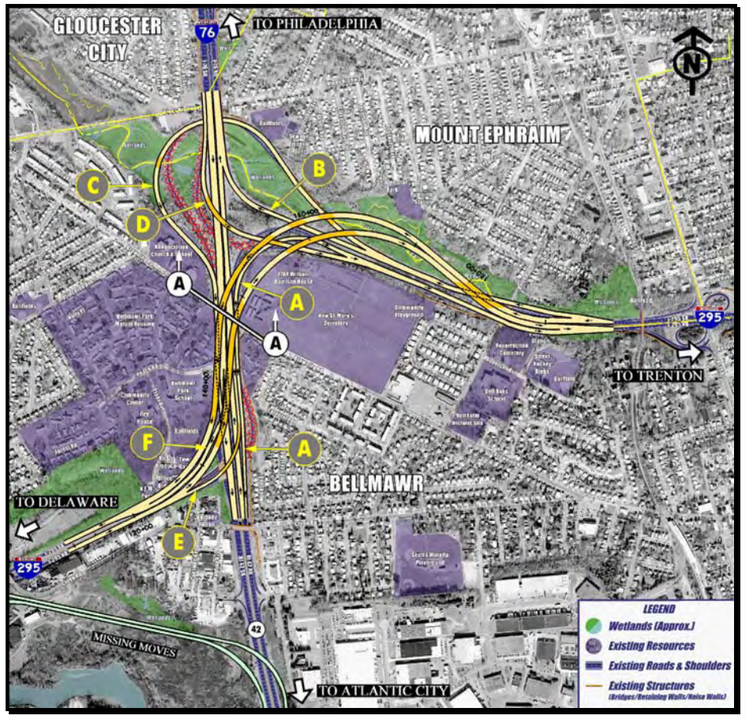


Figure 4.2-22: Alternative F1

and then curves right with a radius of 700 feet to meet I-76 northbound near Kings Highway. Ramp C splits to the right and would follow the existing Ramp C configuration underneath I-76 and then merge with Route 42 southbound. The substandard radius on the existing Ramp C is replaced with a 700-foot radius.

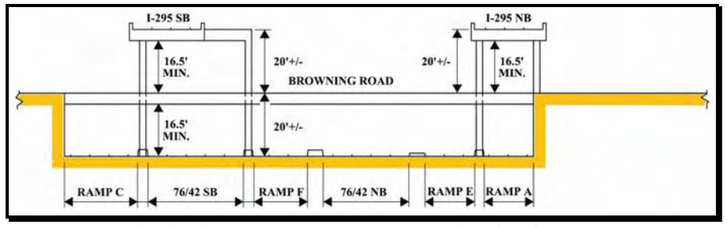


Figure 4.2-23: Section A-A at Browning Road (Alternative F1)

4.2.16 Alternative F2

Alternative F2 is almost identical to Alternative F. From southbound I-295 the exits for Route 42 south and I-76 north are to the right, north of Bell Road (see **Figure 4.2-24**). Ramps B and C would be combined until they diverge before I-76. Ramp B curves to the right with a radius of 700 feet to meet I-76 northbound near its current location. Ramp C curves to the left using a 700-foot radius curve which crosses over Ramp D and I-76 before a tangent section parallels I-76/Route 42. Ramp C would pass over Browning Road and under Ramp F, northbound and southbound I-295 and Ramp E.

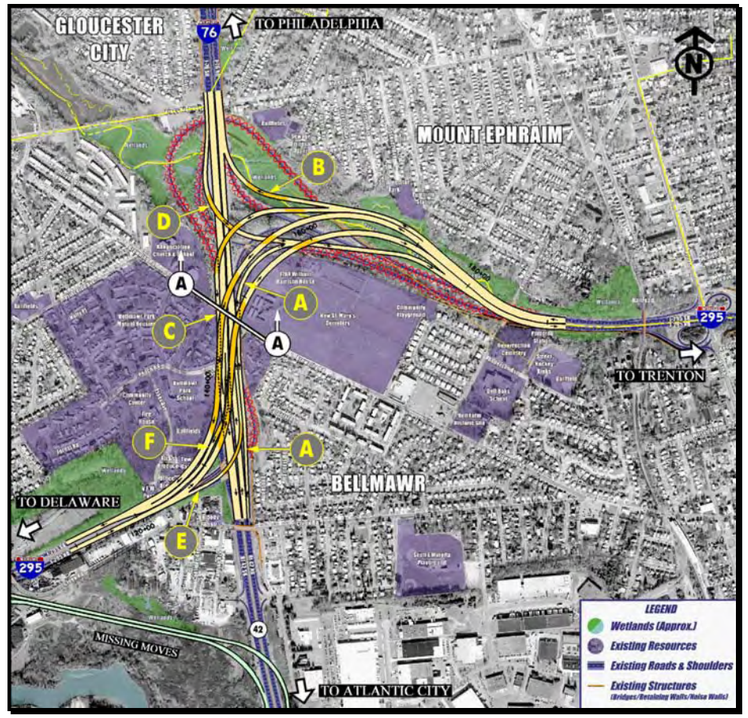


Figure 4.2-24: Alternative F2

In Alternative F2, Ramp A/D will follow the configuration of the proposed I-295 northbound alignment and merge with I-295 northbound north of Bell Road.

4.2.17 Alternative G

Alternative G begins between Bell Road and the interchange with Route 168 (see **Figures 4.2-25 and 26**). The northbound and southbound lanes of I-295 align over top of each other as an over and under viaduct and shift north using a curve to the right of radius 2,000 feet followed by a 670-foot-long tangent. The northbound and southbound alignments converge with the northbound over the southbound alignment. The I-295 viaduct alignment then curves to the left using a radius of 1,400 feet. The roadway is elevated throughout this section of alignment to cross over all of the ramps as well as I-76 and Browning Road. The I-295 alignment crosses over I-76 on a skewed alignment with a tangent length of 1,200 feet. The alignment then continues with a curve to the right using a 1,400-foot radius to diverge and lower in elevation to meet the existing I-295 pavement north of the Creek Road Bridge. I-295 northbound will be a fourth-level viaduct and southbound will be a third-level viaduct for the Route 42, Ramps A, E, F, and Browning Road crossings. Ramp A and Ramp D would be reconstructed to increase the curve radius to 700 feet. Vehicles on Route 42 whose destination is I-295 northbound, would exit on Ramp A which will be separated but parallel with Route 42.

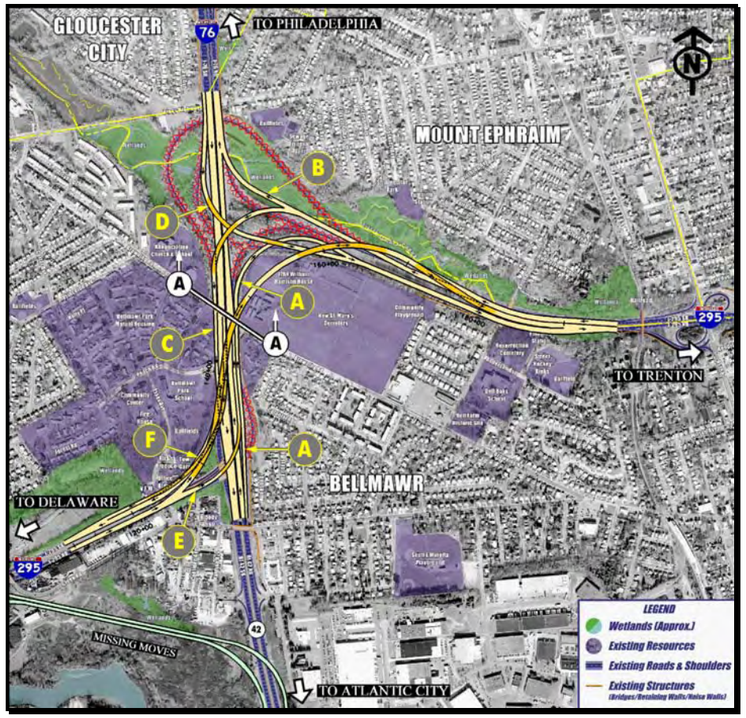


Figure 4.2-25: Alternative G

Ramp A would cross under northbound and southbound I-295, Browning Road and Ramp D before joining the Ramp D alignment.

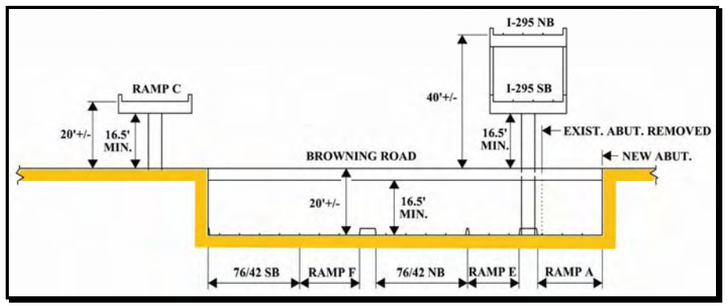


Figure 4.2-26: Section A-A at Browning Road (Alternative G)

From southbound I-295, the exits for Route 42 south and I-76 north use the existing alignment of I-295. In the southbound direction Ramps B and C would be combined until they diverge before I-76. Ramp B curves to the right with a radius of 700 feet to meet I-76 northbound near its current location. Ramp C curves to the left using a 700-foot radius curve which crosses over Ramp D and I-76 before a tangent section parallels I-76/Route 42. Ramp C would pass under Browning Road and under Ramp F, northbound and southbound I-295, and Ramp E.

Ramp D is the move for I-76 southbound to I-295 northbound. Ramp D would follow an alignment similar to its current alignment. The Ramp D alignment would cross over I-76, under Ramp C, over Ramp A and under I-295 northbound and southbound. Both Ramps A and D merge together before connecting with I-295 south of Bell Road.

Northbound I-295 traffic heading north on I-76 will utilize Ramp E which follows essentially the same alignment as it does now. Ramp E would have a curve with a 700-foot radius.

The I-76 southbound to I-295 southbound move is Ramp F. Ramp F follows close to its existing alignment and elevates over Ramp C before connecting to I-295 southbound north of the Creek Road Bridge.

4.2.18 Alternative G1

Alternative G1 is almost identical to Alternative G. The primary difference is the configuration of Ramps B and C (see **Figure 4.2-27**). From southbound I-295 the exits for Route 42 south and I-76 north use the existing alignment of I-295. In the southbound direction Ramps B and C would be combined until they diverge before I-76. Ramp B splits to the left and then curves right with a radius of 700 feet to meet I-76 northbound near Kings Highway. Ramp C splits to the right and would follow the existing Ramp C configuration underneath I-76 and then merge with Route 42 southbound. The substandard radius on the existing Ramp C is replaced with a 700-foot radius.

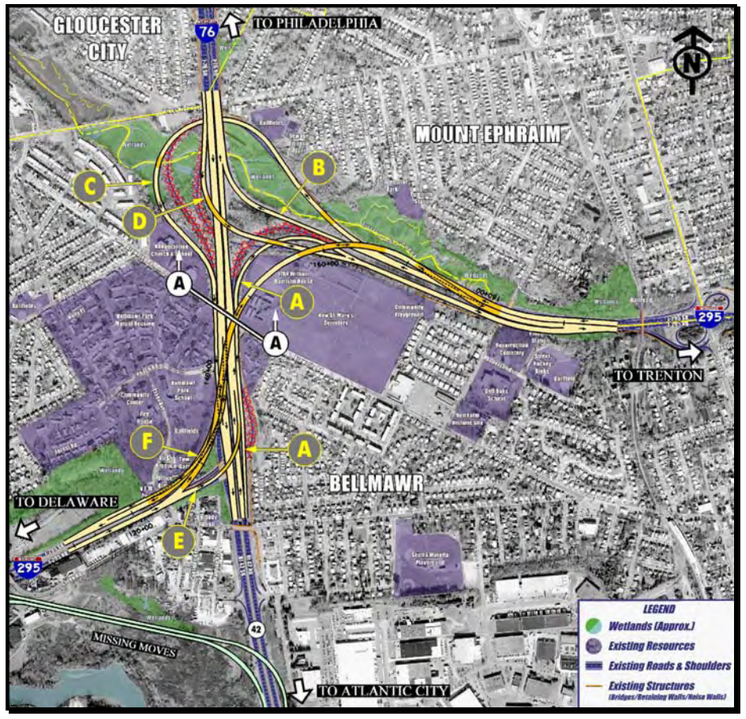


Figure 4.2-27: Alternative G1

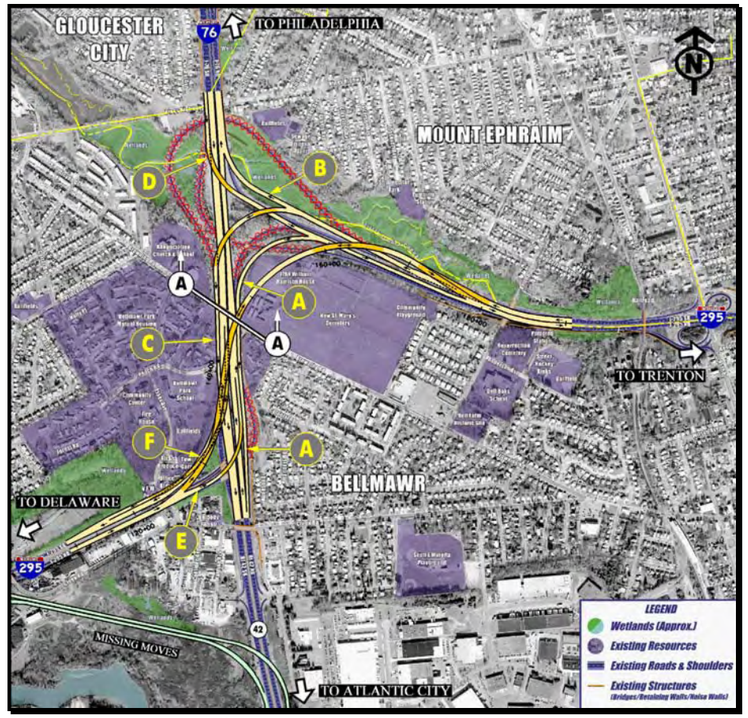


Figure 4.2-28: Alternative G2

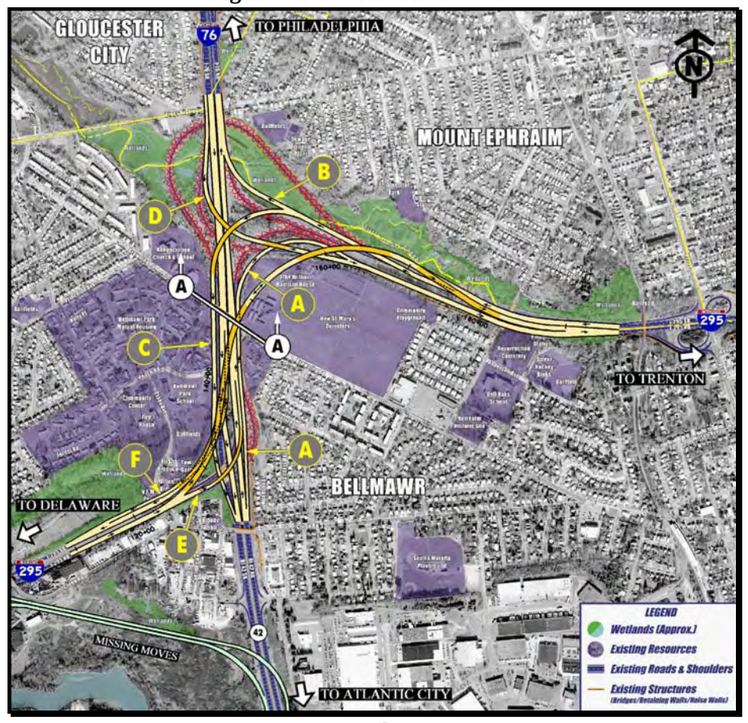


Figure 4.2-29: Alternative H

4.2.19 Alternative G2

Alternative G2 is almost identical to Alternative G. The primary difference is the configuration of Ramps A and D (see **Figure 4.2-28**). Vehicles on Route 42 whose destination is I-295 northbound, would exit on Ramp A which will be separated from, but parallel to Route 42. Ramp A would cross under northbound and southbound I-295, Browning Road, and the Ramp D alignment. Ramp D would follow an alignment similar to its current alignment. The Ramp D alignment would cross over I-76, under Ramp C, and under I-295 northbound and southbound. Both Ramps A and D merge before connecting with I-295 north of Bell Road.

4.2.20 Alternative H

Alternative H is almost identical to Alternative G. The primary difference between the alternatives is the configuration of Ramps B and C (see **Figure 4.2-29**). Traffic to these ramps would follow the existing southbound I-295 alignment. Ramp B would be essentially identical to its current configuration except that a 700-foot radius curve would be used to improve geometrics. Instead of the diverge proposed in Alternative G, a right hand exit would be utilized for Ramp C. Ramp C elevates over Ramp B, Ramp D, I-76 and Browning Road. Ramp C crosses under I-295 northbound and southbound and under Ramp E before connecting with Route 42.

In general, other mainline and ramp configurations remain the same as in Alternative G.

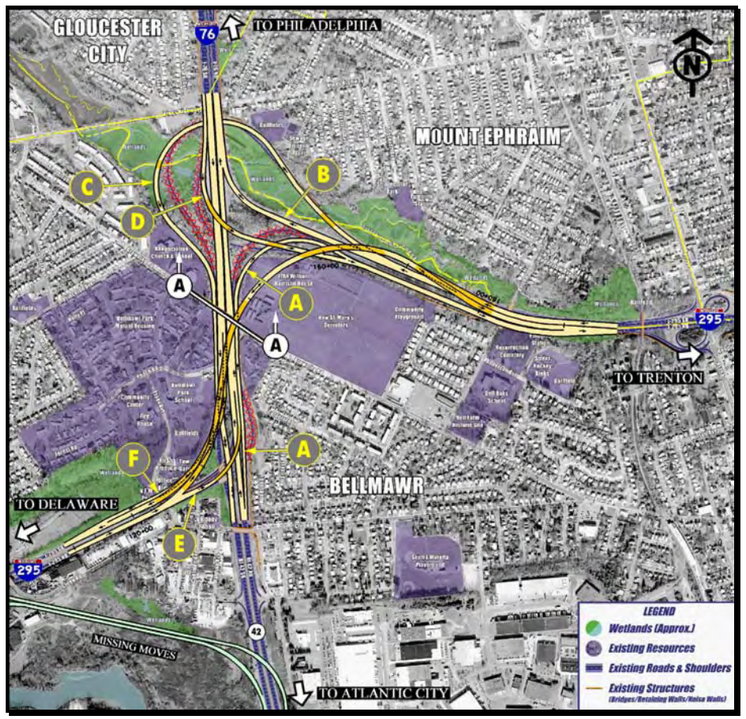


Figure 4.2-30: Alternative H1

4.2.21 Alternative H1

Alternative H1 is almost identical to Alternative H. The primary difference is the configuration of Ramps B and C (see **Figures 4.2-30 and 4.2-31**). From southbound I-295 the exits for Route 42 south and I-76 north use the existing alignment of I-295. In the southbound direction Ramps B and C would be combined until they diverge before I-76. Ramp B splits to the left and then curves right with a radius of 700 feet to meet I-76 northbound near Kings Highway. Ramp C splits to the right and would follow the existing Ramp C configuration underneath I-76 and then merge with Route 42 southbound. The substandard radius on the existing Ramp C is replaced with a 700-foot radius.

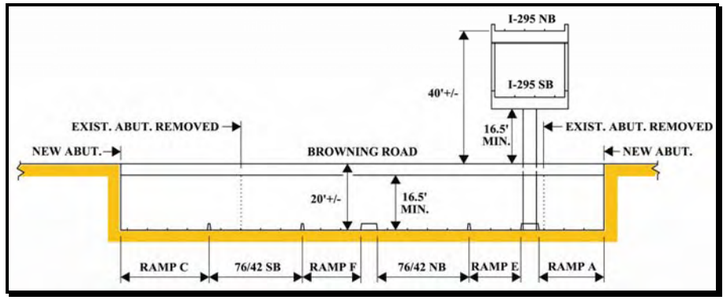


Figure 4.2-31: Section A-A at Browning Road (Alternative H1)

4.2.22 Alternative I

Alternative I is a modified form of Alternative E. This alternative primarily provides I-295 as a continuous direct-through alignment which crosses the New St. Mary's Cemetery (see **Figures 4.2-32 and 4.2-33**).

Alternative I begins just south of Bell Road. Northbound and southbound lanes of I-295 adjoin and curve to the left using a radius of 1,400 feet traversing the cemetery. This curve is followed by a tangent length of 1,100 feet followed by a 1,450-foot radius curve that extends directly from I-295 just north of the Creek Road Bridge.

Vehicles on Route 42 whose destination is I-295 northbound, would exit on Ramp A which will be separated but parallel with Route 42. Ramp A would cross under I-295, Browning Road and Ramp D before joining the Ramp D alignment. Curve radii on Ramp A are 700 feet.

From southbound I-295 the exits for Route 42 south and I-76 north use the existing alignment of I-295. In the southbound direction Ramps B and C would be combined until they diverge before I-76. Ramp B curves to the right with a radius of 700 feet to meet I-76 northbound near Kings Highway. Ramp C curves to the left using a 700-foot radius curve which crosses over Ramp D and I-76 before a tangent section parallels I-76/Route42. Ramp C would pass under Browning Road, Ramp F, I-295, and Ramp E.

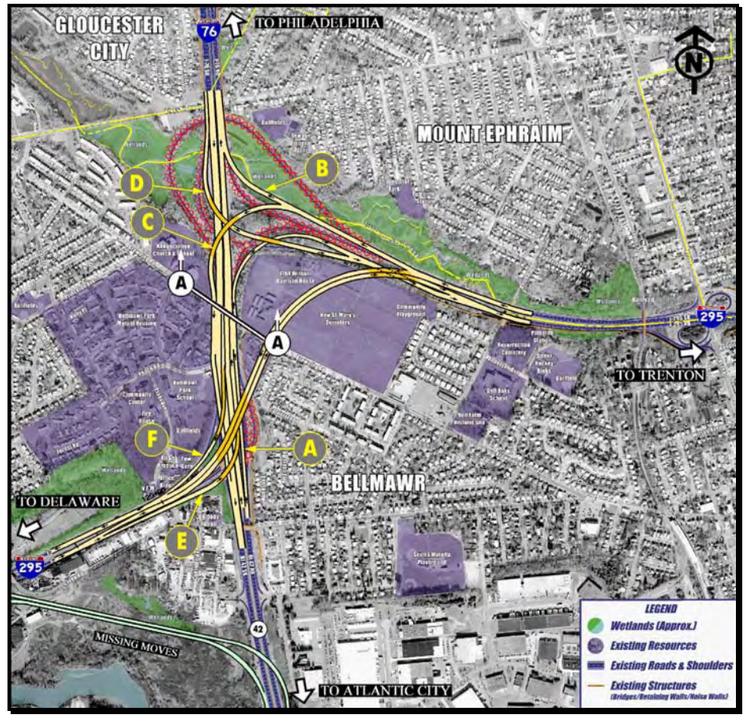


Figure 4.2-32: Alternative I

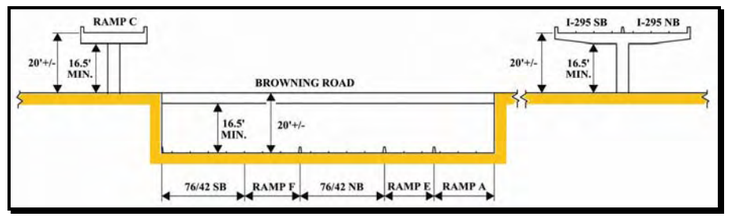


Figure 4.2-33: Section A-A at Browning Road (Alternative I)

Ramp D is the move for I-76 southbound to I-295 northbound. Ramp D would begin and end in locations similar to its existing termini. The Ramp D alignment would have a radius of 700 feet and would cross over I-76, under Ramp C and over Ramp A. Ramps A and D merge before connecting with I-295 north of Bell Road.

Northbound I-295 traffic heading north on I-76 will utilize Ramp E which follows essentially the same alignment as it does now. The I-76 southbound to I-295 southbound move is Ramp F. Ramp F follows close to its existing alignment and elevates over Ramp C before connecting to I-295 southbound north of the Creek Road Bridge.

4.2.23 Alternative I1

Alternative I1 is almost identical to Alternative I. The primary difference is the configuration of Ramps B and C (see **Figure 4.2-34**). From southbound I-295 the exits for Route 42 south and I-76 north use the existing alignment of I-295. In the southbound direction Ramps B and C would be combined

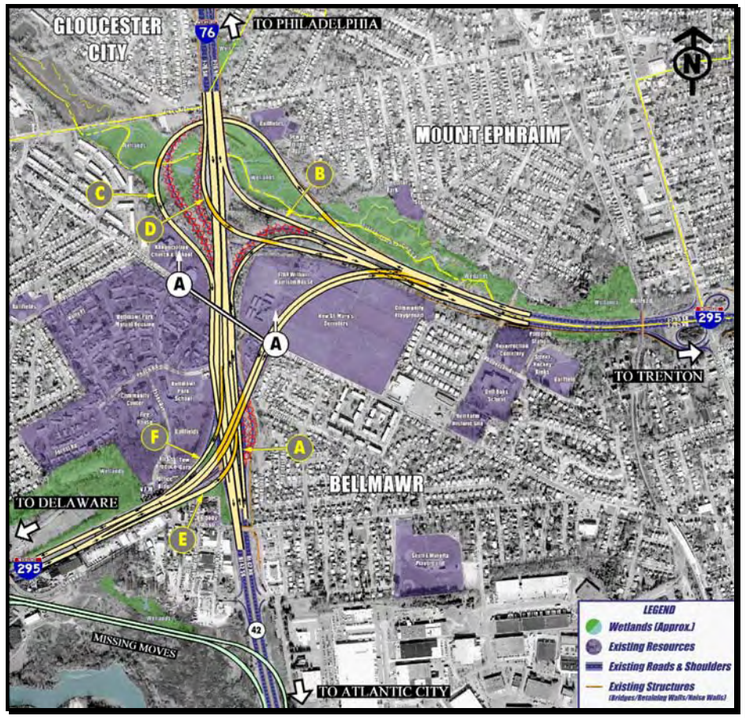


Figure 4.2-34: Alternative I1

until they diverge before I-76. Ramp B splits to the left and then curves right with a radius of 700 feet to meet I-76 northbound near Kings Highway. Ramp C splits to the right and would follow the existing Ramp C configuration underneath I-76 and then merge with Route 42 southbound. The substandard radius on the existing Ramp C is replaced with a 700-foot radius.

4.2.24 Alternative J

Alternative J is a modified form of Alternative A. This alternative provides I-295 as a continuous direct-through alignment in the form of a tunnel beneath I-76/Route 42 (see **Figures 4.2-35 and 4.2-36**).

Alternative J begins south of the existing interchange with Route 168. Northbound and southbound I-295 are shifted north using a curve to the right with a radius of 1,400 feet. This curve is followed by a 1,200-foot-long tangent after which, the northbound and southbound roadways adjoin and curve to the left using a 1,400-foot radius. A 600-foot tangent along the western or southbound side of I-76/Route 42 then follows. The alignment curves to the right with a 1,400-foot radius curve to meet the existing I-295 pavement north of the Creek Road overpass.

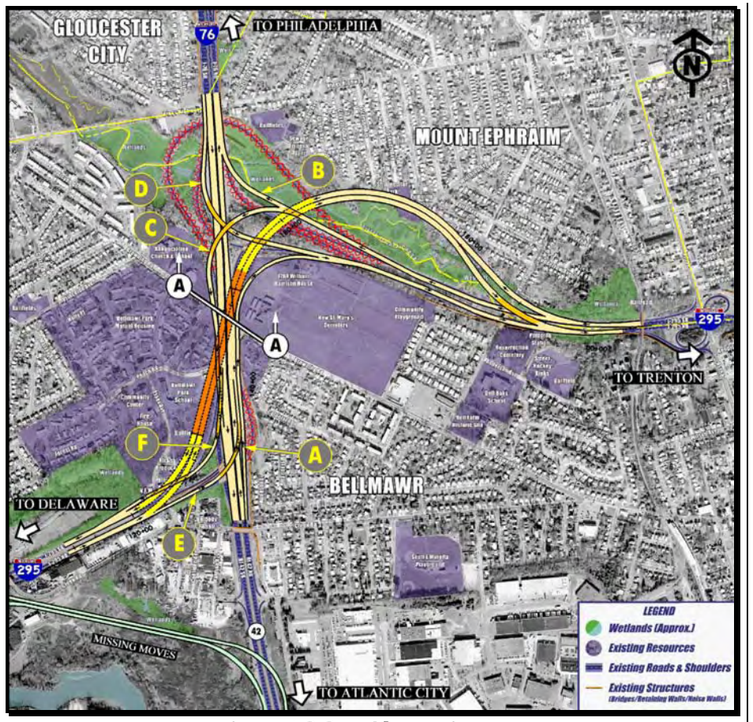


Figure 4.2-35: Alternative J

As for its vertical components, heading southbound, the I-295 mainline begins to descend at a 3% grade right around the wetlands region of Mount Ephraim. The road transitions vertically for about 925 feet and reaches a full depth of 35.5 feet around the northern boundary of the cemetery. The roadway continues at full depth, passing under I-76/Route 42, and begins to ascend at a 3% grade just under the baseball fields. At this point, the roadway transitions vertically for about 1,185 feet and is at grade again by station 120+00.

Vehicles on Route 42 whose destination is I-295 northbound, would exit on Ramp A, and be separated from, but parallel to Route 42. This ramp configuration, in conjunction with the new I-295 mainline alignment, eliminates the current substandard weaving condition at this location. Ramp A would cross under Browning Road and join the Ramp D alignment. Ramp D is the move for I-76 southbound to I-295 northbound. Ramp A would have a radius of 700 feet. The new Ramp D alignment would also have a radius of 700 feet.

Southbound I-295 traffic heading to I-76/Route 42 would exit left from I-295 near Bell Road. This ramp, after passing under I-295 northbound would split with Ramp C to the left for Route 42 southbound and Ramp B on the right for I-76 northbound.

Ramp E would merge onto I-76 from I-295 northbound in a configuration similar to the existing except that the weaving traffic from Ramp A has been removed as explained above. For I-76 southbound traffic wishing to proceed north on I-295, Ramp D would exit to the right much the same as it currently does. This ramp would cross over I-76 and under Ramp C before passing under I-295 to join Ramp A.

I-76 southbound traffic could utilize Ramp F to exit to I-295 southbound. This Ramp would cross over Ramp C and the I-295 mainline. The existing Ramp H would be eliminated.

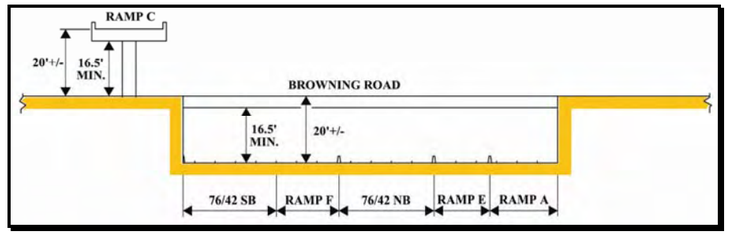


Figure 4.2-36: Section A-A at Browning Road (Alternative J)

4.2.25 Alternative K

Alternative K is a modified form of Alternative D. This alternative provides I-295 as a continuous direct-through alignment in the form of a tunnel beneath I-76/Route 42 (see **Figures 4.2-37 and 4.2-38**).

Alternative K begins between Bell Road and the interchange with Route 168. Mainline I-295 shift slightly north using a curve to the right of radius 2,000 feet. This curve is followed by a 630-foot-long tangent. The roadway then curves to the left with a 1,400-foot radius. A tangent length of 770 feet follows before the alignment curves to the right again with a 1,400-foot radius to meet the I-295 pavement north of the Creek Road overpass.

As for its vertical components, heading southbound, the I-295 mainline begins to descend at a 3% grade close to the cemetery. The road transitions vertically for about 225 feet and reaches a full depth of 35.5 feet in the northwestern corner of the cemetery. The roadway continues at full depth, passing under I-76/Route 42, and begins to ascend at a 3% grade beside the baseball fields. At this point, the roadway transitions vertically for about 1,185 feet and is at grade again by station 120+00.

Vehicles on northbound Route 42 whose destination is I-295 northbound, would exit on Ramp A which will be separated from, but parallel with, Route 42. This ramp configuration, in conjunction with the new I-295 mainline alignment, eliminates the current substandard weaving condition with Ramp E at this location. Ramp A would cross over I-295, under Browning Road and Ramp D, before joining the Ramp D alignment.

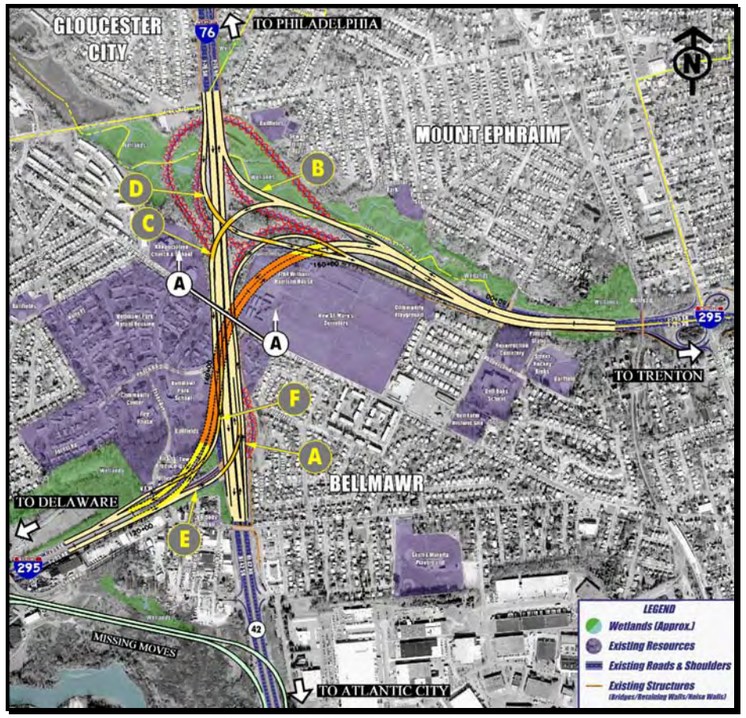


Figure 4.2-37: Alternative K

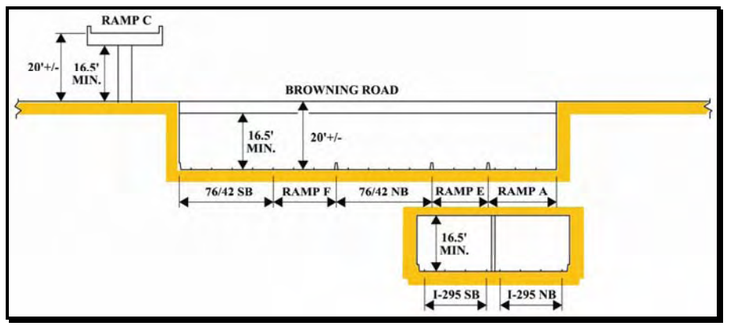


Figure 4.2-38: Section A-A at Browning Road (Alternative K)

Ramp B will provide the movement from southbound I-295 to northbound I-76. Ramp C will provide the movement from southbound I-295 to southbound I-76/Route 42. Ramp B and Ramp C will exit from I-295 from the right at about the point that mainline I-295 curves to the left. Ramp B will then diverge to the right and follow its existing alignment to meet I-76 northbound. Ramp C will split to the left and cross over Ramp D and I-76 with a 700-foot radius curve to the left. Then Ramp C will pass over I-295 and under Ramp E to connect with Route 42 just north of the Creek Road Bridge.

Ramp D is the move for I-76 southbound to I-295 northbound. Ramp D would exit I-76 in much the same way that it does now. The Ramp D alignment would have a radius of 700 feet and would cross over I-76, under Ramp C, over Ramp A and over I-295 before merging with Ramp A. Ramps A and D would then follow the existing alignment of I-295 to merge with the I-295 mainline north of Bell Road. Northbound I-295 traffic heading north on I-76 will utilize Ramp E which follows essentially the same alignment as it does now. I-76 southbound traffic could utilize Ramp F to exit to I-295 southbound. This ramp would cross over Ramp C and the I-295 mainline. The existing Ramp H would be eliminated.

4.2.26 Alternative L

Alternative L provides I-295 as a continuous direct-through alignment in the form of a tunnel beneath I-76/Route 42 (see **Figures 4.2-39 and 4.2-40**).

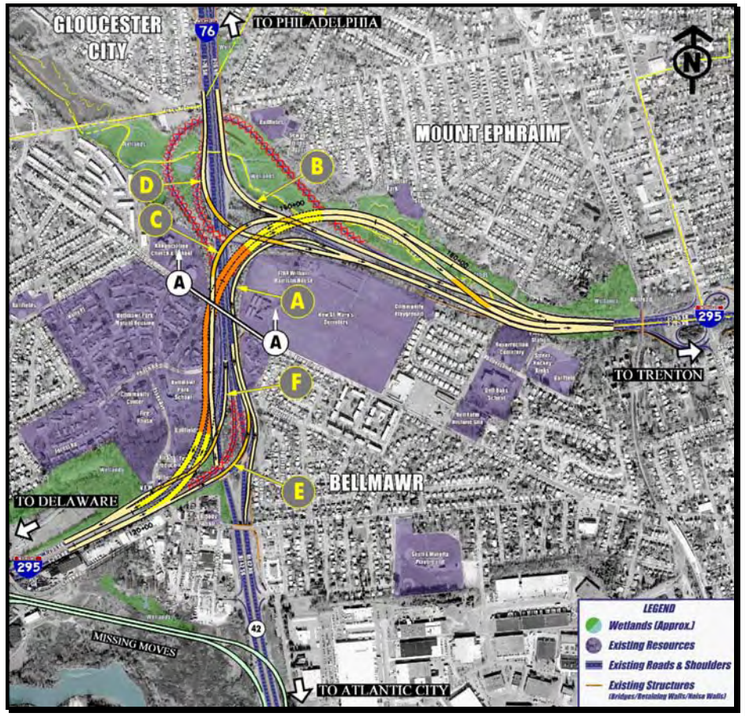


Figure 4.2-39: Alternative L

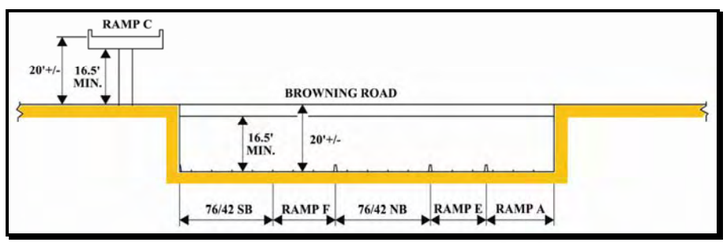


Figure 4.2-40: Section A-A at Browning Road (Alternative L)

4.3 ALTERNATIVES SCREENING PROCESS

The alternatives screening process employed an informed qualitative decision-making approach that involved consensus building amongst all stakeholders with respect to the alternatives recommended for further consideration. The project team prepared the necessary documentation and guided the process that began in the fall of 2003 and concluded in March 2004. Summaries of the pertinent workshops that led to the selection of the alternatives recommended for further study can be found in Chapter 11.

An Alternatives Screening Matrix was assembled to evaluate the potential impacts of each conceptual alternative on the many resources located in the study area. The matrix criteria, as well as the screening methodology, were developed in consultation with the agencies and other stakeholder groups. Meetings and workshops were conducted with the project team, NJDOT subject matter experts (known as the NJDOT Core Group), and stakeholders to evaluate each alternative with respect to the rating criteria, complete the matrix, and then compare the alternatives to determine the list of alternatives recommended for further study.

4.4 ALTERNATIVES SCREENING CRITERIA

Table 4.4-1 describes the criteria developed to assess potential impacts resulting from the conceptual project alternatives. These individual screening criteria address impacts to the natural environment, disruption to the community and motoring public during construction, and overall improvement of safety and traffic flow. The ratings were either qualitative, such as high, moderate, or low, or, if applicable, quantitative, consisting of an actual numerical value of acres, or number of resources impacted (such as wetlands, cultural resources or potentially contaminated sites). The evaluation criteria established the basis for the alternatives screening and the selection of those alternatives that were recommended for further study. Each alternative was scored on the Alternatives Screening Matrix by the project team and the stakeholder groups. The impact quantities were estimated based on preliminary highway alignment designs, prior to the TES preparation.

Input from all stakeholder groups was essential to this process because the screening scores could not simply be added up to determine the alternative with the highest or lowest impacts, as all impacts were not equally weighted, and many were subjective. The Alternative Screening Matrix is shown in **Table 4.4-2.**

CRITERIA	CRITERIA DEFINITION
Constructability	Constructability is a time efficient tool that aids in providing useful design documents to the bidders and to the field oversight team. Constructability, if done properly, can point out sometimes obvious oversights from the perspective of a field person. Each alternative was rated for constructability as Highly Difficult, Moderately Difficult, or Low Difficulty.
Maintainability	Evaluation factors for this criterion included anticipated ease of routine maintenance or the need for expensive or labor intensive maintenance for the alternatives under development to ensure that the project does not have extensive hidden high life cycle costs or flaws. Each alternative was rated for maintainability as Highly Difficult, Moderately Difficult, or Low Difficulty.
Comparison of Estimated Construction Cost	The relative relationship of Construction Costs for each alternative was developed utilizing a comparison of roadway and bridge lengths for each alternative. The equivalent lane length shown on the completed matrix is the sum of the actual lane length of roadway in feet plus the equivalent lane length of bridges, plus the equivalent lane length of tunnel.
Compliance with Design Criteria	This criterion shows the number of undesirable design features as well as the number of proposed conflict points.
Right-of-Way	For right-of-way, impacts were measured either as the number of residential or commercial structures affected (a number), cemetery plots disturbed (a number), or the impact to community facilities and schools (High-Moderate-Low).
Wetlands	Each alternative was evaluated on the basis of total wetland acreage impacted for each category of wetland – tidal and non-tidal.
Floodplains	Each alternative was evaluated on the basis of total acreage impact to the 100-year floodplain.
Noise	Each alternative was evaluated for its probable noise impact without mitigation. Factors considered were proximity to and type of receptors and the height of the new facility over the existing ground. The increase in noise is rated as High, Moderate, or Low.
Air Quality	Each alternative was evaluated for its probable impact on air quality. The effects to air quality are rated as High, Moderate, or Low.
Socioeconomics	Socioeconomics were evaluated qualitatively: • High Impact – Alternative divides or isolates an existing residential community, or disrupts major pedestrian or vehicular routes resulting in significant detours. Substantially alters character of community. • Moderate Impact – Alternative impacts the edge of an existing residential community, or disrupts pedestrian or vehicular routes resulting in minor detours. • Low Impact – Alternative avoids or has minimal impacts to existing residential communities, and results in little, if any, disruption of pedestrian or vehicular routes.
Environmental Justice	Based on the preliminary evaluation conducted, there were no significant differences between alternatives; therefore, EJ was not used as a screening criterion.
Archaeological Resources	Within the project study area there are current areas of archeological resources that have not yet been evaluated for significance. The potential level of sensitivity of the sites has been determined and mapped as High, Moderate, or Low.
Historic Architectural Resources	Within the project study area there are resources of varying historic significance. The number of cultural resources potentially impacted physically, visually, or audibly for each degree of impact – High, Moderate, or Low – were identified.
Potential Hazardous / Contaminated Sites	Based upon the preliminary review conducted, there are no significant differences between alternatives; therefore, Potential Hazardous/Contaminated Sites was not used as a screening criterion.
Visual / Contextual Impacts	Under this criterion, an evaluation was made as to whether an alternative introduces a visual intrusion that does not fit into the context of the project area. Impacts are qualified as High, Moderate, or Low.

Table 4.4-1: Alternatives Screening Criteria

4.4.1 Alternatives Screening Methodology

The methodology that was developed to determine the alternatives screening criteria is explained in the following sections.

4.4.1.1 Constructability

Constructability evaluated the relative impact between the alternatives reviewed, with some having advantages over the others. Generally, all alternatives were evaluated in terms of impacts resulting from construction staging, local traffic patterns, conflicts with utilities, conflicts with tools and machinery, overhead obstructions, underground hazards, safety hazards, and the practicality of the design in terms of time, cost, and scope. Other factors considered included the impact to local residents and the motoring public (dust, noise, detours and diversions, etc.).

Two specific design types, tunnels and stacked alternatives, required additional consideration under this criterion. Tunnels are always long-term, costly projects that are very difficult to construct in a timely, safe manner even if they are cut and cover. With cut and cover operations there is always the problem of proper shoring. This would be a design issue that would have to be examined. Drilling, boring, or jacking operations are very difficult to perform because of confined space issues as well as shoring and lighting.

The stacked alternatives present safety and logistical problems because operations would have to be performed near and over live traffic. The stacked alternatives will most likely push construction operations to night which provide for increased contract lengths, difficult working conditions, and difficult conditions for the traveling public due to limited sight lines and restricted lane widths. Night operations, although reducing traffic impacts and delays during the times of peak volumes, would have an obvious high impact to the adjoining communities.

As a result, tunnels and stacked alternatives are considered highly difficult designs. The determination of low and moderate difficulty is based on contextual elements related to the design of the non-tunnel/stacked alternatives. For example, alternatives that require construction near an existing overpass or intensive construction in a known dangerous weave area would be considered moderately difficult. Alternatives that present mostly typical construction hazards are considered to be low difficulty alternatives.

4.4.1.2 Maintainability

This evaluation considered whether the proposed facility could be properly maintained utilizing standard equipment/methods with acceptable labor demands. Examples of elements requiring high future maintenance include tunnels or multi-level structures. Impacts of numerous structures and single-lane ramps, with their inherent maintenance issues of salt usage and snow removal problems during the winter, were also considered.

The National Cooperative Highway Research Program Report #349 *Maintenance Considerations in Highway Design* provided information on current practices by transportation agencies to incorporate maintenance considerations in design. The FHWA and the Federal Transit Administration's *Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual* was reviewed in the evaluation of the tunnel alternatives.

Maintenance requirements of a tunnel include washing the tunnel interior, flushing the tunnel drainage system, tile/tunnel interior surfacing repairs, and maintenance of the various electrical, ventilation, lighting, and control systems used in the tunnel. Although lighting is normally present on a roadway or bridge structure, the other tunnel-related systems listed are not. Additionally, while it may be acceptable to wait to replace a luminaire along a roadway until it burns out or to clean an inlet once a puddle is reported, with the tunnel systems, regular, preventative, checks and maintenance of these systems are required. In light of the extensive maintenance requirements of a tunnel, any alternative which utilized a tunnel for mainline I-295 was rated as highly difficult.

Maintenance considerations for bridge structures include accessibility for inspection, maintenance, and repairs, corrosion protection, ease of rehabilitation, and maintenance of traffic during rehabilitation. Bridge components including railings, deck joints, bearings, foundations and drainage systems are vulnerable to deterioration. Alternatives which have large structures or a large amount of bridge deck were considered moderately difficult to maintain. The alternatives with a double-deck configuration and the alternatives which utilize a split alignment for I-295 were considered moderately difficult to maintain since U-turns would be impossible within those structures.

4.4.1.3 Comparison of Estimated Construction Cost

As part of the alternative evaluation and selection process, the relative relationship of construction costs for each alternative was developed utilizing a comparison of roadway, bridge and tunnel lengths for each alternative. Information that was available on the construction cost of the Route 29 and Atlantic City – Brigantine Tunnel was utilized as well as the Initial Design Cost Estimating worksheets developed by NJDOT to derive factors for bridge and tunnel construction. The length of new bridge lane construction required by an alternative was multiplied by a factor of 35 and added to the length of new roadway lanes to determine the relative cost required to construct each alternative. In a similar fashion, the length of new tunnel lane construction will be multiplied by a factor of 90. The equivalent lane length shown on the matrix is the sum of the actual lane length of roadway in feet plus the equivalent lane length of bridges, plus the equivalent lane length of tunnel.

4.4.1.4 Compliance with Design Criteria

As part of the alternative evaluation and selection process, the initial conceptual alternatives were evaluated to determine the number of conflict points present in each alternative. In more common intersection applications, conflict points arise as a result of vehicles and/or pedestrian travel paths crossing each other. For purposes of this freeway analysis, conflict points are associated with weaving movements. That is, those movements involving two vehicles having two different origins matched with two different destinations and whose respective travel paths cross one another. In contrast, locations where queuing, diverging, or merging actions

IMPACTS	A	A1	A2	B	B1	B2	C	C1	C2	D	D1	E	E2	F	F1	F2	G	G1	G2	H	H1	I	I1	J	K	L
Constructability	M	M	M	H	H	M	H	H	H	H	H	L	H	H	H	H	H	H	H	M	M	M	M	H	H	H
Maintain and Operate	L	L	L	L	L	L	M	M	M	M	M	L	H	M	M	M	M	M	M	M	M	L	L	H	H	H
Comparison of Estimated Construction Cost (x$100,000)	8.4	7.9	5.9	9.6	9.6	7.1	10.1	9.8	10.5	8.2	8	6.6	24.1	9.9	9.7	7.6	12.6	12.5	12.5	13	12.8	6.2	6.1	14.6	17.4	16.5
Compliance with Design Criteria																										
Undesirable design features	1	1	0	2	2	1	1	1	0	0	0	1	2*	2	2	2	2	2	2	2	2	1	1	1	1*	3*
Number of conflict points	2	2	1	2	2	1	2	2	1	2	2	2	2	2	2	1	2	2	1	2	2	2	2	2	2	2
Right-of-Way																										
Residential	49	49	49	56	58	73	34	36	33	22	24	189	190	24	26	22	22	24	22	26	32	53	55	54	30	32
Commercial	9	9	9	10	10	10	8	8	9	8	9	11	12	9	9	9	10	10	10	10	10	11	11	10	10	10
Community Facilities																										
- Cemetery Plots	0	0	0	0	0	0	0	0	0	0	0	124	124	0	0	0	0	0	0	0	0	3800	3800	0	0	0
- Church	M	M	M	M	M	M	M	M	M	L	L	M	M	L	L	L	L	L	L	M	H	M	M	M	M	M
- School	M	M	M	L	L	L	L	L	L	M	M	M	M	M	M	M	L	L	L	M	M	M	M	H	M	H
- Parks																										
H-	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1
M-	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0
L-	0	1	0	0	1	0	1	1	1	0	1	1	2	0	1	0	1	2	1	1	2	1	2	0	0	0
Wetlands																										
Tidal	11.5	15	17	6.5	7	12	7.5	11.5	13	5	8.5	1	5	11	15	17.5	7	7.5	7	5	7.5	1	5.5	10	9	11.5
Non-Tidal	5.5	6	3.5	6	6.5	4.5	4	4.5	2	3	3	3.5	3.5	5	5.5	3	3	3.5	2	3.5	4	1.5	1.5	5.5	3	5.5
Total	17	21	20.5	12.5	13.5	16.5	11.5	16	15	8	11.5	4.5	8.5	16	20.5	20.5	10	11	9	8.5	11.5	2.5	7	15.5	12	17
Floodplains	16.5	23.5	20.5	20	22	29	21	28	27.5	6	13.5	3.5	11	16	23	21	5	12.5	7	6.5	12.5	2	10	24	9.5	16.5
Noise	H	H	M	H	H	M	H	H	H	M	M	M	L	H	H	M	H	H	H	H	H	L	M	L	L	L
Air	L	L	L	L	L	L	H	H	H	L	L	L	L	L	L	L	H	H	H	H	H	L	L	L	L	L
Socioeconomics	M	M	M	M	M	M	L	L	L	L	L	H	H	L	L	L	L	L	L	M	L	H	H	M	L	L
Visual/Contextual Impacts	H	M	H	M	M	M	H	M	H	M	M	L	H	M	H	H	H	H	H	H	H	H	H	L	L	L
Archaeological Resources																										
Prehistoric Resources																										
H-	26	30	20	24	23	21	24	29	22	14	19	13	18	24	29	21	16	20	10	16	20	8	14	25	16	26
M-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-
L-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Historic Resources																										
H-	4	4	4	4	4	4	3	2	1	5	5	2	2	4	4	4	4	4	4	5	5	2	2	4	5	4
M-	2	2	2	6	5	7	5	5	4	2	2	4	4	2	2	2	2	2	2	2	2	9	9	7	2	2
L-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Historic Architecture																										
Harrison-Glover House	H,V	H,V	H,V	H,D,V,A	H,D,V,A	H,D,V,A	H,V	H,V	H,V	H,D,V,A	H,D,V,A	M,V	H,V	H,D,V,A	H,D,V,A	H,D,V,A	H,D,V,A	H,D,V,A	H,D,V,A	H,D,V,A	H,D,V,A	H,D,V,A	H,D,V,A	H,D,V,A	H,D,V	M,V
Camden County Railroad	L	L	L	L	L	L	L	L	L	L	L	M,D	M,D	L	L	L	L	L	L	L	L	L	L	M,D	L	L

NOTES:
1. H - High Sensitivity, M - Moderate Sensitivity, L - Low Sensitivity, A – Audio, V – Visual, D – Direct.
2. The terms High, Moderate, and Low Sensitivity are used relative to the sensitivities of the other alternatives under consideration. An item labeled 'L' means only that the potential impacts are lower than those of alternatives labeled 'M' or 'H'.
3. Alternative K is assumed to be a bored tunnel underneath the cemetery.
4. Alternatives E and E2 impact both the New St. Mary's Cemetery and the Resurrection Cemetery.
*5. *Although all alternatives meet current geometric design standards, certain design features applicable to open roadways may not be applicable in a tunnel (e.g., shoulders).*

Table 4.4-2: Alternatives Screening Matrix

occur are not considered conflict points, although they have the potential of disrupting the free flow of through-traffic under congested conditions.

The provision of acceleration and deceleration lanes of sufficient length and proper design allows vehicles to safely and efficiently enter or leave the roadway without disrupting through-traffic flow. Accordingly, since the alternatives being considered utilize such auxiliary lanes and direct-connect ramps for entering and exiting vehicles, there are no conflict points associated with them.

One area of concern with regard to freeway conflict points is locations where traffic leaving the roadway must weave with traffic entering the roadway. In these locations, the impact of a conflict point from a safety and efficiency perspective can be moderated, if not eliminated, if sufficient distance is provided between the exit and entrance ramps.

Under this condition, the drivers involved in the weaving maneuver are able to complete the weave without feeling forced or rushed. Within the main interchange area and under all of the alternatives, no weaving problem will exist. Beyond the limits of the alternatives, there are locations where vehicles utilizing existing interchange ramps (that are not being considered for improvement at this time) have to weave with other vehicles. Although the extent of this difficulty cannot be determined without more detailed traffic analyses, a preliminary determination can be made at this time.

The exit ramp from northbound I-76 to Market Street may conflict with traffic entering I-76 from southbound I-295. This configuration is present in all of the alternatives being considered. The location of ramps entering southbound I-295 from Route 168 and exiting northbound I-295 to Route 168 is also an area that may not provide the necessary weaving distance. This configuration is present in all of the alternatives except the "2" series of alternatives (A2, B2, etc.).

Accordingly, the "2" series of alternatives offer the most improvement in this regard and may be considered to have one conflict point each (ramp from I-76 northbound to Market Street). The remaining alternatives are considered to have three conflict points (ramp from I-76 northbound to Market Street, ramp from Route 168 to southbound I-295, and the ramp from northbound I-295 to Route 168). More detailed traffic operational analyses were conducted under subsequent phases of the EIS process.

4.4.1.5 Right-of-Way

The right-of-way criterion identified four categories of properties that could be affected by the proposed alternatives and assessed the impacts as follows.

Residential Property Impacts

Impacts to residents were evaluated for each of the alternatives by counting the number of discrete residential structures that would require taking and therefore would be considered a relocation. Residential structures that are located within 50 feet of the alignment are less likely to incur relocation but have proximity impacts and were also counted. For the Bellmawr Park area and other multi-family structures, each individual residential unit was counted separately.

Commercial Property Impacts

Impacts to commercial properties were evaluated for the alternatives in the same manner as the residential properties.

Institutional Properties

There are several institutional properties such as churches, schools, and cemeteries that may potentially be impacted. The impacts to these facilities were shown in the same manner as residential impacts except that the categories were the number of facilities impacted severely, moderately, or only slightly.

Recreational Properties

There are several recreational properties that may be potentially impacted. The evaluation of the impacts was performed in the same manner as the institutional properties. A probable relocation, and therefore a severe impact, existed where the impacts were extensive enough to make the facility nonfunctional. An example of a moderate property impact is the rearrangement of the layout of some ballfields. No differentiation was made for recreational properties having or lacking protected Section 4(f) status.

4.4.1.6 Wetlands

Both tidal and non-tidal wetlands are present in the study area. For this evaluation each type of wetland was evaluated separately. The total wetland acres impacted for each alternative was determined from existing published wetland mapping confirmed by limited field observations. The wetlands were identified through the use of NJDEP and USACE maps.

4.4.1.7 Floodplains

The extent of floodplains was identified through the use of Federal Emergency Management Agency (FEMA) maps. The total acreage of 100-year floodplain impact was calculated for each alternative evaluated.

4.4.1.8 Noise

The impact on noise receptors in the project area was quantified through a point system. Points were assigned based on the positive and negative effects that a particular alternative may produce in that area. These points were established based on the vertical and horizontal alignments which may affect the noise. Points were calculated and then averaged over all areas to achieve an overall value for the alternative. Based upon the overall average, alternatives were ranked low, moderate or high relative to the level of noise impact.

The horizontal rating criterion differentiated between a ramp and a mainline since there was a different level of impact associated. For this analysis, it was assumed that I-295 was the mainline. A ranging degree of points were assigned for a mainline shift due to higher associated volume and speeds. This range was based on the magnitude and the presence of ramps included in the encroachment. A varying range of points was deducted in areas that would benefit from a horizontal shift or elimination of the mainline or ramp, as follows:

- Ramps encroaching into a neighborhood: 1 point.
- Mainline encroaching into a neighborhood: 2 points.
- Ramps and mainline encroaching into a neighborhood: 3 points.
- Mainline encroaching significantly into a neighborhood: 4 points.
- Ramps and mainline encroaching significantly into a neighborhood: 4.5 points.
- Existing ramps being eliminated/moved away from a neighborhood: -1 point.
- Elimination of Al Jo's Curve: -2 points.
- Existing mainline being eliminated/moved away from a neighborhood: -4 points.

Noise levels within sensitive areas can be affected by vertical changes in the roadway. As roadways are lifted on structures, the level of noise impacts greatly increases. Points were assigned for each vertical level within the potentially affected noise sensitive areas. Structures carrying a mainline were assigned higher points than the same level structure carrying a ramp, as follows:

- Level-1 ramp: 1.5 points
- Level-2 ramp: 2.5 points
- Level-2 mainline: 3 points
- Level-3 ramp: 3.5 points
- Level-3 mainline: 4 points
- Level-4 ramp: 4.5 points
- Level-4 mainline: 5 points

Some alternatives propose tunneling the mainline, which can have a positive effect on noise levels in areas above the tunnel. However, tunnels produce a negative effect in the areas adjacent to the openings. Therefore, appropriate points were assigned to sensitive areas near the tunnel openings and were deducted from areas above the tunnel. The method of ventilation is not known. Therefore, any negative effects from stationary noise sources caused by the ventilation method were not evaluated.

- Opening of tunnel in the vicinity of a neighborhood: 4 points.
- Opening of tunnel in the vicinity of a commercial area: 0 points.
- Tunnel replacing existing mainline in the vicinity of a neighborhood: -4 points.

In some alternatives, building acquisitions are necessary to allow for the required right-of-way. These residential buildings currently serve as a "natural barrier," protecting second and third-row homes from the roadway noise. Therefore, points were assigned to areas which would have an increase in noise levels due to building acquisitions, as follows:

- Building acquisitions, which act as natural barriers: 1 point.

After each alternative was ranked, the minimum and maximum values were established to determine the ranges. Alternative values between 0.00 and 1.50 are ranked low, between 1.51 and 2.37 are ranked moderate and 2.38 or above are ranked high.

4.4.1.9 Air Quality

The impact of air quality on each area was quantified through a point system. Points were assigned based on the positive and negative effects that a particular alternative may produce in that area. These points were established based on the vertical and horizontal alignments which may affect the air quality. Points were calculated and then averaged over all areas to achieve an overall value for the alternative.

The horizontal rating criterion did not differentiate between a ramp and a mainline since it was assumed there is no difference in the level of impact associated. This was based on the assumption that the mainline will carry a large amount of vehicles traveling at 55 mph, while the ramps will carry less vehicles at lower speeds (40 mph). It is important to note that carbon monoxide emissions are generally higher at lower speeds. For this analysis, it was assumed that I-295 was the mainline. A range of points was assigned for a mainline or ramp shift as well as magnitude of encroachment. A varying range of points was deducted in areas that would benefit from a horizontal shift or elimination of the mainline or ramp, as follows:

- Ramps encroaching into a neighborhood: 2 points.
- Mainline encroaching into a neighborhood: 2 points.
- Ramps and mainline encroaching into a neighborhood: 4 points.
- Mainline encroaching significantly into a neighborhood: 4 points.
- Ramps and mainline encroaching significantly into a neighborhood: 6 points.
- Existing ramps being eliminated/moved away from a neighborhood: -2 points.
- Elimination of Al Jo's Curve: -3 points.
- Existing mainline being eliminated/moved away from a neighborhood: -2 points.

Air quality levels within sensitive areas can be affected by vertical changes in the roadway. As roadways are lifted on structures, air pollutant levels can build in underlying roadways without sufficient ventilation. Alternatives that propose structure placements that could potentially prohibit air emission dispersion were given points accordingly. Points were assigned for each vertical level within the potentially affected air quality sensitive areas, as follows:

- Level-1 ramp: 2.5 points.
- Level-2 ramp: 2 points.
- Level-2 mainline: 2 points.
- Level-3 ramp: 3 points.
- Level-3 mainline: 3 points.
- Level-4 ramp: 4 points.
- Level-4 mainline: 4 points.
- Caps a depressed roadway: 4 points.

Some alternatives propose tunneling the mainline, which can have a positive effect on air quality levels in areas above the tunnel. However, tunnels produce a negative effect in the areas adjacent to the openings. Carbon-monoxide concentrated air will be released from tunnel openings which can potentially raise air quality levels in adjacent areas. Therefore, appropriate points were assigned to sensitive areas near the tunnel openings and were deducted from areas above the tunnel.

- Opening of tunnel in the vicinity of a neighborhood/commercial area: 4 points.
- Tunnel replacing existing mainline in the vicinity of a neighborhood: -4 points.

After each alternative was ranked, the minimum and maximum values were established to determine the ranges. It was determined that all alternatives that have the potential of producing areas of high air quality levels would be ranked high. All other alternatives would be classified as low. Alternative values between 0 and 3.28 are ranked low and 3.29 and above are high.

4.4.1.10 Socioeconomics

A preliminary assessment of the potential impact of each alternative on community cohesion was performed by an overlay analysis. The first step was to overlay each alternative onto an aerial photograph of the project area. A visual assessment was performed of the extent to which each alternative would adversely affect residential communities in Bellmawr, Gloucester City, and Mount Ephraim. Each location impacted by the proposed project was ranked and then an overall rank was assigned to each alternative.

4.4.1.11 Environmental Justice

Preliminary data regarding environmental justice (EJ) populations had been gathered through census data and initial public outreach in the study area. Since impacts to EJ populations may include impacts resulting from displacement of residences or community facilities, disruption of community cohesion, air quality impacts, noise impacts, etc., data evaluated included census blocks or census block groups located within 100 feet of the alignment for each alternative. Based on the preliminary evaluation conducted, there were no significant differences between alternatives; therefore, EJ was not used as a screening criterion.

4.4.1.12 Archaeological Resources

Criteria used to determine the level of sensitivity of the impact include: the level of current disturbance, the degree of the slope of the land, the site's proximity to water, the soil type, the level to which the sites are disturbed under current conditions and artifacts found during excavations. This level of sensitivity is used to determine the probability level of the existence of an archaeological site. The total impact acreage to either the low, moderate, or high sensitivity sites was calculated for each alternative evaluated.

4.4.1.13 Historic Architectural Resources

Historic architecture analysis typically requires field surveys because as a result of the voluntary nature of listing a property on the National Register of Historic Places, many potentially important resources may not be identified in existing records. Field surveys associated with the 26 alternatives, many of which would be dismissed, would have been an inefficient use of man-hours at this stage of the project. As a result, the historic architecture methodology relied on mapping provided to date, as well as a Geographic Information Systems (GIS) map of identified historic architectural resources. The historic architecture evaluation makes certain assumptions regarding the potential for undocumented resources based on the occurrence of documented resources.

Additionally, the potential for physical impacts to resources is only one element of the historic architecture review. The significance of historic resources may be affected by noise impacts and visual impacts that alter the setting of the resource. The combination of these potential impacts results in the high, moderate, or low rating applied to the evaluation of the alternatives.

4.4.1.14 Potential Hazardous/Contaminated Sites

Several sites have been identified as potentially hazardous/contaminated sites in the project area. Information regarding potential hazardous waste sites was obtained from available NJDEP databases and a site reconnaissance of the study area. The data for sites within 250 feet of the alignment for each alternative was evaluated in the screening process. Based upon the preliminary review conducted, there are no significant differences between alternatives; therefore, a screening criterion for potential Hazardous/Contaminated Sites was not used.

4.4.1.15 Visual/Contextual Impacts

The evaluation was qualitative and based on a review of each alternative and an understanding of the proposed construction and the potential visual impacts on the surrounding communities.

4.5 ALTERNATIVES ADVANCED FOR FURTHER STUDY

NJDOT evaluated the comments and recommendations gathered from the various public and agency meetings to compile the final list of alternatives that were recommended for further study. The five build alternatives that were selected for advancement are Alternatives D, D1, G2, H1, and K. These alternatives generally resulted in fewer impacts to the community as well as to natural resources. **Table 4.5-1** summarizes the rationale that was used to select these five alternatives.

Alternative D was recommended for further study by the NJDOT Core Group, ACM, Project Partnering Session, and CAC because it:

- eliminates Al Jo's Curve;
- is cost effective to construct;
- reduces impact to wetlands/floodplains;
- minimizes community and right-of-way impacts; and
- allows for mixed-use development.

Alternative D1 was recommended for further study by the ACM and Project Partnering Session because it:

ALTERNATIVE	IMPACT SUMMARY											
	Constructability	Maintain and Operate	Estimated Construction Cost (x$100,000)	Right-of-Way-Residential	Right-of-Way-Cemetery Plots	Right-of-Way-School	Wetlands (acres)	Floodplains (acres)	Noise	Air	Socioeconomics	Visual/Contextual
A	M	L	8.4	49	0	M	17	16.5	H	L	M	H
A1	M	L	7.9	49	0	M	21	23.5	H	L	M	M
A2	M	L	5.9	49	0	M	20.5	20.5	M	L	M	H
B	H	L	9.6	56	0	L	12.5	20	H	L	M	M
B1	H	L	9.6	58	0	L	13.5	22	H	L	M	M
B2	M	L	7.1	73	0	L	16.5	29	M	L	M	M
C	H	M	10.1	34	0	L	11.5	21	H	H	L	H
C1	H	M	9.8	36	0	L	16	28	H	H	L	M
C2	H	M	10.5	33	0	L	15	27.5	H	H	L	H
D	H	M	8.2	22	0	M	8	6	M	L	L	M
D1	H	M	8	24	0	M	11.5	13.5	M	L	L	M
E	L	L	6.6	189	124	M	4.5	3.5	M	L	H	L
E2	H	H	24.1	190	124	M	8.5	11	L	L	H	H
F	H	M	9.9	24	0	M	16	16	H	L	L	M
F1	H	M	9.7	26	0	M	20.5	23	H	L	L	H
F2	H	M	7.6	22	0	M	20.5	21	M	L	L	H
G	H	M	12.6	22	0	L	10	5	H	H	L	H
G1	H	M	12.5	24	0	L	11	12.5	H	H	L	H
G2	H	M	12.5	22	0	L	9	7	H	H	L	H
H	M	M	13	26	0	M	8.5	6.5	H	H	M	H
H1	M	M	12.8	32	0	M	11.5	12.5	H	H	L	H
I	M	L	6.2	53	3800	M	2.5	2	L	L	H	H
I1	M	L	6.1	55	3800	M	7	10	M	L	H	H
J	H	H	14.6	54	0	H	15.5	24	L	L	M	L
K	H	H	17.4	30	0	M	12	9.5	L	L	L	L
L	H	H	16.5	32	0	H	17	16.5	L	L	L	L

Green shading indicates rationale for advancement; pink shading indicates rationale for dismissal.

H - High Sensitivity, M - Moderate Sensitivity, L - Low Sensitivity

The terms High, Moderate, and Low Sensitivity are used relative to the sensitivities of the other alternatives under consideration. An item labeled 'L' means only that the potential impacts are lower than those of alternatives labeled 'M' or 'H'.

Table 4.5-1: Dismissed and Advanced Alternatives

- reduces impact to wetlands/floodplains;
- reduces right-of-way impacts;
- reduces speeds on Al Jo's Curve as a ramp;
- provides an increased weave distance; and
- has less visual impact than Alternative D.

Alternative G2 was recommended for further study by the ACM and Project Partnering Session because it:

- eliminates traffic weaving;
- minimizes wetlands impacts;
- minimizes community and right-of-way impacts; and
- eliminates Al Jo's Curve.

Alternative H1 was recommended for further study by the ACM because it:

- eliminates traffic weaving; and
- minimizes wetlands impacts.

Alternative K was recommended for further study by the NJDOT Core Group, ACM, Project Partnering Session, and CAC because it:

- eliminates Al Jo's Curve;
- results in moderate impacts to the community and the environment;
- minimizes residential and wetlands impacts in the tunnel/underpass group;
- reduces noise;
- reduces impacts to Route 42;
- reduces housing impacts; and
- has a relatively short tunnel length.

Generally, the 21 alternatives that were not selected for advancement were dismissed due to higher impacts on one or more of the following impact criteria: residential right-of-way, wetlands/floodplain, noise, and visual/contextual impacts. In addition, the degree to which community and natural resource impacts were avoided and/or minimized by the five build alternatives, rendered the 21 dismissed alternatives impractical and less desirable as a result of the alternative screening workshops and meetings conducted with the NJDOT Core Group, ACM, Project Partnering Session, and CAC.

4.5.1 Common Design Features

Based upon comments received during the alternatives screening process, these five build alternatives were refined and minor alignment adjustments were incorporated into their conceptual design in order to minimize environmental impacts and to improve traffic operations. The basis for the engineering design of the build alternatives is provided in the *Feasibility Assessment Report*. The engineering aspects discussed below are design features that are common to all of the build alternatives.

Photograph 4.4-1: Typical Existing Section of I-295

4.5.1.1 Highway Geometry

The build alternatives have been designed to address the substandard geometry that presently exists at the interchange including horizontal curvature, sight distance, superelevation, shoulder widths, and acceleration and deceleration lane lengths (see **Photograph 4.4-1**). Prior to the development of the build alternatives, NJDOT and FHWA established the design speeds of 60 mph for I-295 and 45 mph for the ramps. In addition, each alternative would meet the current design standards with design exceptions kept to a minimum. Substandard design elements would remain along I-76 north of King's Highway where the improvements are limited to removing the median separating the I-76 local and express roadways. The designs for the build alternatives conform to AASHTO 2001 and the NJDOT Roadway and Bridge Design Manuals. The typical section for I-295 consists of three 12-foot lanes with a 10-foot inner shoulder and a 12-foot outer shoulder in each direction. Ramp widths have been set to provide required sight distance and allow for maintenance of traffic under future redeckings. I-76/Route 42 will maintain the existing number of through lanes and provide for 10-foot inner and 12-foot outer shoulders. All new bridges will provide a vertical clearance of 16.5 feet.

4.5.1.2 Structural Design

There are a total of 14 existing bridges and four existing culverts within the project limits originally constructed between 1956 and 1960. Although the five build alternatives selected for advancement generally will result in fewer environmental impacts, 12 of the bridges (including three local bridges) and all four of the culverts will be impacted by each of the five alternatives.

The existing structures carrying Ramps D, E, and G traffic would be demolished and replaced with new structures along the proposed alignments. The existing I-295 structures over Essex Avenue will require replacement to accommodate the proposed mainline profile. Alternative K may require Essex Avenue to be lowered by approximately two feet. Widening of the existing I-76 mainline bridges over Ramp C and Kings

Highway are required to accommodate the proposed Ramp D alignment. The existing Ramp C roadway will be abandoned under all build alternatives. To improve the vertical underclearance at the I-76 bridge over Kings Highway, it is proposed to locally lower Kings Highway by approximately one foot (see **Photograph 4.5-1**).

Photograph 4.5-1: Existing I-76 over Kings Highway

The existing bridges at Bell Road, Browning Road, and Creek Road will be raised to provide proper vertical clearance and lengthened to accommodate the wider typical section of I-295 or I-76/Route 42. The Borough of Bellmawr has requested that these roadways remain operational with one lane of traffic in each direction at all times and one sidewalk for pedestrians.

Photograph 4.5-2: Culvert of I-295 over Little Timber Creek

The existing culverts will either require extension or will be demolished under the proposed alternatives (see **Photograph 4.5-2**).

Retaining walls are specified to protect wetlands, state open waters, residential and commercial properties, Annunciation Church and School, New St. Mary's Cemetery, and existing local roads, along with proposed roadways and ramps. The limited subsurface investigation revealed poor soils in the vicinity of the wetlands along Little Timber Creek, such that over-excavation and replacement with borrow excavation bridge foundation material may be required.

Boat sections (consisting of a pair of opposing retaining walls with a structural invert slab constructed between them) are required where the proposed roadway is located below the groundwater table and the weight of the pavement structure is not sufficient to counteract the buoyancy effect. Extremely tall retaining walls up to 50 feet or more are required along the depressed roadways adjacent to the Annunciation Church, New St. Mary's Cemetery and Fir Place residential properties.

4.5.1.3 Tunnel Design

Each of the build alternatives have a depressed roadway or "tunnel" section crossing under I-76/Route 42 requiring cut and cover construction in three or four steps in order to maintain four operational lanes of traffic in each direction on I-76/Route 42. Alternative K is the only build alternative that proposes the construction of a mainline I-295 tunnel. Hazardous cargo would be allowed through the tunnel sections. Provisions for ventilation, lighting, signing, monitoring, and security within the structure limits will be necessary.

Requirements for mechanical and electrical systems for tunnels are derived from the National Fire Protection Association's *Standard for Road Tunnels, Bridges and Other Limited Access Highways* 2004 Edition (NFPA 502). NFPA 502 mandates emergency tunnel ventilation requirements as a function of tunnel length. Emergency ventilation is not required by NFPA 502 for tunnel lengths less than 800 feet, though ventilation may be installed at the owner's discretion. Ramp A for Alternative K is the only tunnel section greater than 800 feet for which a detailed engineering analysis would be required.

Fire suppression systems required by NFPA 502 also vary according to tunnel length. In all alternatives, a Class I fire standpipe system is required with a minimum of two remotely located fire department connections and hose connections located such that no part of the roadway is more than 150 feet from the hose connection. Tunnel lighting is needed as a life safety system during normal tunnel operation as per the Illuminating Engineers Society (IES) RP-22 which stipulates tunnel lighting levels. A Supervisory Control and Data Acquisition (SCADA) system would monitor conditions in the tunnel and provide information to a control room. This information would include emergency pull box alarms, ventilation monitoring, and contaminant concentrations exceeding criteria.

4.5.1.4 Facility Maintenance and Operation

The construction of large complex structures, tunnels, stormwater facilities, etc., create maintenance and operational issues that are more significant or are not presently required at the existing interchange. The pumping stations, bioretention basins, and stormwater chambers included in the build alternatives require regular maintenance. Tunnel sections require operation and maintenance of ventilation, lighting, drainage, security, facility monitoring, and emergency response. The increased surface area of bridges and retaining walls will result in additional effort for inspection and testing (i.e., steel cap box girders), deck joint maintenance, painting, and future deck slab replacement.

4.5.1.5 Security

FHWA and NJDOT have both instituted programs to evaluate Homeland Security issues on their facilities. Tunnels and multi-span bridges are much more susceptible to a breach of security than a normal highway, since an incident in a tunnel or an incident that impacts the pier of a bridge can result in a potential catastrophic event. Such an incident could cause serious injuries and require a significant rebuilding effort which could close the facility for a number of years and have secondary effects. In addition, bridges that are elevated next to residential areas, schools, churches or other areas where a large number of people may congregate need special consideration since a breach of security would cause injuries by falling or exploding structural members. An event causing catastrophic infrastructure impacts is less likely to occur on a normal highway section, where typical damage would be the development of a crater and subsequent damage to the pavement, for which repair could be completed in a relatively short time frame.

4.5.2 Description of Build Alternatives

The sections below expand upon the descriptions provided in Section 4.2 in order to explain the detailed engineering that was incorporated into the refined conceptual design for each alternative. Illustrations showing the refined conceptual designs for each alternative are shown on **Figures 4.5-1** through **4.5-5.**

4.5.2.1 Alternative D

The design features of the Alternative D alignment include:

- Northbound and southbound I-295 are side-by-side.
- Removes express/local lanes on I-76 northbound.
- I-295 Posted Speed Limit: 55 mph (Design Speed: 60 mph).
- Ramp Speed Limits: 40 mph (Design Speed: 45 mph).
- Ramps are two lanes except for Ramp F.
- Beginning in the vicinity of the Grenloch Secondary Railroad, mainline I-295 shifts slightly south then north and elevates to cross over Ramp D. The alignment crosses I-76/Route 42 as a third-level viaduct at a skew through an unused area of New St. Mary's Cemetery. The roadway crosses over Ramp C as a second-level viaduct, before meeting the I-295 pavement north of the Creek Road overpass.
- Mainline I-295 bridge will be approximately 1,400-feet-long with multiple spans and will be approximately 55-feet-high over I-76/Route 42.
- Ramp A (northbound Route 42 to I-295 northbound) crosses under Ramp E and then over Route 42 northbound before joining the elevated I-295 northbound alignment just north of Browning Road. This ramp configuration, in conjunction with the new I-295 mainline alignment, eliminates the current substandard weaving condition with Ramp E at this location.
- Ramp B (southbound I-295 to northbound I-76) follows an alignment similar to its existing one to meet I-76 northbound.
- Ramp C (southbound I-295 to southbound I-76/Route 42) splits from Ramp B and crosses under Ramp D, I-76, Browning Road, and I-295 to connect with Route 42 north of the Creek Road Bridge. The Ramp C two lane tunnel section just north of Browning Road will be approximately 400-feet-long and 48-feet-wide. I-76 over existing Ramp C will be a 60-foot single span bridge. Retaining walls/boat section heights will be up to 50 feet. Existing Ramp C under I-76 will be abandoned and replaced with a foot trail (Al Jo's Curve).
- Ramp D (I-76 southbound to I-295 northbound) crosses over I-76, over Ramp C, and under I-295 before merging with I-295 northbound south of Bell Road.
- Ramp E (I-295 northbound to I-76 northbound) follows essentially the same alignment as it does now.
- Ramp F (I-76 southbound to I-295 southbound) diverts from I-76 from the right and passes under Browning Road, running parallel to Ramp C and then adjacent to I-295 southbound. Ramp F rises from a depressed section at Browning Road to an elevated section as it ties into I-295 southbound prior to Essex Avenue.
- Cost to build - $608 million.
- Construction duration - 64 months.

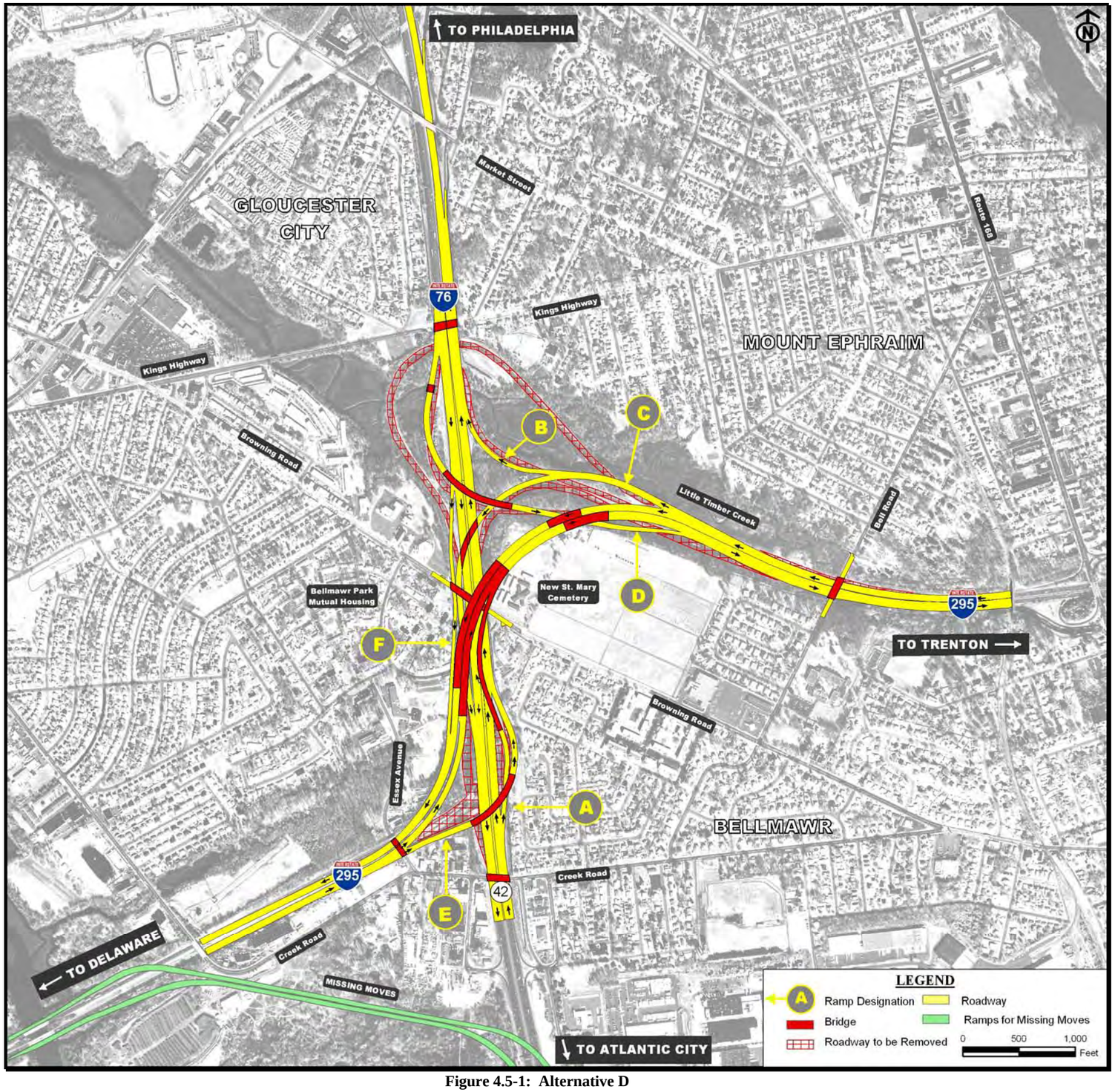


Figure 4.5-1: Alternative D

4.5.2.2 Alternative D1

Alternative D1 is almost identical to Alternative D. The primary difference is the configuration of Ramps B and C. The design features of the Alternative D1 alignment include:

- Northbound and southbound I-295 are side-by-side.
- Removes express/local lanes on I-76 northbound.
- I-295 Posted Speed Limit: 55 mph (Design Speed: 60 mph).
- Ramp Speed Limits: 40 mph (Design Speed: 45 mph).
- Ramps are two lanes except for Ramp F.
- Beginning in the vicinity of the Grenloch Secondary Railroad, mainline I-295 shifts slightly south then north and elevates to cross over Ramp D. The alignment crosses I-76/Route 42 as a third-level viaduct at a skew through an unused area of New St. Mary's Cemetery. The roadway crosses over Ramp C as a second-level viaduct, before meeting the I-295 pavement north of the Creek Road overpass.
- Mainline I-295 bridge will be approximately 1,400-feet-long with multiple spans and will be approximately 55-feet-high over I-76/Route 42.
- Ramp A (northbound Route 42 to I-295 northbound) crosses under Ramp E and then over Route 42 northbound before joining the elevated I-295 northbound alignment just north of Browning Road. This ramp configuration, in conjunction with the new I-295 mainline alignment, eliminates the current substandard weaving condition with Ramp E at this location.
- Ramp B (southbound I-295 to northbound I-76) is on a new alignment south of its present location, but ties into I-76 at a similar location.
- Ramp C (southbound I-295 to southbound I-76/Route 42) generally follows the existing Ramp C alignment (Al Jo's Curve) and passes under I-76 and Ramp F before merging with Route 42 southbound. The substandard radius on the existing Ramp C is replaced with a larger radius. The Ramp C two-lane tunnel section will be approximately 300-feet-long and 48-feet-wide. I-76 over Ramp C will be a 60-foot single span bridge just south of the existing Ramp C (Al Jo's Curve). Existing Ramp C under I-76 will be abandoned. Retaining walls/boat section heights will be up to 50 feet.
- Ramp D (I-76 southbound to I-295 northbound) crosses over I-76, over Ramp C, and under I-295 before merging with I-295 northbound south of Bell Road.
- Ramp E (I-295 northbound to I-76 northbound) follows essentially the same alignment as it does now.
- Ramp F (I-76 southbound to I-295 southbound) diverts from I-76 from the right and passes under Browning Road, running parallel to Ramp C and then adjacent to I-295 southbound. Ramp F rises from a depressed section at Browning Road to an elevated section as it ties into I-295 southbound prior to Essex Avenue.
- Cost to build - $642 million.
- Construction duration - 63 months.

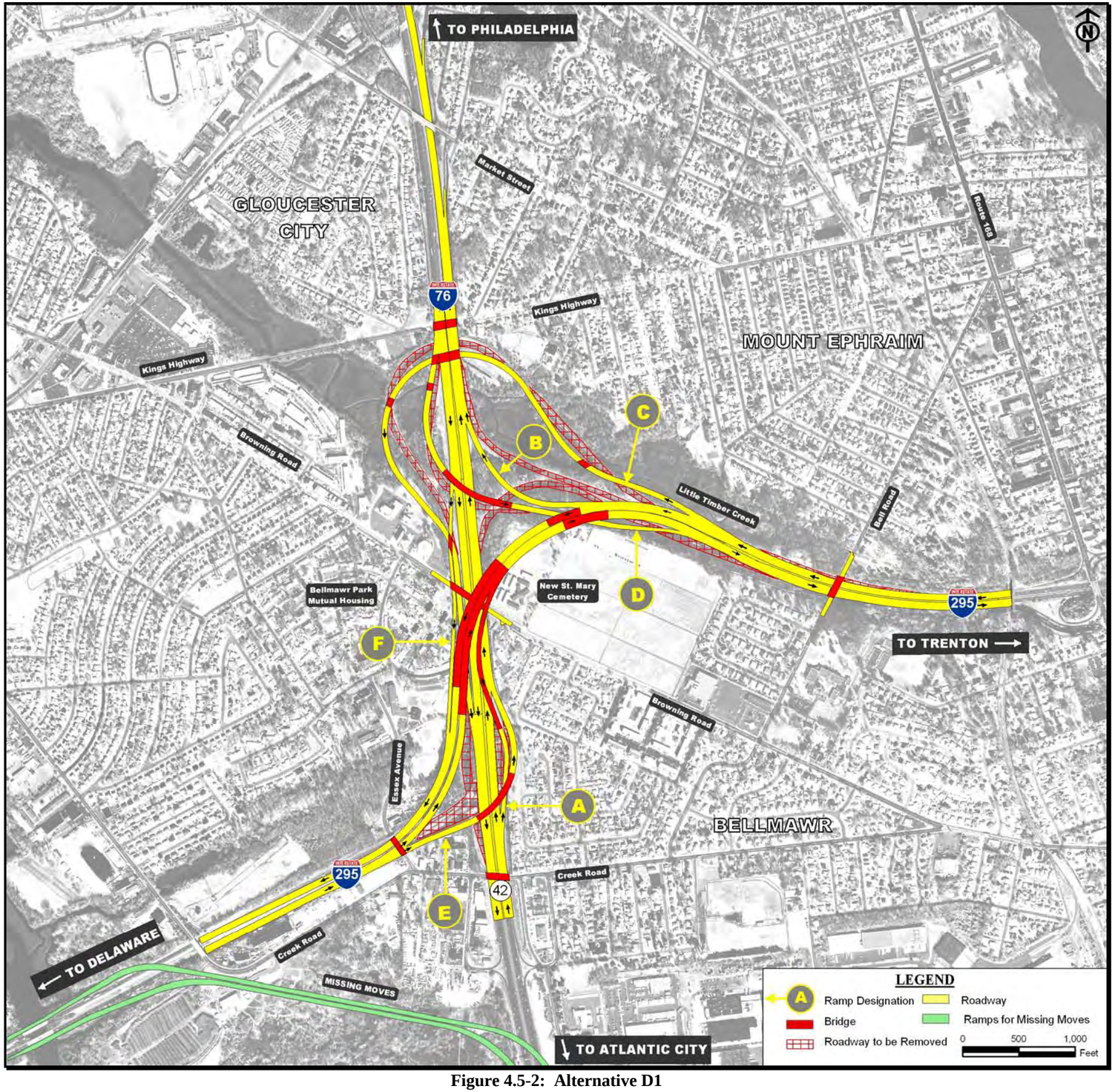


Figure 4.5-2: Alternative D1

4.5.2.3 Alternative G2

The design features of the Alternative G2 alignment include:

- Southbound I-295 is placed above northbound I-295 using a double-decker configuration.
- Removes express/local lanes on I-76 northbound.
- I-295 Posted Speed Limit: 55 mph (Design Speed: 60 mph).
- Ramp Speed Limits: 40 mph (Design Speed: 45 mph).
- Ramps are two lanes except for Ramp F.
- Beginning in the vicinity of the Grenloch Secondary Railroad Bridge, mainline I-295 is elevated to cross over all of the ramps as well as I-76 and Browning Road. I-295 crosses over I-76 on a skewed alignment. The alignment then diverges and lowers in elevation to meet the existing I-295 pavement north of the Creek Road Bridge.
- I-295 southbound is a fourth-level viaduct and northbound is a third-level viaduct at the Route 42 and Browning Road crossings. A double-stacked structure supported by common piers will carry the I-295 southbound and northbound roadways over Route 42 and Ramp D. Straddle bents will support the viaduct structure where I-295 northbound is not on structure but still directly below I-295 southbound. I-295 southbound passes over Bell Road, whereas I-295 northbound passes under Bell Road.
- I-295 northbound bridge will be about 1,400-feet-long with multiple spans and will be approximately 55-feet-high over I-76/Route 42.
- I-295 southbound bridge will be an approximately 6,800-foot long viaduct, 30-feet-high over I-295 northbound and approximately 85-feet-high over I-76/Route 42.
- Ramp A (northbound Route 42 to I-295 northbound) crosses under Ramp E and then crosses over Route 42 northbound before joining the elevated I-295 northbound alignment just north of Browning Road, similar to Alternative D.
- Ramps B exits I-295 from the right with Ramp C. Ramp B curves to the right following similar alignment to its existing alignment to meet I-76 northbound.
- Ramp C splits from Ramp B and crosses under Ramp D, I-76, Browning Road and I-295 to connect with Route 42 north of Creek Road Bridge. The Ramp C two-lane tunnel section north of Browning Road will be roughly 400-feet-long and 48-feet-wide.
- I-76 over existing Ramp C will be a 60-foot single span bridge. Retaining walls/boat section heights will be up to 50-feet. Existing Ramp C under I-76 will be abandoned and replaced with a foot trail (Al Jo's Curve).
- Ramp D (I-76 southbound to I-295 northbound) crosses over I-76, over Ramp C, and under I-295 before merging with I-295 northbound south of Bell Road.
- Ramp E (I-295 northbound to I-76 northbound) follows essentially the same alignment as it does now.
- Ramp F (I-76 southbound to I-295 southbound) diverts from I-76 from the right (existing exit is from the left), and then passes under Browning Road. Ramp F rises from a depressed section at Browning Road parallel to Ramp C to an elevated structure as it ties into I-295 southbound prior to Essex Avenue.
- Cost to build - $833 million.
- Construction duration - 70 months.

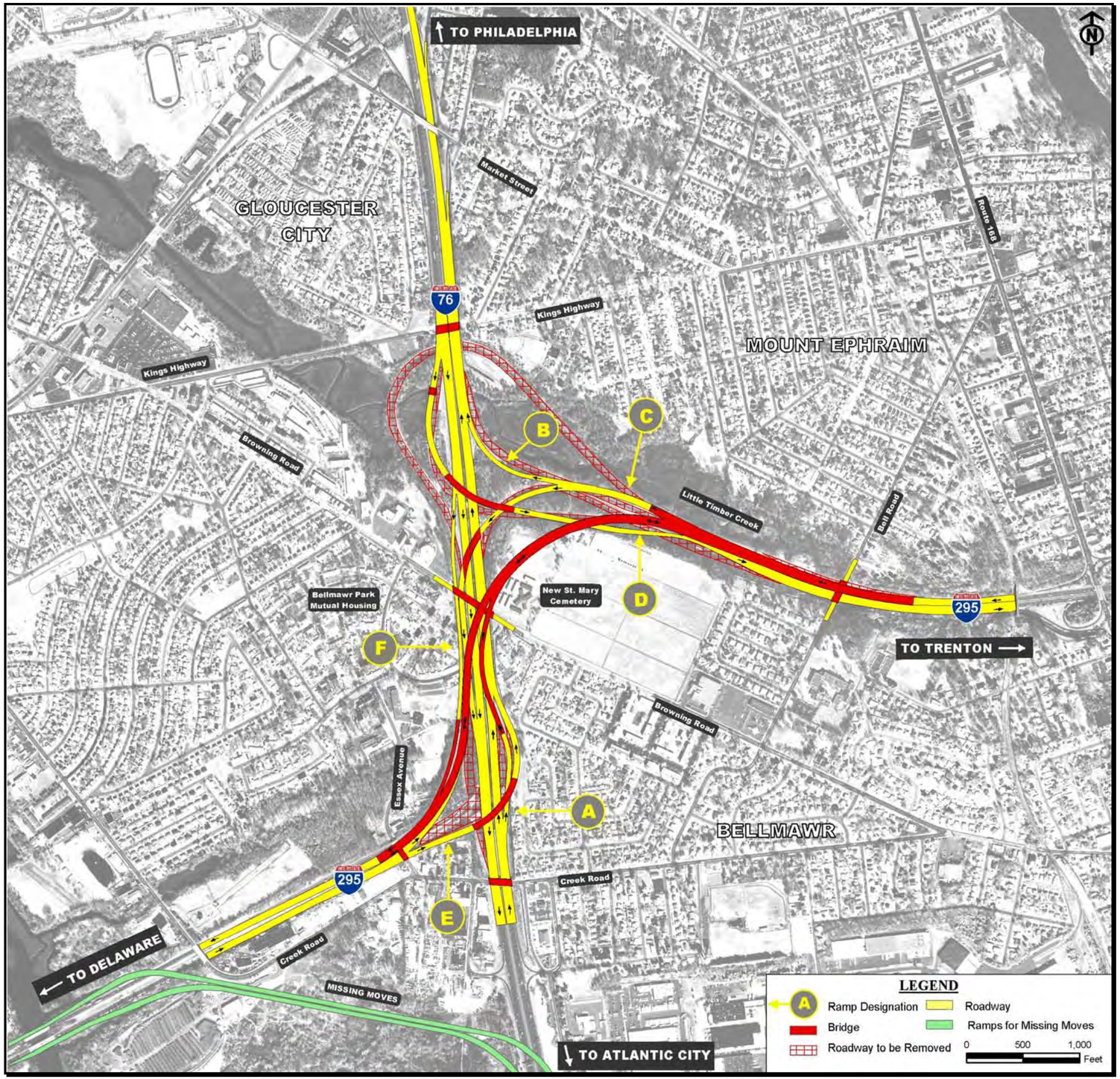


Figure 4.5-3: Alternative G2

4.5.2.4 Alternative H1

Alternative H1 is almost identical to Alternative G2. The primary difference is the configuration of Ramps B and C. The design features of the Alternative H1 alignment include:

- Southbound I-295 is placed above northbound I-295 using a double-decker configuration.
- Removes express/local lanes on I-76 northbound.
- I-295 Posted Speed Limit: 55 mph (Design Speed: 60 mph).
- Ramp Speed Limits: 40 mph (Design Speed: 45 mph).
- Ramps are two lanes except for Ramp F.
- Beginning in the vicinity of the Grenloch Secondary Railroad Bridge, mainline I-295 is elevated to cross over all of the ramps as well as I-76 and Browning Road. I-295 crosses over I-76 on a skewed alignment. The alignment then diverges and lowers in elevation to meet the existing I-295 pavement north of Creek Road Bridge.
- I-295 southbound is a fourth-level viaduct and northbound is a third-level viaduct at the Route 42 and Browning Road crossings. A double-stacked structure supported by common piers will carry the I-295 southbound and northbound roadways over Route 42 and Ramp D. Straddle bents will support the viaduct structure where I-295 northbound is not on structure but still directly below I-295 southbound.
- I-295 southbound passes over Bell Road, whereas northbound passes under Bell Road.
- I-295 northbound bridge will be approximately 1,400-feet-long with multiple spans, and will be approximately 55-feet-high over I-76/Route 42.
- I-295 southbound bridge will be an approximately 6,800-foot-long viaduct, 30-feet-high over I-295 northbound and approximately 85-feet-high over I-76/Route 42.
- Ramp A (northbound Route 42 to I-295 northbound) crosses under Ramp E and then crosses over Route 42 northbound before joining the elevated I-295 northbound alignment just north of Browning Road, similar to Alternative D.
- Ramp B exits I-295 from the right with Ramp C. Ramp B follows a similar alignment to its existing alignment to meet I-76 northbound.
- Ramp C splits from Ramp B and generally follows the existing Ramp C alignment (Al Jo's Curve) and passes under I-76 and Ramp F before merging with Route 42 southbound. The substandard radius on the existing Ramp C is replaced with a larger radius. The Ramp C two lane tunnel section will be 350-feet-long and 48-feet-wide. I-76 over Ramp C will be a 60-foot single span bridge just south of the existing Ramp C (Al Jo's Curve). Existing Ramp C under I-76 will be abandoned. Retaining walls/boat section heights will be up to 50 feet.
- Ramp D (I-76 southbound to I-295 northbound) crosses over I-76, over Ramp C, and under I-295 before merging with I-295 northbound south of Bell Road.
- Ramp E (I-295 northbound to I-76 northbound) follows essentially the same alignment as it does now.
- Ramp F (I-76 southbound to I-295 southbound) diverts from I-76 from the right (existing exit is from the left), and then passes under Browning Road. Ramp F rises from a depressed section at Browning Road parallel to Ramp C to an elevated structure as it ties into I-295 southbound prior to Essex Avenue.
- Cost to build - $893 million.
- Construction duration - 73 months.

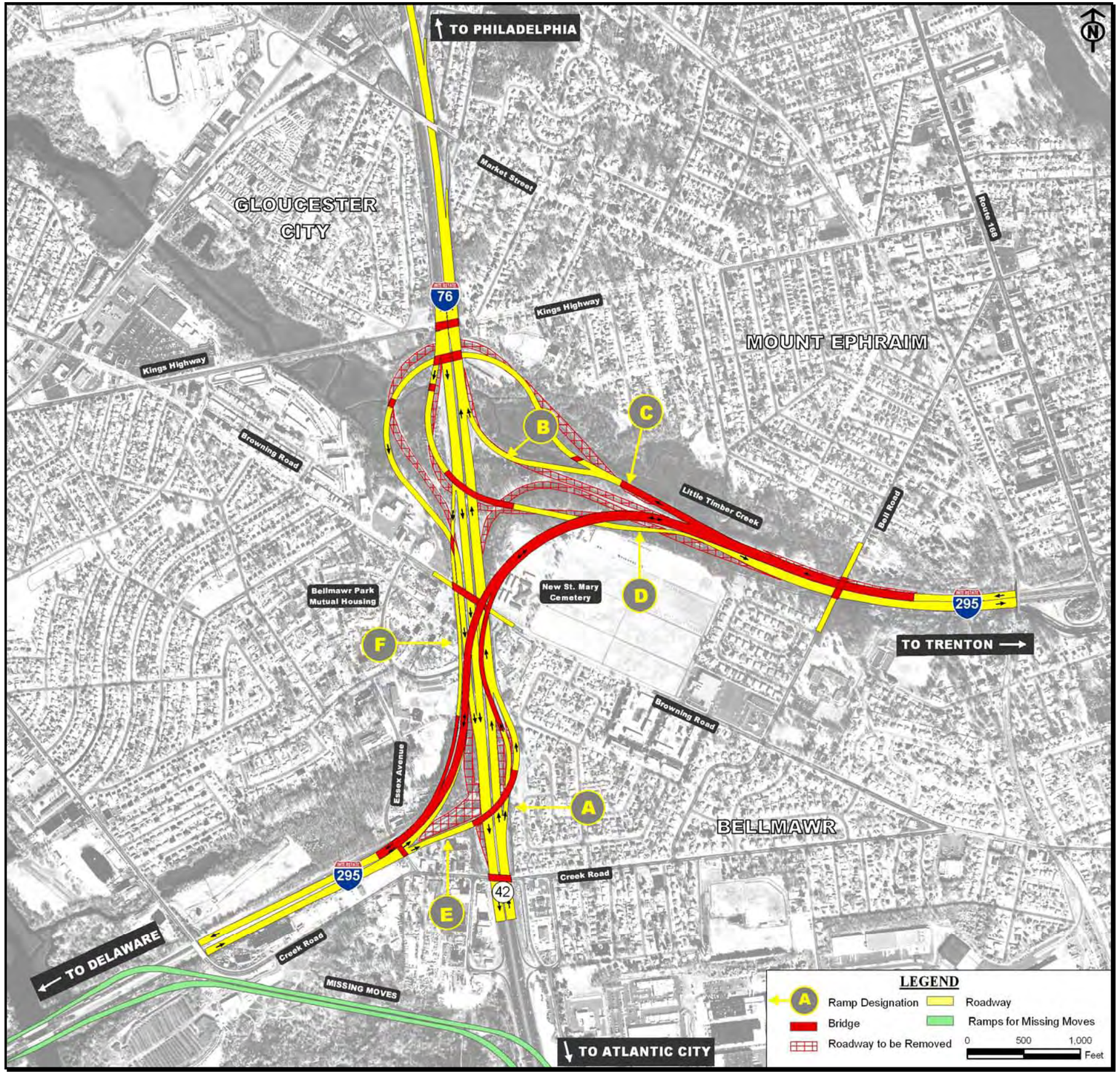


Figure 4.5-4: Alternative H1

4.5.2.5 Alternative K

The design features of the Alternative K alignment include:

- I-295 is a continuous direct-through alignment in the form of a tunnel beneath I-76/Route 42.
- Northbound and southbound I-295 are side-by-side.
- Removes express/local lanes on I-76 northbound.
- I-295 Posted Speed Limit: 55 mph (Design Speed: 60 mph).
- Ramp Speed Limits: 40 mph (Design Speed: 45 mph).
- Two lane ramps except Ramp F.
- Beginning in the vicinity of the Grenloch Secondary Railroad Bridge, mainline I-295 shifts slightly south and begins to descend at approximately 3.5% grade close to New St. Mary's Cemetery. The road reaches a depth of 60 feet in the northwestern corner of New St. Mary's Cemetery, and a depth of 35 feet below the I-76/Route 42 pavement. The roadway begins to ascend at a 4% grade beside the baseball fields and is at grade to meet the I-295 pavement north of the Creek Road overpass.
- The mainline I-295 tunnel will be approximately 660-feet-long with two tubes, approximately 60-feet-wide, passing under I-76/Route 42. The center pier for the Browning Road Bridge may be integrated with the tunnel structure.
- I-295 mainline tunnel section consists of three 12-foot travel lanes with inner and outer shoulders in both directions separated by a median wall. Northbound outer shoulder and southbound inner shoulder both widen for stopping sight distance.
- I-295 mainline tunnel has maximum span parallel to the I-76 roadway of 220 feet. Portals set parallel to I-76 minimize overall length.
- Ramp A (northbound Route 42 to I-295 northbound) crosses under Ramp E before joining the depressed I-295 alignment north of Browning Road. This ramp configuration, in conjunction with the new I-295 mainline alignment, eliminates the current substandard weaving condition with Ramp E at this location. Ramp A will be immediately below Ramp E for approximately 900 feet, abutting the proposed retaining wall adjacent to Fir Place. For a tunnel length greater than 800 feet, ventilation issues become more of a concern requiring detailed engineering analysis.
- Ramp B (southbound I-295 to northbound I-76) follows a similar alignment to its existing one to meet I-76 northbound.
- Ramp C crosses over Ramps B and D, I-76, Browning Road, and I-295 to connect with Route 42 north of the Creek Road Bridge. Ramp C over I-295 will be an approximately 2,200-foot viaduct, and will be approximately 55-feet-high over I-76/Route 42.
- Ramp D (I-76 southbound to I-295 northbound) crosses over I-76, under Ramp C, over Ramp A and over I-295 before merging with Ramp A.
- Ramp E (I-295 northbound to I-76 northbound) follows essentially the same alignment as it does now.
- Ramp F (I-76 southbound to I-295 southbound) diverts from I-76 from the right (existing exit is from the left), and then passes under Browning Road. Ramp F rises from a depressed section at Browning Road parallel to Ramp C to an elevated structure as it ties into I-295 southbound prior to Essex Avenue.
- I-76 over existing Ramp C is a 60-foot single span bridge whose roadway below will be abandoned and replaced with a foot trail.
- Retaining walls/boat section heights will be up to 67 feet.
- Cost to build - $822 million.
- Construction duration – 88 months.

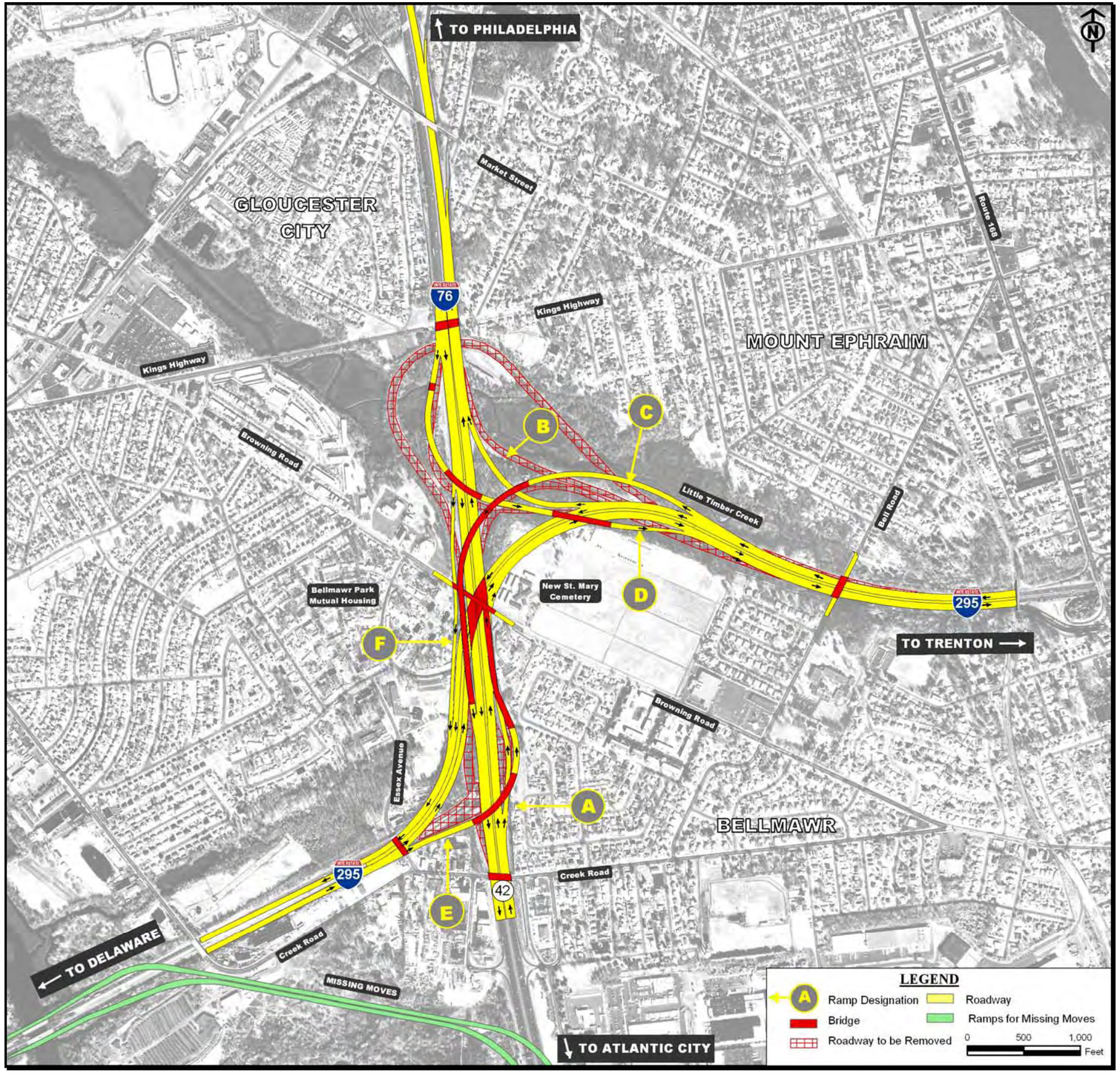
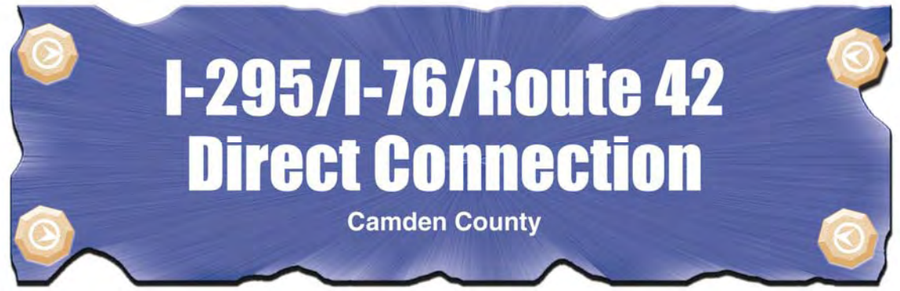


Figure 4.5-5: Alternative K



CHAPTER 5:
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter provides a description of existing conditions, as well as potential impacts and mitigation for the following environmental disciplines: traffic and transportation; noise; air quality; socioeconomics, land use, and environmental justice; natural ecosystems; archaeological resources; historic architectural resources; and hazardous materials. The evaluations provided in this chapter serve as summaries of the *Traffic Report* and TES reports that were prepared for the proposed project. For more detailed information regarding existing conditions and potential impacts, refer to the *Traffic Report* and TES reports included as attachments to this DEIS.

5.1 TRAFFIC AND TRANSPORTATION

Highway designs are typically developed from forecasts of travel patterns and corresponding traffic volumes for a future design year. While separating the traffic flows between I-295 and the I-76/Route 42 tandem roadways is an obvious reason for undertaking this project to improve safety and efficiency, the proper design details for this freeway system must be shaped by what future needs it is required to accommodate. This section summarizes the results of a *Traffic Report* and analyzes potential impacts to traffic and transportation that could result from the proposed project. For more detailed information, refer to the *Traffic Report* which is included in Attachment 1.

5.1.1 Methodology

This traffic analysis follows the operational analysis procedures required for preparing FHWA Interstate Access Modification/Revision Reports. Consistent with FHWA guidance, the analysis year for this traffic study is 2030, which represents the estimated year of project completion (2010) plus 20 years. The study area boundary for this traffic analysis is the project limits for the proposed project, as defined in Chapter 2.

Year 2030 traffic projections were based on demographic and land use data from the DVRPC *Destination 2030*, the long-range regional plan for nine counties in both New Jersey and Pennsylvania. It was formally adopted in June 2005. Trips generated using the DVRPC database were then assigned to the project-specific travel demand model network, which itself was built upon the DVRPC's highway network. After proper calibration, the project travel demand model was used to evaluate the impacts and effectiveness of various freeway design alternatives. All of the build alternatives meet the project objectives for improving safety and efficiency, while the No Build Alternative does not.

Within New Jersey's Burlington, Camden, and Gloucester Counties, the new DVRPC population and employment projections show high growth within the I-295 corridor (both north and south of I-76/Route 42). From 2000 to 2030, population and employment are forecasted to increase significantly in Burlington, Gloucester and Mercer Counties. In contrast, forecasts for Camden County in these categories are minimal (see **Tables 5.1-1** and **5.1-2**). These trends are typical of all metropolitan areas around the country. Since the first suburban development was completed in Levittown, Pennsylvania in 1958, most of the growth in population and employment anywhere in the United States has largely occurred in suburban areas surrounding the older, central cities. Although this trend is expected to continue into the future, newer regional plans (such as *Destination 2030*) that are being developed include combinations of various strategies to help curb sprawl and preserve natural resources.

POPULATION	2000	2030 FORECAST	% CHANGE (2000 TO 2030)
Burlington	202,535	249,653	23.2%
Camden	216,931	235,453	8.5%
Gloucester	99,467	135,627	36.4%
Mercer	209,758	258,818	23.4%
Total (4 NJ Counties)	728,691	879,551	20.7%
Source: DVRPC *Destination 2030* (June 2005)			

Table 5.1-1: DVRPC Population Projections

EMPLOYMENT	2000	2030 FORECAST	% CHANGE (2000 TO 2030)
Burlington	423,394	532,850	25.9%
Camden	508,932	515,425	1.3%
Gloucester	254,673	337,090	32.4%
Mercer	350,761	398,389	13.6%
Total (4 NJ Counties)	1,537,760	1,783,754	16.0%
Source: DVRPC *Destination 2030* (June 2005)			

Table 5.1-2: DVRPC Employment Projections

5.1.2 Existing Conditions

In October 2000, an extensive traffic data collection effort was undertaken to record prevailing traffic flows in the interchange area. These field studies included automatic traffic counts that recorded one-week's worth of hourly data, manual turning movement counts at local intersections, and travel time and delay studies on freeways within the project area. The resulting year 2000 traffic flows, which are rounded to the nearest 10 vehicles, are shown for existing conditions and the 2030 No Build Alternative on **Figure 5.1-1.** Both AM and PM peak hours are shown.

Traffic in the study area flows primarily toward Philadelphia during the AM peak and away from Philadelphia during the PM peak. Heavy trucks comprised 1%-5% of the total vehicles during any hour of the day. It should be noted that Route 42 connects with the Atlantic City Expressway; as a result, traffic volumes through the I-295/76/42 interchange are significantly higher during the summer-to-early fall months when the New Jersey shore communities are in full operation. In general, freeway sections that serve the peak travel direction operate at capacity even absent any operational complexity or roadway deficiency. Sections where major movements weave across each other (such as the weave between I-295 northbound and Route 42 northbound vehicles, as shown in **Photograph 5.1-1**) turn into bottlenecks during peak travel periods and generate back-ups that propagate onto upstream sections of roadways. Origin-and-Destination (O&D) data for drivers on I-295, I-76/Route 42 and various ramps were compiled using an aerial survey and a license plate survey. Data from sections where weaving volumes occurred were analyzed in great detail. The O&D data—i.e., where drivers enter and exit the interchange area, respectively—are useful for the design, alignment and spacing of various ramps as well as for the configuration of mainline lanes. A sampling of significant observations from these studies is provided below:

Photograph 5.1-1: View of Existing Traffic Flow Looking South

- Regardless of which freeway drivers use to enter the interchange area, over 80% of them stayed on the same freeway to leave the interchange.
- Approximately 50% of drivers who enter I-295 southbound from Route 168 northbound travel to destinations that can be reached via I-76 northbound (involving a weave movement). The other 50% have destinations that are reached by using I-295 southbound or Route 42 southbound (via Al Jo's Curve). By comparison, only 16% of drivers entering I-295 southbound from Route 168 southbound travel to destinations that can be reached via I-76 northbound.
- Approximately 50% of drivers who exit I-295 northbound at the Route 168 interchange originate from Ramp D, the ramp that exits I-76 southbound and connects with I-295 northbound. The other 50% originate from south of the interchange on either I-295 northbound or Route 42 northbound.
- Approximately 65% of drivers exiting Route 42 southbound for Leaf Avenue (involving a weave movement) originate from I-76 southbound. The remaining 35% come from I-295 southbound.
- Approximately 50% of drivers exiting I-76 northbound for Market Street originate from the I-76 northbound, local lanes. The other 50% originate from I-295 southbound.
- Approximately 90% of drivers exiting I-76 northbound for Route 130 northbound originate from either I-295 northbound or Route 42 northbound. The rest originate from I-295 southbound
- Approximately 80% of drivers entering I-76 southbound from Route 130 and Market Street have destinations that are reached via Route 42 southbound or I-295 southbound. The remaining 20% have destinations that are reached via I-295 northbound.
- Data on bus volumes were collected for Route 42/I-76 in order to analyze the need for dedicated bus lanes within the interchange. NJ Transit data included northbound I-76 bus volumes bound for the Walt Whitman and Ben Franklin Bridges. While the AM weekday data showed a relatively low volume of buses (18-21) using the Walt Whitman and Ben Franklin Bridges and traveling on Route 42/I-76 freeways, the PM data showed a range from 36 buses for a typical weekday to 61 buses for a Saturday evening, which is likely related to activities in Atlantic City.

5.1.3 Potential Impacts and Mitigation

Considerable details were added to the DVRPC highway network within the project area in order to better reflect capacity limitations imposed by individual ramps and intersections in this area. The year 2030 traffic volume projections were constrained as needed to ensure that the projected peak hour volumes on the highway sections leading to and from the interchange did not exceed the maximum hourly capacities of these highway sections. No constraints were applied to exit ramp capacities that might exist due to conditions at local road intersections. Consequently, the constrained volumes may be somewhat conservative because the actual maximum volumes that can pass through the interchange could potentially be lower. The resulting traffic volumes are shown in **Figure 5.1-2** for the 2030 build scenario. Both AM and PM peak hours are shown.

5.1.3.1 Impact Evaluation Criteria

To determine the traffic impacts of the No Build Alternative and each of the build alternatives, five quantitative performance measures were evaluated. These performance measures are discussed below and each section evaluates potential benefits and impacts that could result under each alternative.

5.1.3.2 No Build Alternative

Under the No Build Alternative, only routine maintenance would take place and no improvements would be made to study area roadways. The existing interchange would continue to be insufficient to accommodate current traffic volumes and travel speeds safely. Failing levels of service on the interchange ramps, combined with congestion of local streets, would continue to adversely affect the quality of life in the surrounding communities.

5.1.3.3 Build Alternatives

Traffic Operations Benefits

The traffic analysis indicates that overall traffic flow conditions under any of the five build alternatives will be relatively similar. Against the No Build Alternative, any of the build alternatives will deliver better overall traffic operations because they will separate through-traffic on I-295 from that on I-76/Route 42. Average speeds will be higher and average delay per vehicle will be lower on the I-295 mainline and the I-76/Route 42 mainline for all build alternatives compared to the No Build Alternative. The overall interchange average speed predicted under the build alternatives is 32 mph (AM/PM peak) versus 25/26 mph (AM/PM peak) under the No Build Alternative.

On a section-by-section basis, however, there are instances where sections of freeway in the No Build Alternative would operate at relatively better levels of service because they are located downstream of sections that are congested (bottleneck). As a result, the bottleneck section is regulating or metering the volume that gets through it and arrives at the downstream section. If these bottlenecks were in fact addressed by the build alternatives, it is possible that the section(s) of freeway downstream of the previously bottlenecked section would operate at a lower level of service under the build alternatives compared to the No Build Alternative.

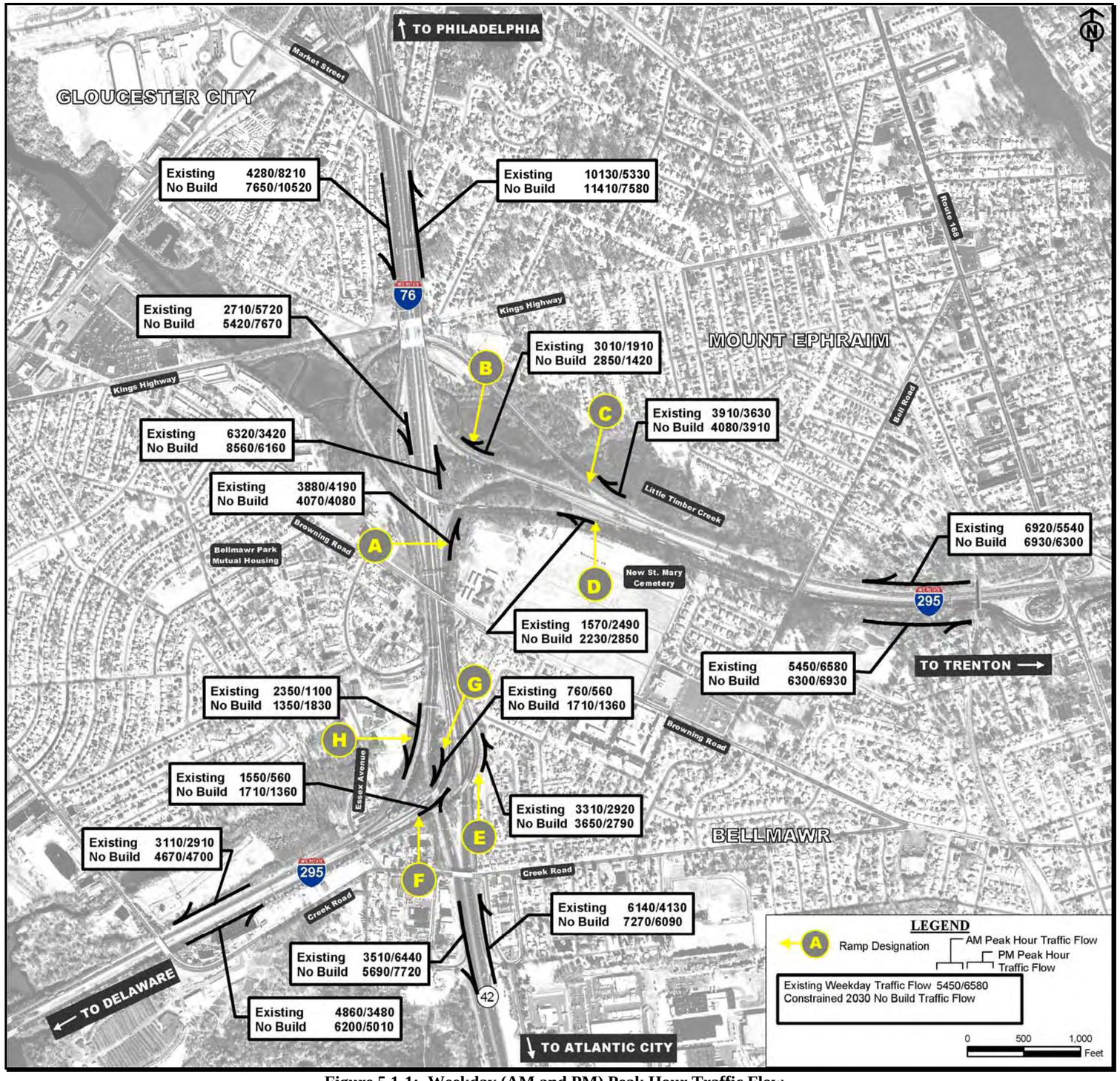


Figure 5.1-1: Weekday (AM and PM) Peak Hour Traffic Flow

One such section is I-76 northbound (or Route 42 northbound) where it intersects with Ramp B (I-295 southbound to I-76 northbound). During the AM peak hour, the section of I-76 northbound can be expected to operate at an average speed of 47 mph under the No Build Alternative. But the section of I-76 northbound upstream of this junction with Ramp B is the section where I-295 northbound and I-76 northbound (i.e., on the I-76 local roadway only, not the I-76 expressway) come together and their respective heavy traffic volumes have to weave against one another to get to their destinations. This is a bottleneck where the expected average speeds of I-76 northbound vehicles will be about 10 mph. By comparison, under the build alternatives, the section of I-76 northbound where Ramp B joins with it is expected to operate at an average speed of about 20 mph. This low speed results from the need to accommodate 9,240 vehicles per hour (VPH) on a four-lane I-76 northbound mainline at a point where Ramp B, with its 1,540 VPH, is coming onto I-76 northbound. It is important to note that the 9,240 VPH on I-76 will arrive at the Ramp B junction without encountering any bottleneck at an upstream section. One of the sections upstream of Ramp B is where Ramp E comes onto I-76 northbound. At that location, the I-76 mainline is expected to operate at an average speed of 42 mph. (As mentioned above, this same section will operate with an average speed of only 10 mph under the No Build Alternative.)

At the I-295/Route 168 interchange, traffic operations on I-295 southbound will be similar between the No Build Alternative and any of the build alternatives. This common condition is expected because traffic volumes in the year 2030 under either the No Build Alternative or the build alternatives will have exceeded the capacity of I-295 in both directions. Further, no capacity improvement to I-295 is assumed under this project. For I-295 northbound however, traffic flow under the build scenarios will be slightly better than those under the No Build because traffic volumes from the two Route 168 on-ramps to I-295 northbound will be lower in 2030 under the build conditions.

Travel Time Savings

Comparisons of the total Vehicle-Hours Traveled (VHT) that the highway assignment model estimates for the AM and PM peak periods under both the build alternatives and No Build Alternative were completed. The following area-wide reductions in delay will be realized as a result of building the proposed project—i.e., any of the build alternatives—compared to the No Build Alternative:

- Approximately 4,570 vehicle-hours during the two-hour AM peak period, and
- Approximately 7,120 vehicle-hours during the three-hour PM peak period.

The project travel demand model does not provide estimates for other time periods, but it is reasonable to assume that the vast majority of travel time savings occur during regular weekday, peak commuting periods. Most of these savings will be realized on roads within the towns of Mount Ephraim and Bellmawr, along with the adjacent towns such as Brooklawn and Runnemede, because the project will reduce overall traffic volumes on their local roads. Although the build scenarios deliver significantly higher average travel speeds than those in the No Build Alternative, more traffic

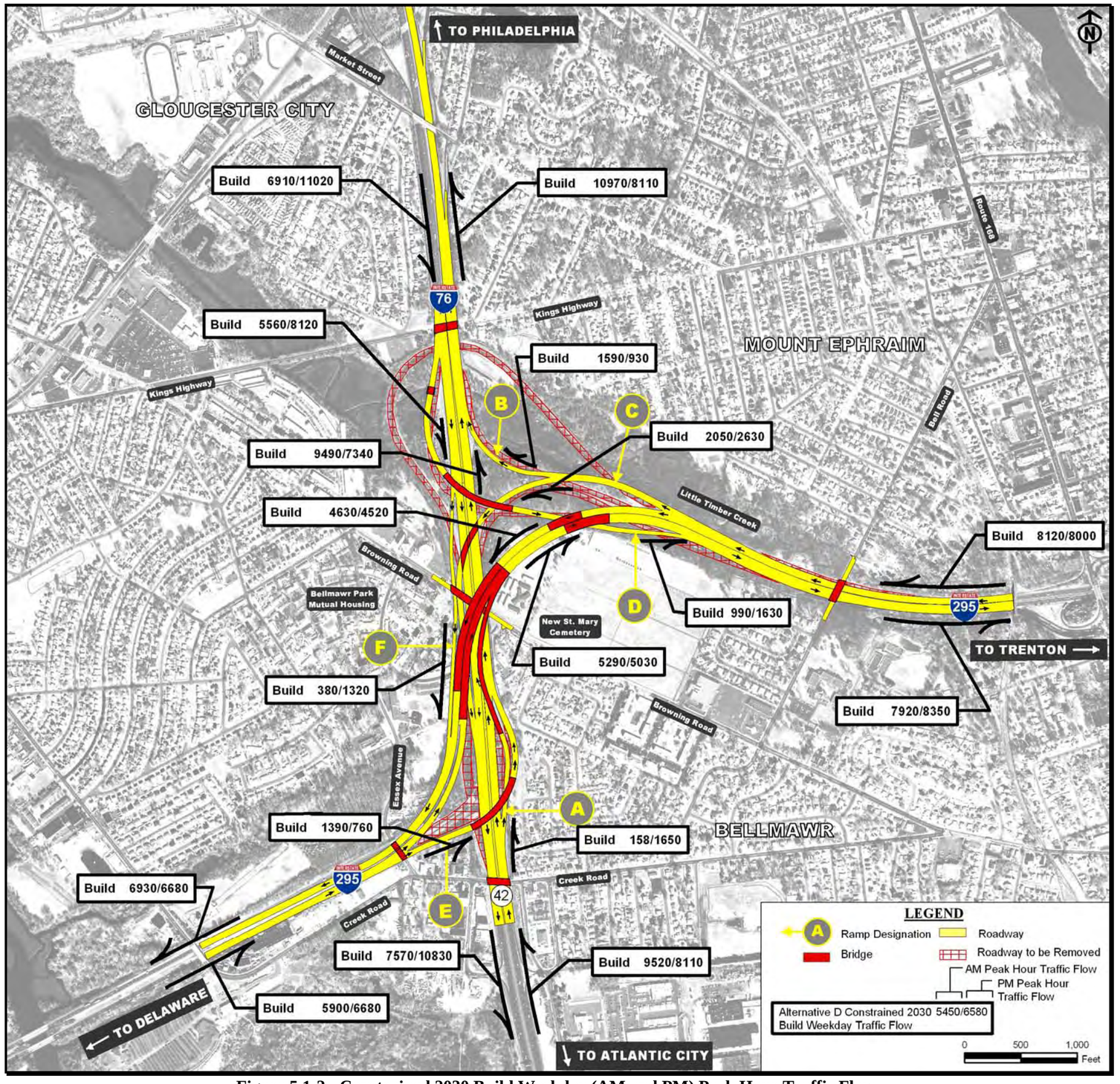


Figure 5.1-2: Constrained 2030 Build Weekday (AM and PM) Peak Hour Traffic Flow

volumes are being accommodated under the build scenarios than the No Build Alternative. As a result, the travel time savings are not as pronounced on mainline freeway sections between No Build Alternative and build scenarios. Overall, traffic flow under the build scenario will be much better (and with higher throughput efficiency) than the No Build Alternative.

Congestion Relief on Local Arterials

Consistent with the travel time savings cited above, considerable reductions in traffic volumes on the local arterial system within the project area can also be anticipated for the build scenarios because regional traffic will choose to remain on the highway. The magnitudes of these reductions are presented in **Figures 5.1-3 and 5.1-4.** Reducing the traffic volumes on the local arterial system will invite greater use by both pedestrians and bicyclists alike, fostered by the compact design, mixed land uses and maturity of the communities surrounding the interchange area.

Traffic volume reduction strategies that have already been implemented, or will be evaluated during final design, include Park and Ride Lots/Express Lanes, Intelligent Transportation Systems, Feasibility and Concept Development of Southern New Jersey Ferry Service, Pilot Commuter-based Carpool Programs, and EZPass implementation at the Walt Whitman Bridge Toll Plaza.

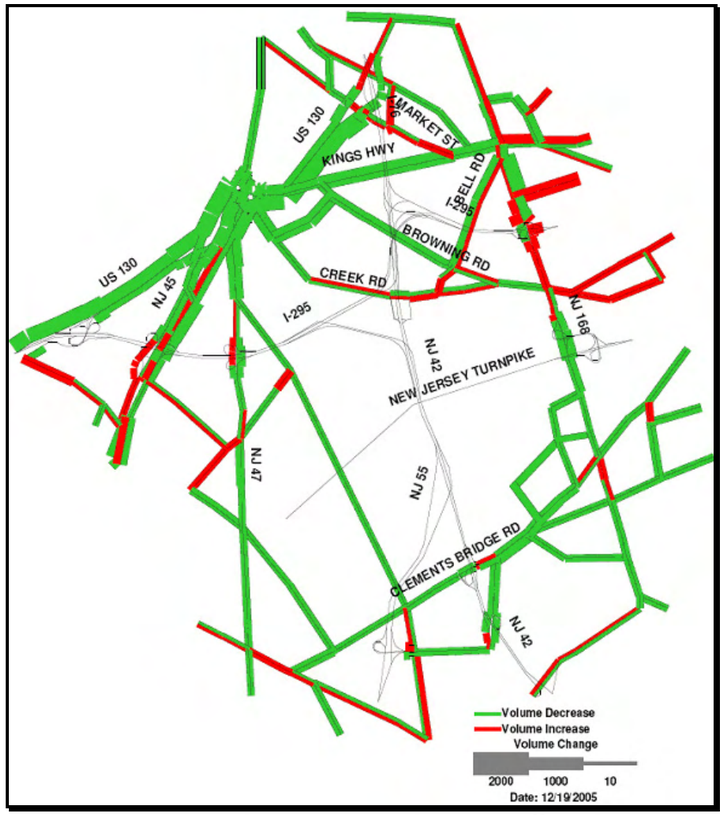


Figure 5.1-3: Change in AM Peak Hour Traffic Volume Build vs. No Build

Construction Impacts

Throughout construction of the proposed project, the same number of lanes available today will be maintained during peak hours. Traffic diversions to the local arterial system will be planned in such a manner so as to minimize the chance of overwhelming any specific location.

A temporary weaving condition on I-76 southbound (a.k.a. Route 42 southbound) will exist after the closure of existing Ramp G and prior to the closure of existing Ramp C. PM peak period diversions in 2010 due to the temporary southbound weaving section will be much more dispersed. Most roadways, with the exception of I-295 southbound, will generally not be impacted by this temporary weave condition. Average back-ups on I-295 southbound will be approximately seven miles long with the weave condition compared to four miles long without it. This longer back-up will add about 17 minutes of travel time through the interchange.

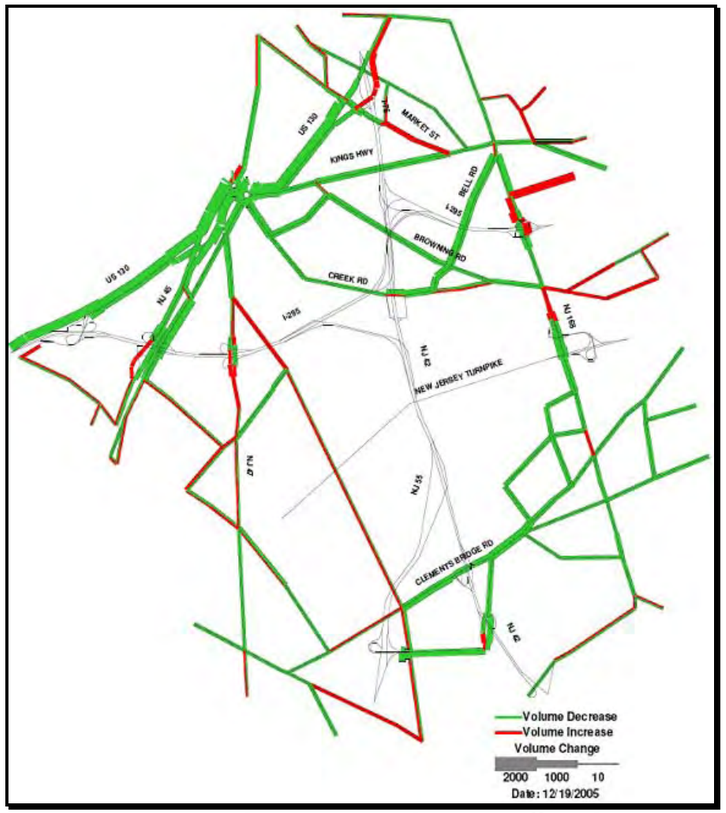


Figure 5.1-4: Change in PM Peak Hour Traffic Volume Build vs. No Build

The weave condition would take place for Alternatives D, D1, G2, and H1 for the durations listed below:

- Alternative D—8 months;
- Alternative D1—18 months;
- Alternative G2—30 months; and
- Alternative H1—12 months.

During final design, opportunities to shorten these durations will be investigated with the addition of temporary pavement and use of a temporary bridge. Southbound through-traffic on I-295 and traffic from southbound I-295 to southbound Route 42 will share a three-lane, 900-foot section of roadway with traffic from southbound I-76 to southbound I-295. The travel demand model estimates some diversions of I-76 southbound mainline traffic to southbound Route 130. An illustration of such diversions (for Alternative D) is shown in **Figure 5.1-5** for the year 2010. More traffic is expected to divert during the AM peak because I-295 southbound through-traffic is projected to be high. As southbound Route 130 is not congested in the morning, it is expected that this roadway should be able to absorb the added load. By comparison, Alternative K can be constructed without using the temporary weave condition. However, due to the complexities of tunnel construction, it will require a minimum of 24 additional months of construction time compared to the construction schedule of other build alternatives.

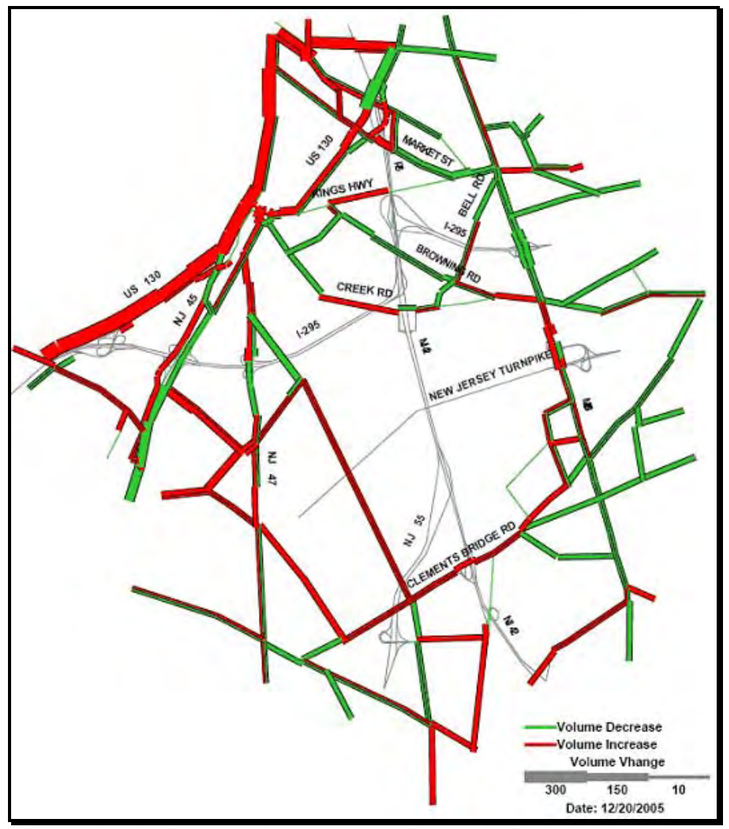


Figure 5.1-5: Construction Impacts—Change in 2010 AM Peak Hour Traffic Volume Alternative D vs. No Build

Accident Reduction Benefits

All of the build alternatives will reduce the number of annual crashes that result in injuries and fatalities at the interchange by approximately 70%, even if no growth in traffic occurs between the No Build Alternative and the build

alternatives. The annual economic benefit of such reductions is about $11 million in 2005 terms, based on approximate average costs provided by NJDOT. Most of these crash reductions will be realized because all build alternatives will physically separate the major traffic flows on I-295 from those on I-76/Route 42, as well as from the construction of highway facilities that meet current design standards.

5.2 NOISE

The proposed project involves reconstruction of a busy roadway interchange, which may result in noise level increases due to alignment alternations and construction activities. This section summarizes results of the *Noise TES* and analyzes potential noise impacts that could result from the proposed project. For more information, refer to the *Noise TES* included in Attachment 2.

5.2.1 Methodology

A noise analysis was performed to predict the existing noise levels (Year 2000) and future noise levels (Year 2030) under the No Build Alternative and the build alternatives. In order to predict future noise levels, an accurate understanding of the existing noise environment was necessary. Therefore, short and long-term noise monitoring was performed by NJDOT during summer (August 2000) and non-summer periods (March through April 2001). The noise monitoring data as well as existing traffic volumes, speeds, existing noise wall heights and other site-specific information were utilized to validate the approved FHWA Traffic Noise Model, Version 2.5 (TNM2.5). Additional receptors representing sensitive land-use were placed within the validated model.

To ensure the most conservative noise condition was predicted, future (Year 2030) conditions were modeled utilizing Level of Service C (LOS C) traffic volumes and speeds along each roadway within the study area. During LOS C traffic conditions, roadways experience a maximum number of vehicles traveling at the speed limit, which generally yields peak noise levels.

In order to accurately predict future interior noise levels at specific sensitive sites, a building attenuation study was performed at the Annunciation Regional School and Bellmawr Park Elementary School in several first and second floor classrooms. A combination of measured and standard FHWA building attenuation values were utilized when predicting interior noise levels.

5.2.1.1 Regulatory Context

To evaluate the impact of the proposed project, a noise analysis was performed in accordance with the provisions set forth in 23 CFR 772. For purposes of this project, highway traffic noise was measured and modeled based on approved methods. In accordance with 23 CFR 772 and NJDOT guidelines, noise impacts were assessed in two ways: the overall resultant noise level with implementation of the project (each build alternative including the No-Build Alternative) as well as the change in noise levels over existing conditions, even though the impact criterion level is not reached. The immediate area within the I-295/I-76/Route 42 Direct Connection project is developed and has changed very little since 2000. Planned, designed and programmed sensitive sites were assumed as part of the analysis.

5.2.1.2 Criteria for Determining Impacts

Noise levels are quantified in units of decibels (dB) for which several scales have been developed. The A-weighted scale (units expressed as dBA) relates to human frequency sensitivity and therefore compares well with human reaction. Since very few noise sources are constant, an equivalent steady-state sound level (units expressed as L_{eq}) is utilized to represent average noise levels over a period of time. Therefore, highway traffic noise is measured and modeled based on A-weighted, one-hour equivalent sound level, which is denoted as dBA L_{eq}.

FHWA has established Noise Abatement Criteria (NAC) for several land-use activities, as shown in **Table 5.2-1**. The study area for this noise analysis includes three NAC land-use categories: Category B (exterior), Category C (exterior), and Category E (interior). Within the study area, the Category B land-use includes residential dwellings (single, dual, and multi-family) and special-use properties (school fields, recreational areas, and cemeteries). Category E (interior) land-use, such as schools and churches, was also investigated. In addition, there were several commercial/industrial sites or Category C land-use investigated throughout the study area. According to FHWA guidance and current NJDOT policy, a project-related noise impact occurs if either of the following conditions is met:

- Predicted noise levels (dBA L_{eq}) approach or exceed the NAC. Noise levels that approach the criteria are defined as occurring one dBA L_{eq} less than the NAC. As a result, impacts are quantified based on the following noise levels: Category B—66 dBA L_{eq}, Category C—71 dBA L_{eq} and Category E—51 dBA L_{eq}.
- A substantial increase (10 dBA L_{eq}) in predicted project-related noise levels over existing conditions, even though the impact criterion level above is not reached. This increase is roughly a doubling of the perceived noise levels.

ACTIVITY CATEGORY	NOISE LEVEL (dBA L_{eq})	DESCRIPTION OF ACTIVITY CATEGORY
A	57	Lands on which serenity and quiet are of extraordinary significance and serve an important public need where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72	Developed lands, properties or activities not included in Categories A or B above.
D	—	Undeveloped lands.
E	52 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Table 5.2-1: Threshold for Noise Interference and Noise Abatement Criteria (dBA L_{eq})

Under existing and future conditions, residential Category B impacts are quantified based upon the number of structures as well as the total number of residential units (single, dual, and multi-family). Total multi-family residential units were calculated based on 75 residential units within the Mount Ephraim Senior Housing building and four residential units within each Bellmawr Park Mutual Housing Corporation quad. In addition, there is one row of housing along Browning Road that consists of 23 individual residential units.

For simplicity, a reference to the Bellmawr Baseball League Fields includes two baseball fields, while a reference to the Bellmawr Park Elementary School includes the playground and baseball field. Any reference to the Scott E. Mueller Park includes three hockey rinks and one baseball field. The Annunciation B.V.M. Church grounds include the Annunciation B.V.M. Church and Church Hall, the Annunciation Regional School, a convent, rectory, and playground. The Church, Church Hall and School are classified as Category E land-use, while the rectory, convent and playground are Category B.

FHWA LAND-USE ACTIVITY	IMPACT CRITERION	NUMBER OF IMPACTS						
		2000 EXISTING	2030 NO BUILD	2030 BUILD ALTERNATIVES				
				D	D1	G2	H1	K
B-Residential (Single-family)	NAC	52	101	145	147	151	153	147
	10 dBA Above "Existing"	—	—	1	1	4	4	0
B-Residential (Dual-family)	NAC	22	42	48	48	72	72	38
	10 dBA Above "Existing"	—	—	0	0	1	1	0
B-Residential (Multi-family)	NAC	103	126	146	146	150	150	142
B-Cemetery	NAC	1	1	2	2	2	2	2
B-Recreational Area	NAC	2	2	3	5	3	5	3
E-School	NAC	2	2	3	3	3	3	3
E-Church	NAC	2	2	2	2	2	2	2
C-Commercial/ Industrial	NAC	7	11	11	11	15	15	10
Percentage Increase over No Build		N/A	N/A	26%	27%	40%	42%	21%
TOTAL		191	287	361	365	403	407	347

Table 5.2-2: Summary of Impacts without Mitigation 2000 Existing, 2030 No Build, and 2030 Build Alternatives D, D1, G2, H1 and K

In accordance with 23 CFR 772, noise levels were calculated for existing and proposed land-use including the recently constructed Mount Ephraim Senior Housing building (multi-family residential) and a proposed residential development with sub-division approval located at Bell Court in Mount Ephraim. In addition, future 2030 sensitive receptors include a proposed softball field associated

with Mount Ephraim Girls Softball. Construction of the NJDOT Missing Moves project was also assumed throughout all future 2030 noise analyses.

5.2.2 Existing Conditions

Under the 2000 existing analysis, noise walls were modeled based on their current location and height. A total of 177 residential units, including the Mount Ephraim Senior Housing Building, possess noise levels that approach or exceed the Category B NAC. In addition, three Category B special-use properties, including one cemetery (New St. Mary's) and two recreational areas (Bellmawr Park Elementary School and the Bellmawr Baseball League Fields), incur noise levels that approach or exceed the NAC. Interior noise levels approach or exceed the Category E NAC within two schools (Annunciation Regional and Bellmawr Park Elementary) and two public-use buildings (Church and Church Hall), associated with the Annunciation B.V.M. Church. Results of the 2000 existing analysis are included within **Table 5.2-2.**

5.2.3 Potential Impacts and Mitigation

5.2.3.1 No Build Alternative

Under the 2030 No Build Alternative, a total of 269 residential units, including the Mount Ephraim Senior Housing building, are predicted to possess noise levels that approach or exceed the Category B NAC. Similar to existing conditions, three Category B special-use properties, including New St. Mary's Cemetery, Bellmawr Park Elementary School and Bellmawr Baseball League Fields, possess noise levels that approach or exceed the NAC. In addition, two schools (Annunciation Regional and Bellmawr Park Elementary) and two Annunciation B.V.M. Church buildings (Church and Church Hall) are predicted to possess noise levels that approach or exceed the Category E NAC under the 2030 No Build Alternative. Results of the analysis under the 2030 No Build Alternative are included within **Table 5.2-2**. Predicted impacts as well as the 66 dBA L_{eq} contour are detailed within **Figure 5.2-1**.

5.2.3.2 Build Alternatives

Under the 2030 build alternatives, eight structure acquisitions would be necessary under Alternatives D, D1, and K, and three would be necessary under Alternatives G2 and H1. In addition, several segments of existing noise walls would require removal to accommodate the designs. Therefore, the build alternatives were modeled with these acquisitions and noise wall removals taken into account to determine the true impact of each alternative. Thus, predicted impacts increase by 26%, 27%, 40%, 42% and 21% under Alternatives D, D1, G2, H1, and K, respectively, when compared to the No Build Alternative.

Under each build alternative, two cemeteries (New St. Mary's and Resurrection of Christ) are predicted to possess noise levels that approach or exceed the Category B NAC. In addition, three recreational areas (Bellmawr Park Elementary School, Bellmawr Baseball League Fields, and Scott E. Mueller Park) possess noise levels that approach or exceed the Category B NAC. Under Alternatives D1 and H1, the proposed Mount Ephraim Girls Softball Field and the Annunciation Regional School playground are predicted to be impacted. Three schools (Annunciation

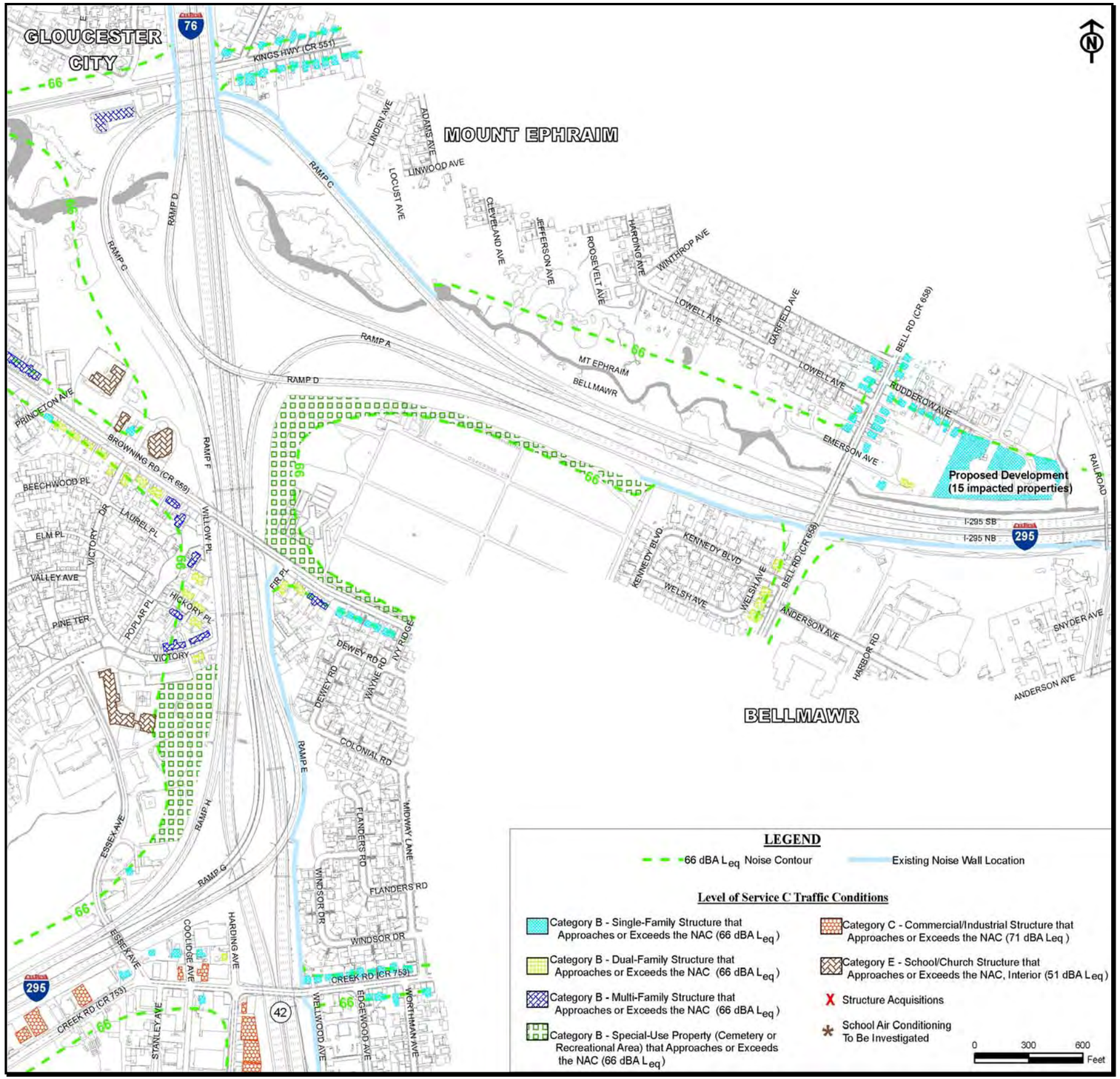


Figure 5.2-1: 2030 No Build Alternative 66 dBA Noise Contour

Regional, Bellmawr Park Elementary, and Bell Oaks) as well as two church buildings (Church and Church Hall) associated with the Annunciation B.V.M. Church, possess noise levels that approach or exceed the Category E NAC under each build alternative. **Table 5.2-2** includes results of the build alternatives. Note that the table details both impact criteria: noise levels that approach or exceed the NAC as well as noise levels that substantially increase from existing to build conditions. Receptors that are impacted based on the second criterion are located behind existing noise wall segments, which would be removed and subsequently replaced.

5.2.3.3 Mitigation

Noise mitigation measures must be considered when noise impacts are predicted. The FHWA recognizes five methods of mitigation: traffic management, roadway alignment alterations, property acquisition, sound proofing, and noise walls (see **Photograph 5.2-1**). Traffic management strategies, such as prohibiting specific types of vehicles throughout the interchange, alternative traffic routing schemes, or reducing speeds, are contradictory to the purpose of the project. Due to the complexity of roadway geometry, roadway alignment alternations by either increasing or decreasing roadway or shifting the roadway horizontal geometry, specifically for mitigation purposes, is not feasible. Each build alternative requires property acquisitions due to the design; however, there are no buffer areas available in the project area. Although each strategy was investigated, sound proofing of public-use buildings and noise walls were determined to be feasible mitigation methods for the proposed project.

Photograph 5.2-1: Existing Noise Wall Along I-76 Northbound

Regardless of the alternative selected, areas within the proposed project limits would experience an increase in noise levels during the construction phase. Equipment such as bulldozers, scrapers, backhoes, graders, loaders,

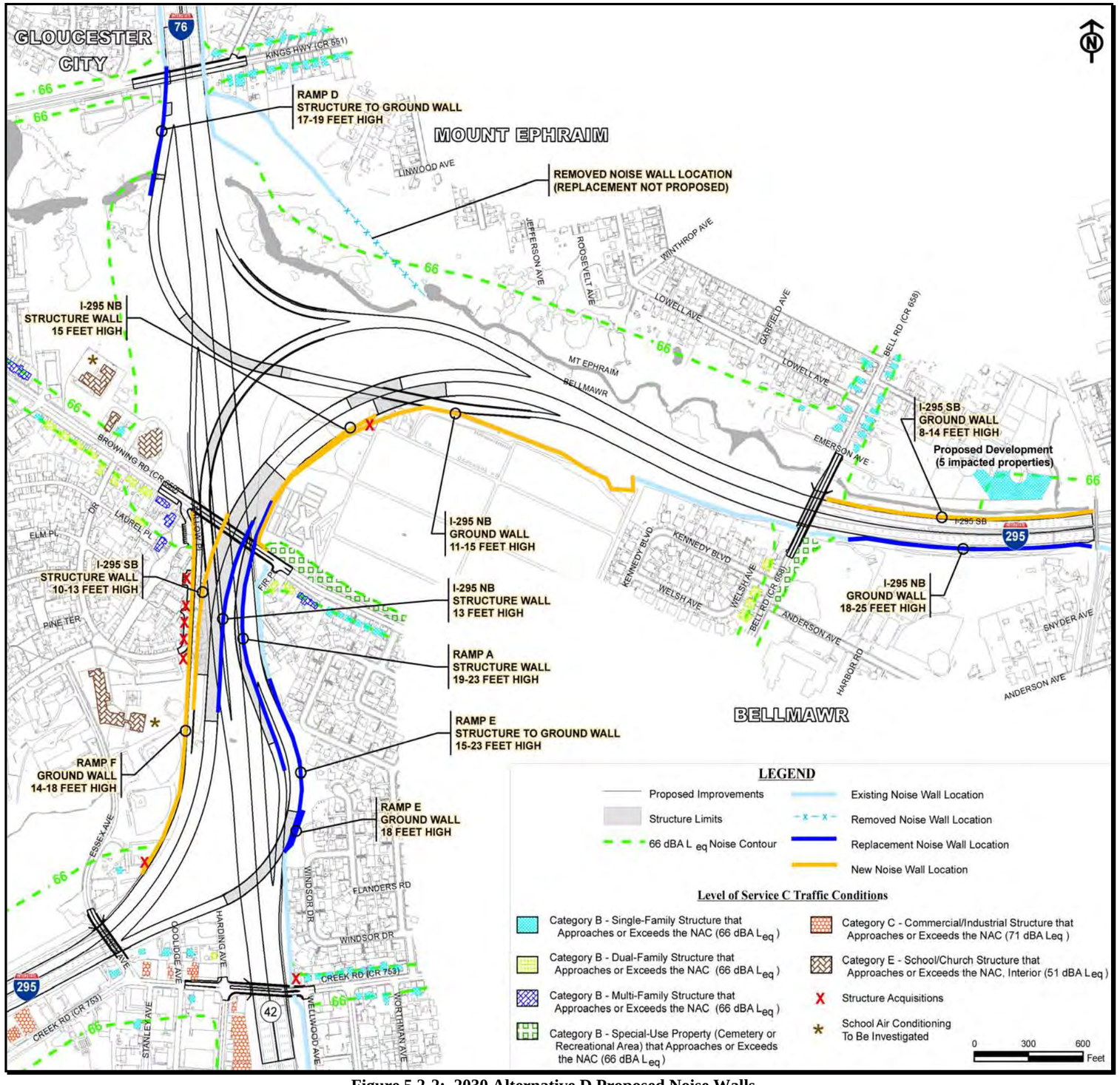


Figure 5.2-2: 2030 Alternative D Proposed Noise Walls

cranes and trucks would be used during construction; however, the equipment is subject to construction noise specifications. Construction noise levels for residences and commercial/industrial establishments may reach 90 to 95 dBA L_{eq} during some phases of construction.

Photograph 5.2-2: Existing Noise Wall Along Al Jo's Curve

On-site construction noise mitigation options such as mufflers and construction of portable noise walls around individual construction equipment when operated within 150 feet of noise sensitive sites, will be specified to minimize construction noise impacts. Whenever possible, the proposed noise walls will be constructed as early as feasible within the construction schedule of the project. When this is not possible, temporary sound walls will be evaluated. During final design, the project staging will be reviewed to determine high noise activities and potential impacts. Public outreach programs will be implemented throughout the construction duration to notify residents of construction activities, including temporary noise impacts due to construction staging. Construction specifications will require that truck routes during construction avoid residential neighborhoods whenever possible. Construction activities on the highways will not require trucks to traverse through residential neighborhoods. However, certain work activities (i.e. landscaping) may require trucks to access this work through the adjacent residential neighborhoods.

Sound Proofing

Sound proofing a public-use building is an effective means of mitigating a Category E NAC interior noise impact. There are five Category E land-use facility impacts within this study area: the Annunciation B.V.M. Church and Church Hall, the Annunciation Regional School, the Bellmawr Park Elementary School, and the Bell Oaks School. The Annunciation B.V.M Church and Church Hall are already air conditioned, thus sound proofing is not necessary.

Under all build alternatives, air conditioning is recommended at the

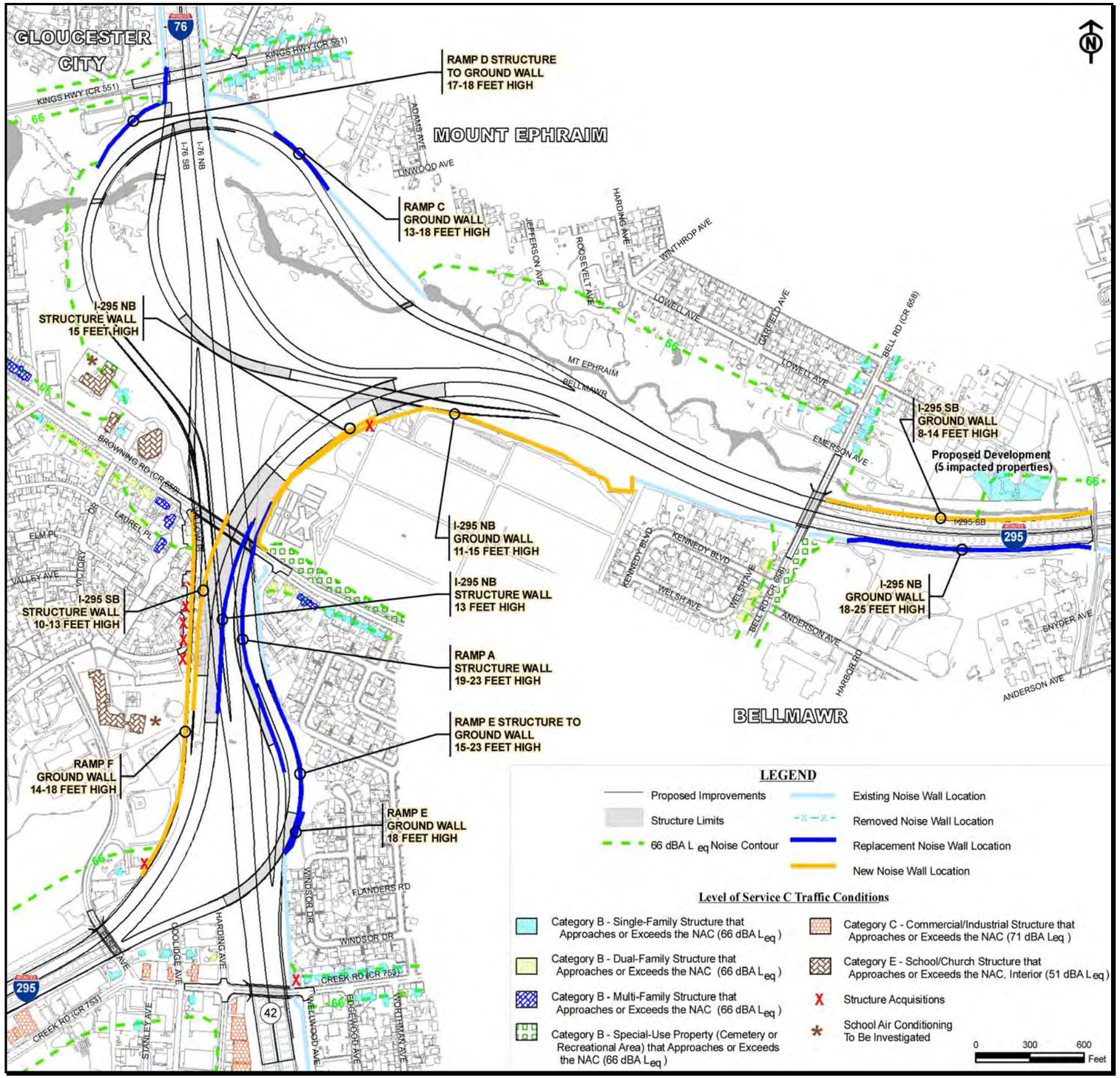


Figure 5.2-3: 2030 Alternative D1 Proposed Noise Walls

MITIGATED IMPACTS	D	D1	G2	H1	K
Residential (Single-family)	62	63	39	40	63
Residential (Dual-family)	16	16	22	22	12
Residential (Multi-family)	107	107	103	103	107
Special-Use (Cemeteries)	New St. Mary's Cemetery, Resurrection of Christ Cemetery				
Special-Use (Recreation)	Bellmawr Park Elementary School Bellmawr Baseball League Fields Scott E. Mueller Park	Bellmawr Park Elementary School Bellmawr Baseball League Fields Scott E. Mueller Park Mount Ephraim Girls Softball	Bellmawr Park Elementary School Bellmawr Baseball League Fields Scott E. Mueller Park	Bellmawr Park Elementary School Bellmawr Baseball League Fields Scott E. Mueller Park Mount Ephraim Girls Softball	Bellmawr Park Elementary School Bellmawr Baseball League Fields Scott E. Mueller Park
Total Costs	$11.2 million	$11.5 million	$12.7 million	$13.0 million	$8.0 million
Residential Noise Impact Reduction	109	109	91	91	113

Note: Residential Noise Impact Reduction—The number of impacts predicted under the No Build Alternative minus the number of impacts predicted under each build alternative, after construction of new and replacement noise walls.

Table 5.2-3: Remaining Residential Noise Impacts

Annunciation Regional School and the Bellmawr Park Elementary School.

Air conditioning is recommended at the Bell Oaks School under Alternatives G2 and H1 only, since proposed noise walls within this area provide the required interior protection under Alternatives D, D1, and K.

Noise Walls

Noise walls are effective means of mitigating Category B NAC exterior noise impacts that are adjacent to roadways. Based on noise modeling for the 2030 build alternatives, new and replacement noise walls were investigated. New noise walls are those considered in areas not currently protected, while replacement noise walls are those requiring removal and reconstruction to accommodate the design.

New noise wall designs were subject to the current *NJDOT Noise Wall Policy* (2003), which allows $50,000 per "benefited residence" and a maximum noise wall height of 18 feet. A "benefited residence" is a dwelling for which noise levels will be reduced by at least 5 dBA L_{eq} with a

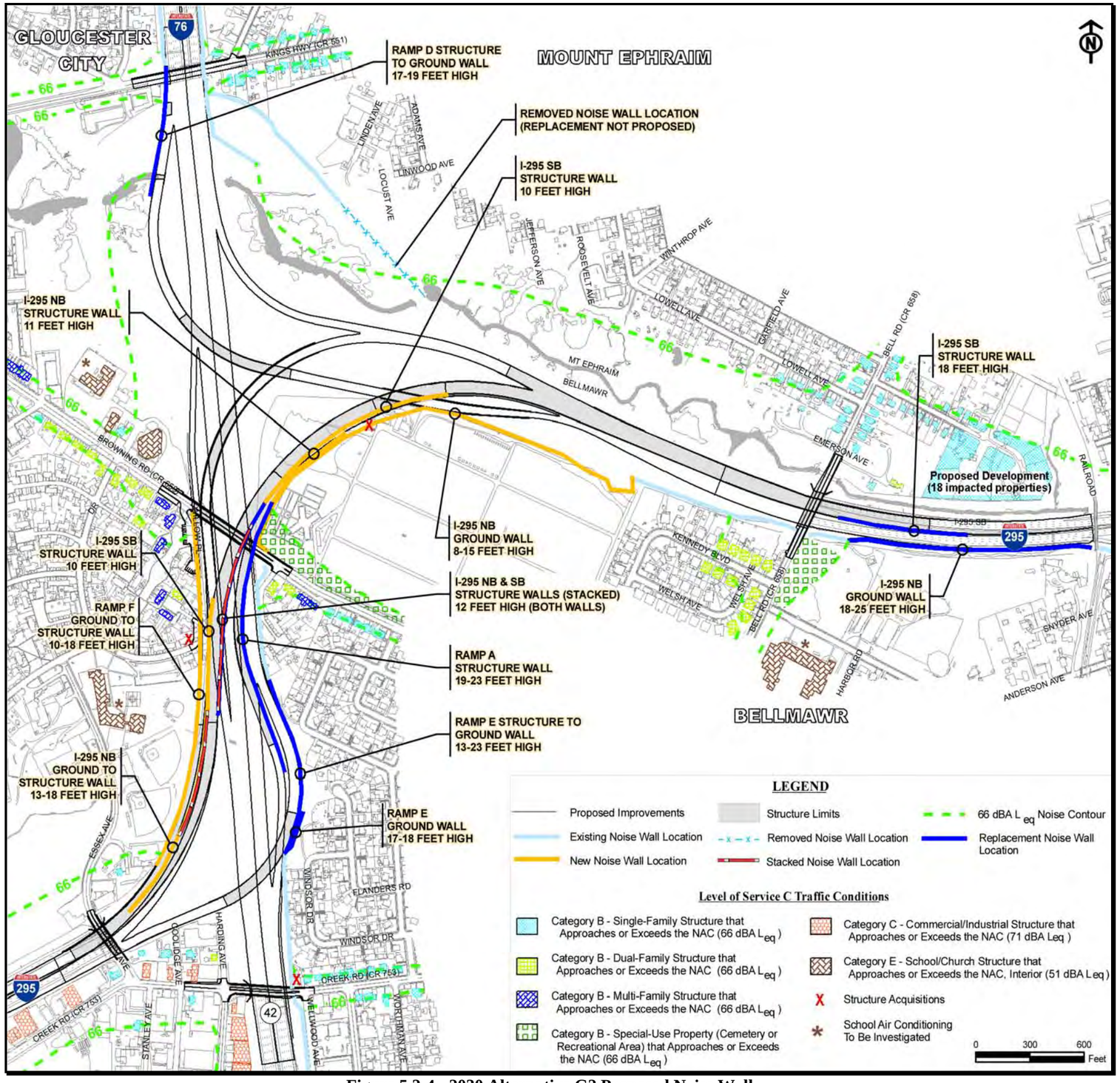


Figure 5.2-4: 2030 Alternative G2 Proposed Noise Walls

noise wall, and resultant noise levels are predicted to be below the NAC after mitigation. When making recommendations for replacement noise walls, the current NJDOT Noise Wall Policy was followed, although several deviations were allowed since the existing noise walls were designed under an earlier Noise Wall Policy. In areas of displaced noise walls, "in-kind" replacement designs were proposed that exceed the current NJDOT Noise Wall Policy. Therefore, replacement noise barriers would provide for future 2030 noise levels under the build alternatives that are comparable to noise levels under the No Build Alternative. A cost per "benefited residence" for replacement noise wall segments was established at $100,000 for these special cases. In addition, NJDOT would allow replacement noise wall designs to exceed 18 feet when necessary, since many of the existing noise walls currently exceed 18 feet (see **Photograph 5.2-2**).

When feasible, new and replacement noise walls are proposed in areas impacted by noise under each build alternative. **Table 5.2-3** provides the number of Category B NAC impacts that were mitigated by noise walls and the total cost of noise walls under each alternative, based on a construction cost of $50/ft^2. Construction of new and replacement noise walls for each build alternative will reduce the number of Category B NAC impacts, when compared to the No Build Alternative. These "residential noise impact reduction" sites are quantified and shown within **Table 5.2-3**. Future noise impacts, location and heights of each noise wall and the 66 dBA L_{eq} noise contour under the build alternatives (with existing and proposed noise walls) are shown within **Figures 5.2-2** through **5.2-6** for Alternatives D, D1, G2, H1 and K, respectively. Although proposed new and replacement noise walls under each build alternative eliminate a significant number of impacts, several residential noise impacts remain. Under Alternatives D, D1 and K, the remaining residential impacts are mainly along the local roadways where noise mitigation is not possible due to driveways and intersections (see **Photograph 5.2-3**). Under Alternatives G2 and H1, the remaining residential impacts are along local roadways as well as areas adjacent to the I-295 double-decker roadways where cost-effective mitigation is not feasible.

DEGREE OF IMPACT	NO BUILD	D	D1	G2	H1	K
Change Not Perceivable (<3 dBA L_{eq})	250	135	125	150	140	133
Change Perceivable (>=3 dBA L_{eq}; <7 dBA L_{eq})	4	15	26	35	46	7
Change Noticeable (>=7 dBA L_{eq})	0	0	0	12	12	0
Approved Future Residential Units	15	5	5	18	18	5
Total Remaining Impacts	269	155	156	215	216	145

Table 5.2-4: Residential Areas with Noise Level Increases from Existing Noise Levels for All Alternatives

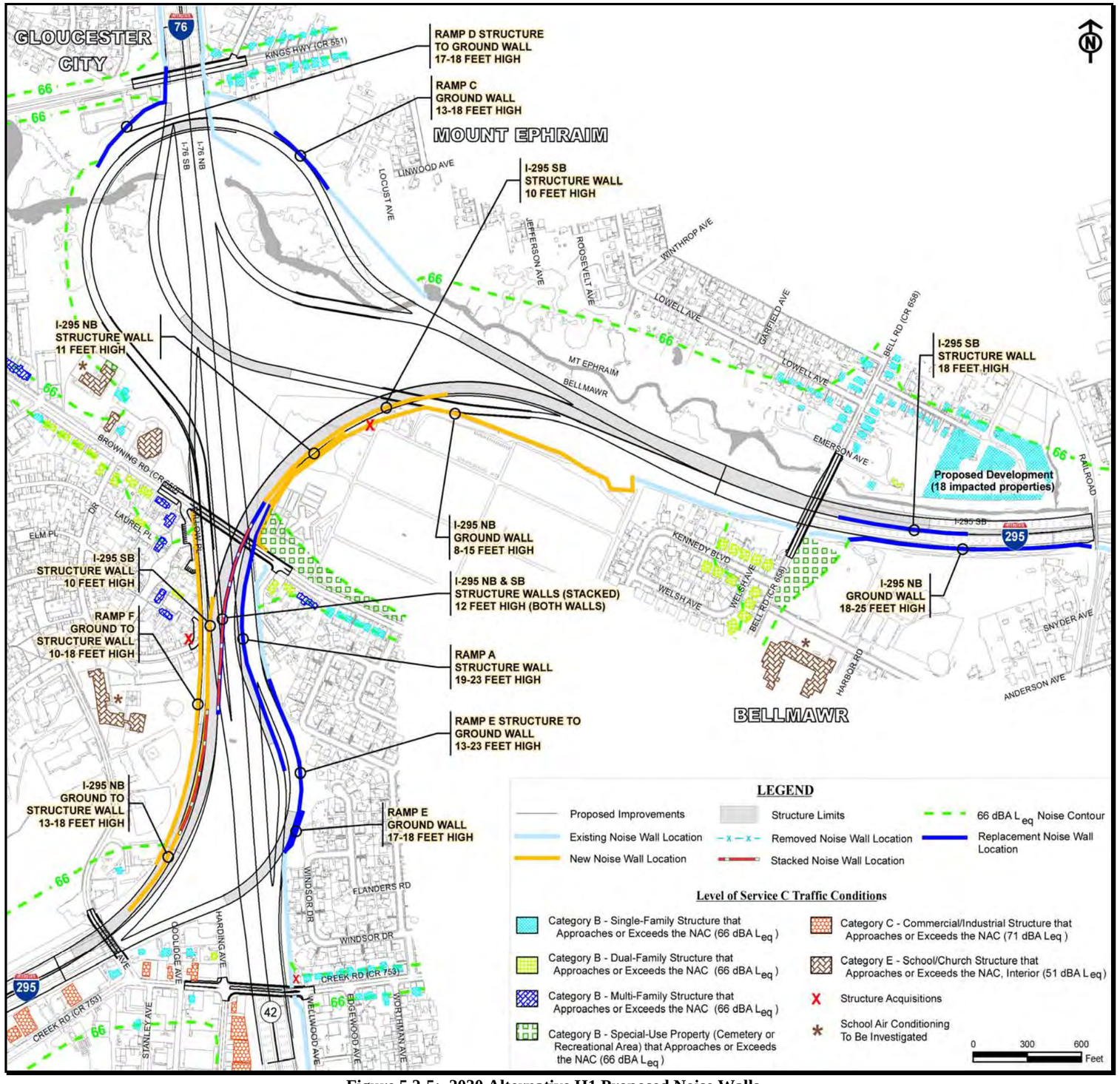


Figure 5.2-5: 2030 Alternative H1 Proposed Noise Walls

Photograph 5.2-3: Existing Noise Wall Along Route 42 Northbound

The remaining impacts to residences were assessed based on the change in noise levels over the existing condition. Increases of less than 3 dBA are considered "not perceivable," since the average human cannot detect an increase less than 3 dBA without the use of instruments. Approximate increases greater than 3 dBA but less than 7 dBA are considered "perceivable," while increases greater than 7 dBA are considered "noticeable." **Table 5.2-4** shows the degree of remaining impacts to residences under the No Build Alternative and each build alternative, in comparison with the existing conditions.

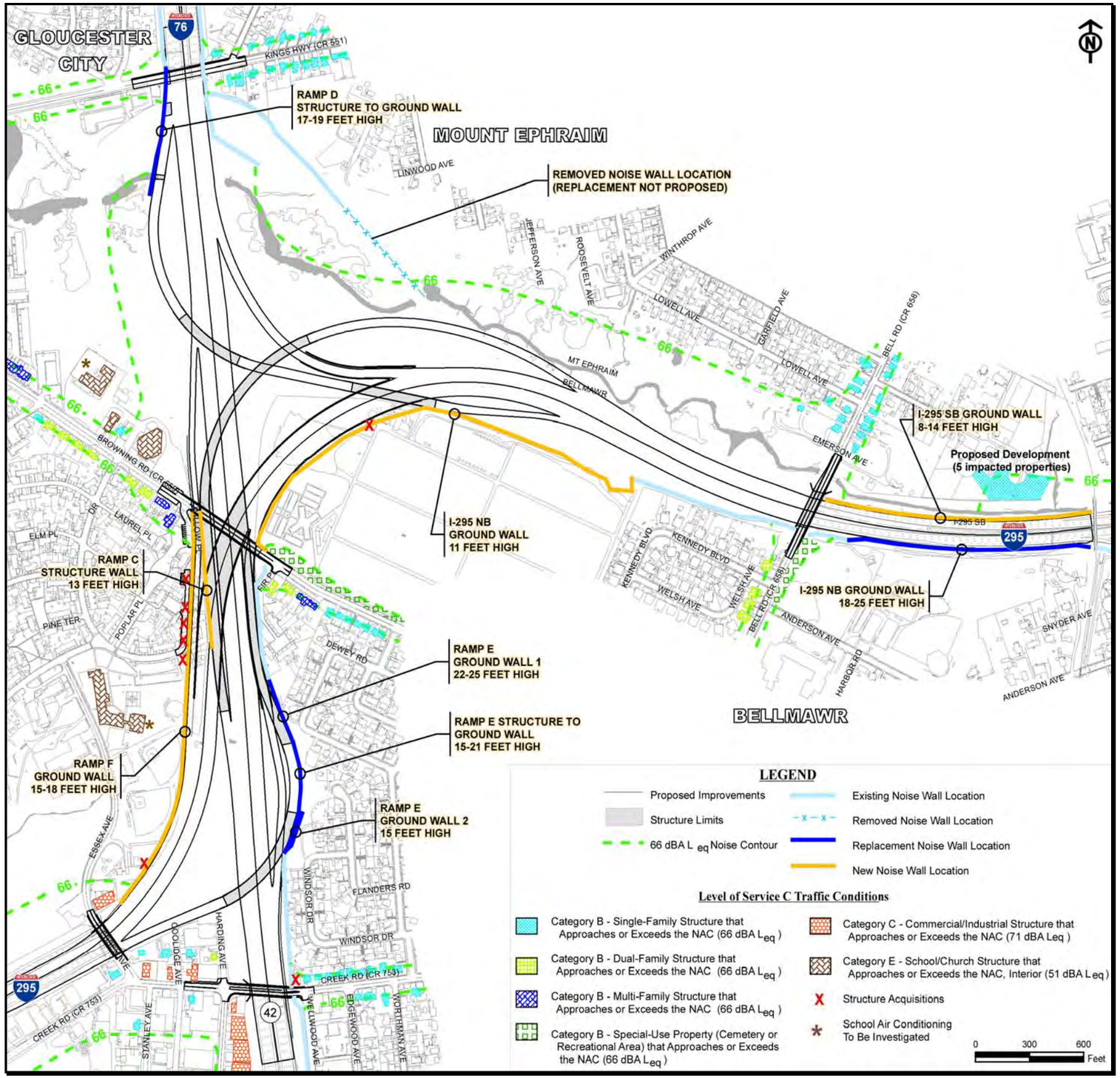


Figure 5.2-6: 2030 Alternative K Proposed Noise Walls

5.3 AIR QUALITY

The proposed project will introduce new traffic movements to the study area and construction activities would occur over several years. Such factors are potential sources of air pollution. This section summarizes the results of the *Air Quality TES* and analyzes potential air quality impacts that could result from the proposed project. For more detailed information, refer to the *Air Quality TES* included in Attachment 3.

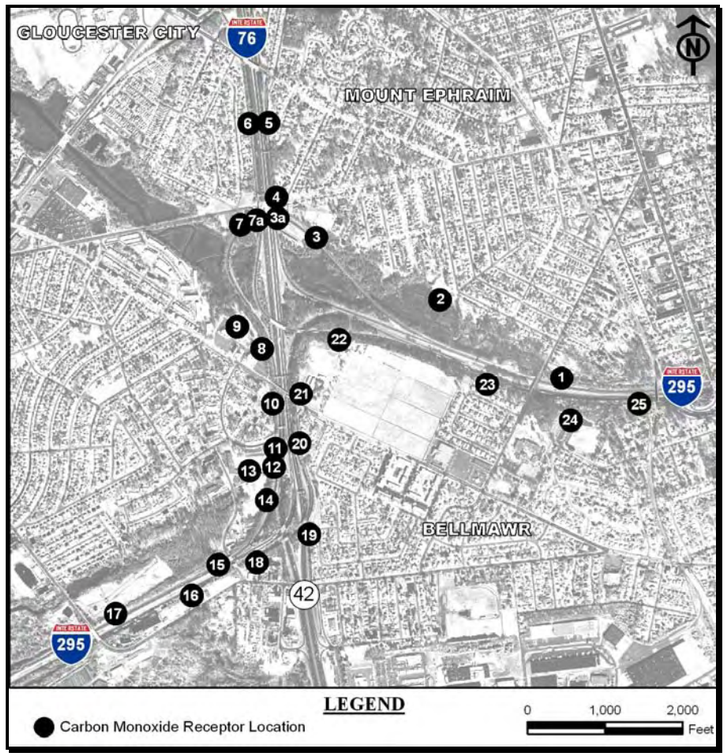


Figure 5.3-1: Carbon Monoxide Detector Locations

5.3.1 Methodology

This air quality analysis was prepared pursuant to requirements set forth by FHWA in 23 CFR Part 771, Title 40, CFR Part 51, Subpart T, and in accordance with USEPA, NJDEP, and NJDOT. As outlined within 40 CFR 93.123, project-related impacts need to be assessed based on a quantitative microscale carbon monoxide (CO) analysis. CO modeling is to be performed at "critical" project-affected intersections. Since there are no project-affected intersections within the study area, a free-flow CO analysis was performed for the proposed project. Detailed 2030 AM and PM peak traffic data for the No Build Alternative and all build alternatives was obtained from the *Traffic Report* (June 2006). Appropriate modeling techniques, outlined in the *Air Quality Analysis for Intersections (November 2001)* document released by the NJDEP's Bureau of Air Quality Evaluation, are required by NJDOT and were utilized to predict CO concentrations.

Three USEPA models were utilized in the air quality analysis: MOBILE6.2 (to calculate emission factors), CAL3QHC (to calculate air dispersion from roadway), and ISC3 (to calculate air dispersion from the tunnel in Alternative K).

A total of 27 sensitive receptors were located along the right-of-way line adjacent to communities and along the perimeter of special-use facilities including recreational areas, baseball fields, schools, churches, and cemeteries (see **Figure 5.3-1**). Some receptors were located in areas that are protected by existing and proposed noise walls. Conservatively, the CO analysis performed for this project assumed no physical barriers existed between the roadway sources and receptor locations. The receptor sites were approximately the same among all alternatives, with minor adjustments in areas where the right-of-way line shifted due to proposed widening.

In March 2006, USEPA established project-level conformity determinations for inhalable particulate matter smaller than 2.5 micrometers ($PM_{2.5}$) non-attainment and maintenance areas and revised the project-level determinations in inhalable particulate matter smaller than 10 micrometers (PM_{10}) areas. This rule requires $PM_{2.5}$ hot-spot analyses be included in project-level conformity determinations when new transportation projects of air quality concern are proposed in $PM_{2.5}$ non-attainment or maintenance areas. The *Transportation Conformity Guidance for Qualitative Hot-spot Analysis in $PM_{2.5}$ and PM_{10} Non-Attainment and Maintenance Areas* (USEPA 420-B-06-902) document was utilized to provide assistance to determine the level of $PM_{2.5}$ assessment.

Although mobile source air toxics (MSATs) are not considered criteria pollutants, interim guidance by FHWA requires MSATs to be addressed due to the potential health risks associated with them. The FHWA's *Interim Guidance on Air Toxic Analysis in NEPA Documents* was utilized to provide direction on MSAT evaluation based on projected impact.

5.3.1.1 Criteria for Determining Impacts

The Clean Air Act of 1970 (CAA) mandated that the USEPA establish ceilings for criteria pollutants. Therefore, National Ambient Air Quality Standards (NAAQS) were established for CO, ozone (O_3), nitrogen dioxide (NO_2), lead (Pb), sulfur dioxide (SO_2), total suspended particulates (TSP), $PM_{2.5}$, and PM_{10}. The ceilings for pollutants are listed within **Table 5.3-1**.

Each criteria pollutant is monitored, on a continuous basis, throughout the state of New Jersey by NJDEP. The main objective of monitoring is to provide an early warning system for pollutant concentrations, assess air quality in light of public health and welfare standards, and track trends in these pollutant levels.

Section 107 of the CAA requires that the USEPA and states throughout the country identify those areas which do and do not meet the NAAQS. An area that meets current standards is referred to as in "attainment." An area which does not meet a standard is in "non-attainment." For non-attainment areas, states are required to revise their State Implementation Plan (SIP) to detail measures whereby NAAQS can be met as expeditiously as practical, within certain time limits. If an area consistently demonstrates air quality levels

POLLUTANT	AVERAGING PERIOD	NEW JERSEY PRIMARY	NEW JERSEY SECONDARY	NATIONAL PRIMARY	NATIONAL SECONDARY
Carbon Monoxide	1 hour 8 hour	40 mg/m^3 (35 ppm) 10 mg/m^3 (9 ppm)	40 mg/m^3 (35 ppm) 10 mg/m^3 (9 ppm)	40 mg/m^3 (35 ppm) 10 mg/m^3 (9 ppm)	- - - -
Ozone	1 hour 8 hour	0.12 ppm -	0.08 ppm -	0.12 ppm 0.08 ppm	0.12 ppm 0.08 ppm
Nitrogen Dioxide	1 year	0.05 ppm (100 ug/m^3)	0.05 ppm (100 ug/m^3)	0.053 ppm (100 ug/m^3)	0.053 ppm (100 ug/m^3)
Lead	3 months	1.5 ug/m^3	1.5 ug/m^3	1.5 ug/m^3	1.5 ug/m^3
Sulfur Dioxide	3 hour 24 hour 1 year	- - 0.14 ppm (365 ug/m^3) 0.03 ppm (80 ug/m^3)	0.50 ppm (1300 ug/m^3) 0.10 ppm (260 ug/m^3) 0.02 ppm (60 ug/m^3)	- - 0.14 ppm (365 ug/m^3) 0.03 ppm (80 ug/m^3)	0.50 ppm (1300 ug/m^3) - - -
Total Suspended Particulates	24 hour 1 year	260 ug/m^3 75 ug/m^3	150 ug/m^3 60 ug/m^3	- -	- -
Inhalable Particulates (PM_{10})	24 hour 1 year	- -	- -	150 ug/m^3 -	- -
Fine Particulates ($PM_{2.5}$)	24 hour 1 year	- -	- -	35 ug/m^3 15 ug/m^3	- 15 ug/m^3

Table 5.3-1: USEPA NAAQS

below the NAAQS, that area can be re-designated from "non-attainment" to "attainment" and be listed in "maintenance." In these areas, the state Department of Environmental Protection must provide USEPA a comprehensive plan detailing methods being instituted to continue the pollutant reduction.

As discussed in Part D, Section 176 (Limitation on certain federal assistance) of the 1990 Clean Air Act Amendments (CAAA), a proposed project cannot:

- cause or contribute any new violation of any standard in any area;
- increase the frequency or severity of any existing violation of any standard in any area; or
- delay the timely attainment of any standard or any required interim emission reductions or other milestones in any area.

5.3.2 Existing Conditions

The study area for the air quality analysis for this project is located in Camden County which is in attainment for NO_2, Pb, SO_2, TSP, PM_{10} and in attainment/maintenance for CO. Camden County is in non-attainment for O_3 and $PM_{2.5}$.

5.3.3 Potential Impacts and Mitigation

Based on both quantitative and qualitative assessments, there is no expected CO, $PM_{2.5}$ or MSAT impact related to the proposed project and therefore no mitigation is necessary. An assessment for each pollutant, as well as a conformity determination, was conducted. Detailed analyses are included within the *Air Quality TES*.

5.3.3.1 Carbon Monoxide

Microscale CO modeling was performed for all alternatives, including the No Build Alternative. NJDEP-approved background levels are added to the predicted CO concentrations at each receptor, which are all expected to be below the one-hour (35 ppm) and eight-hour (9 ppm) NAAQS set forth for CO. The peak one- and eight-hour CO concentrations, including appropriate background levels, are detailed in **Table 5.3-2**. Bold values represent maximum 1-hour and 8-hour CO concentrations for each alternative.

When comparing the 2030 No Build to the 2030 build alternatives (D, D1, G2, H1 and K), some CO concentrations increase while others decrease. For this project, a decrease in predicted CO concentrations under the build alternatives is mainly due to improved roadway operations. On the contrary, an increase in build concentrations over No Build is not caused by a decline of roadway operations, but rather by the fact that the roadway alignment may shift closer to the right-of-way line, and thus the receptor location. Nonetheless, all future 2030 alternatives (No Build, D, D1, G1, H1 and K) document one-hour CO concentrations below the NAAQS, and therefore no mitigation is necessary.

5.3.3.2 Particulate Matter

$PM_{2.5}$ was addressed qualitatively, as per the *Transportation Conformity Guidance for Qualitative Hot-spot Analysis in $PM_{2.5}$ and PM_{10} Non-Attainment and Maintenance Areas* (USEPA 420-B-06-902). All build alternatives propose a physically separated I-295 through-movement from the I-76/Route 42 roadway network. Based on the *Traffic Report*, the overall interchange average speed predicted under the 2030 No Build Alternative is 25/26 mph (AM/PM peak), as compared to a 32 mph (AM/PM peak) average speed predicted under all 2030 build alternatives. In addition, the project is estimated to reduce vehicle-hours traveled by 4,570 vehicles during the two-hour AM peak period, and by 7,120 vehicles during the three-hour PM peak period. Therefore, the build alternatives improve freeway operations and increase vehicle speeds, which would pose no air quality concern with respect to $PM_{2.5}$ concentrations as suggested in 40 CFR 93.123(b)(i) and (ii).

5.3.3.3 Mobile-Source Air Toxics

Although USEPA has recognized the need to evaluate mobile source air toxics (MSATs), an established procedure to quantify MSAT emissions is not available since the USEPA has incomplete information. Means of accurately estimating emission rates and dispersion of MSATs are also currently being examined. The relevance of unavailable or incomplete information is that it is not possible to make a quantitative evaluation of reasonably foreseeable significant impacts on the human environment. Although reliable methods to accurately estimate MSAT health impacts do not exist at this time, MSATs can be qualitatively addressed.

Projected 2030 vehicle miles traveled (VMT) for each build alternative are predicted to increase (22.5%) over the 2030 No Build Alternative. In addition, preliminary studies performed by FHWA predict that MSATs are expected to decrease substantially over the next 25 years due to implementation of USEPA's new programs for fuel and mobile source vehicle engine emission standards. It is important to note that the emission reductions were shown to offset the additional vehicle miles of travel

RECEPTOR LOCATION	PEAK CONCENTRATION (1 HR/8 HR) BY ALTERNATIVE					
	NO BUILD	D	D1	G2	H1	K
1	4.9 / 3.4	4.5 / 3.2	4.5 / 3.2	4.9 / 3.4	4.9 / 3.4	4.6 / 3.2
2	4.0 / 2.8	4.4 / 3.1	4.3 / 3.0	4.3 / 3.0	4.4 / 3.1	4.4 / 3.1
3	6.1 / 4.3	4.0 / 2.8	4.2 / 2.9	4.0 / 2.8	4.0 / 2.8	4.1 / 2.9
3a	-	6.6 / 4.6	-	6.6 / 4.6	-	6.7 / 4.7
4	6.7 / 4.7	6.7 / 4.7	6.7 / 4.7	6.7 / 4.7	6.7 / 4.7	6.8 / 4.8
5	7.4 / 5.2	7.5 / 5.3	7.5 / 5.3	7.5 / 5.3	7.5 / 5.3	7.5 / 5.3
6	**8.6 / 6.0**	7.1 / 5.0	7.1 / 5.0	7.1 / 5.0	7.1 / 5.0	7.1 / 5.0
7	6.3 / 4.4	4.3 / 3.0	4.5 / 3.2	4.3 / 3.0	4.4 / 3.1	4.4 / 3.1
7a	-	6.0 / 5.2	-	6.0 / 5.2	-	6.2 / 5.3
8	5.3 / 3.7	5.7 / 4.0	6.1 / 4.3	5.5 / 3.9	6.1 / 4.3	6.0 / 4.2
9	4.6 / 3.2	4.4 / 3.1	4.8 / 3.4	4.5 / 3.2	4.7 / 3.3	4.4 / 3.1
10	6.1 / 4.3	7.5 / 5.3	**7.9 / 5.5**	**7.9 / 5.5**	**8.5 / 6.0**	7.5 / 5.3
11	7.1 / 5.0	6.6 / 4.6	6.6 / 4.6	7.4 / 5.2	7.4 / 5.2	6.4 / 4.5
12	7.0 / 4.9	6.4 / 4.5	6.4 / 4.5	6.8 / 4.8	6.9 / 4.8	6.3 / 4.4
13	4.4 / 3.1	5.0 / 3.5	5.1 / 3.6	5.0 / 3.5	5.0 / 3.5	5.1 / 3.6
14	5.6 / 3.9	6.3 / 4.4	6.3 / 4.4	6.3 / 4.4	6.3 / 4.4	6.7 / 4.7
15	5.0 / 3.5	4.9 / 3.4	4.9 / 3.4	4.8 / 3.4	4.8 / 3.4	5.1 / 3.6
16	4.7 / 3.3	5.0 / 3.5	5.0 / 3.5	5.0 / 3.5	5.0 / 3.5	5.0 / 3.5
17	5.3 / 3.7	6.2 / 4.3	6.2 / 4.3	6.2 / 4.3	6.2 / 4.3	6.0 / 4.2
18	5.2 / 3.6	5.5 / 3.9	5.5 / 3.9	5.5 / 3.9	5.5 / 3.9	6.0 / 4.2
19	7.3 / 5.1	6.6 / 4.6	6.6 / 4.6	6.6 / 4.6	6.6 / 4.6	6.9 / 4.8
20	6.7 / 4.7	7.1 / 5.0	7.2 / 5.0	7.2 / 5.0	7.3 / 5.1	**7.7 / 5.4**
21	5.4 / 3.8	6.1 / 4.3	6.1 / 4.3	6.2 / 4.3	6.2 / 4.3	7.1 / 5.0
22	4.6 / 3.2	5.0 / 3.5	5.1 / 3.6	5.1 / 3.6	5.0 / 3.5	5.6 / 3.9
23	5.4 / 3.8	5.7 / 4.0	5.7 / 4.0	6.0 / 4.2	6.0 / 4.2	6.0 / 4.2
24	4.0 / 2.8	4.2 / 2.9	4.2 / 2.9	4.2 / 2.9	4.2 / 2.9	4.2 / 3.0
25	6.6 / 4.6	**7.6 / 5.3**	7.5 / 5.3	7.2 / 5.0	7.3 / 5.1	**7.7 / 5.4**

Table 5.3-2: 1hr/8hr CO Concentrations (ppm)
2030 No Build and 2030 Build Alternatives

predicted with an improved highway. As stated within *FHWA's Interim Guidance on Air Toxic Analysis in NEPA Documents*, MSATs are expected to decline unless VMTs more than double by 2020. Regionally, reductions in MSATs are expected over time due to USEPA's vehicle and fuel regulations along with fleet turnover. Therefore, it is not anticipated that the proposed project would meaningfully increase emissions.

According to the document, *Analyzing, Documenting, and Communicating the Impacts of Mobile Source Air Toxic Emissions in the NEPA Process*, dated March 2007, highway projects which add or create new capacity above the 125,000 Annual Average Daily Traffic for interstates qualify for further quantitative analysis. The I-295/I-76/Route 42 Direct Connection project does not add or create new capacity; therefore, no further analysis was conducted.

Construction activity may generate a temporary increase of MSAT emissions. There are several strategies to mitigate construction-related MSATs including a new USEPA cooperative program that is intended to work toward reducing particulate matter and NO_x. Methods to avoid community exposure may include reducing engine activity or shift times. Others include retrofitting specific construction equipment with devices that provide exhaust emission reduction as well as utilizing an ultra-low sulfur fuel during construction of the proposed project.

5.3.3.4 Conformity Determination

Transportation projects that originate from a conforming Statewide Transportation Improvement Program (STIP) are considered to conform to the Transportation Conformity Rule. The proposed project is listed in the *FY 2006-2008 STIP* as Project ID No. 355, which is included in Appendix A. The results of the CO analysis documents CO levels below the one-hour (35 ppm) and the eight-hour (9 ppm) NAAQS. In addition, the proposed project is not expected to create or worsen $PM_{2.5}$ violations. Furthermore, MSAT emissions will likely be lower in the design year than present levels as a result of USEPA's national control program and fleet turnover. Therefore, this project will comply with the conformity requirements established by the CAA and subsequent amendments.

5.4 SOCIOECONOMICS, LAND USE, AND ENVIRONMENTAL JUSTICE

This section evaluates potential impacts related to socioeconomics, land use, and environmental justice that could result from the five build alternatives and one No Build Alternative. This section also evaluates potential impacts to the visual quality/aesthetic quality of the primary study area, as well as the cost benefit resulting from improved safety and travel time. This analysis is based on the *Socioeconomic, Land Use and Environmental Justice TES*. For more detailed information, refer to the TES report included in Attachment 4.

5.4.1 Methodology

The primary study area includes the area where the proposed improvements would be constructed in Bellmawr, Mount Ephraim, and Gloucester City. The secondary study area includes the remainder of the Borough of Bellmawr, the Borough of Mount Ephraim, and Gloucester City.

A combination of field surveys and existing data was used to document the existing community characteristics, land use and zoning, and development proposals within the study area. This information was used to assess potential impacts in the following areas:

- Community Profile;
- Economic Conditions;
- Accessibility and Safety;
- Land Use and Zoning;
- Environmental Justice; and
- Visual Quality/Aesthetics.

For a detailed discussion on the methodology used to identify the existing conditions and to determine the project's potential impacts, refer to the *Socioeconomic, Land Use and Environmental Justice TES.*

5.4.2 Existing Conditions

5.4.2.1 Community Profile

In 2000, the total population of Bellmawr was 11,262, Mount Ephraim was 4,495, and Gloucester City was 11,484. The study area population was summarized by community and broken down by:

- Minority population—Hispanic, Black, Asian, Native American and Alaskan Native.
- Senior citizens—those being over the age of 85 are of special concern.
- Disabled population—disability is defined by the following long-lasting conditions: (a) blindness, deafness, or a severe vision or hearing impairment (sensory disability); and (b) a condition that substantially limits one or more basic physical activities, such as walking, climbing stairs, reaching, lifting, or carrying (physical disability).
- Linguistically isolated population—defined as households where the primary language spoken at home is not English and where individuals within a household speak English "not very well."
- Female heads of household—households with a female listed as the head of household.
- Transit dependent—defined as persons with "zero vehicle availability."
- Income.

Information used to identify the number of people in these groups was obtained from the 2000 Census Data. Two criteria were used in the community profile. The first, Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (EO 12898)*, requires federal agencies to take appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. EO 12898 considers areas with low-income and minority populations above 50% to be significant. The second criteria is the DVRPC identification of significant populations of people in the following categories: disabilities, foreign language, transit dependent and senior citizen. DVRPC considers the following regional thresholds as significant:

- 2% of the population over the age 85;
- 7% of the population with a disability;
- 2% for linguistically isolated populations;
- 8% for female heads of household with children; and
- 16% for transit dependent individuals.

Minority Population

Figure 5.4-1 identifies the minority population percentage in the portion of the primary study area in Bellmawr by race for each census tract and block. The proposed improvements are not located in any areas with a minority population that exceeds the criteria set by EO 12898. As discussed in the TES report, since the 2000 Census, no other large minority groups were identified. As also discussed in the TES report, no areas within the primary study area within Mount Ephraim or Gloucester City had a minority population that exceeded the EO 12898 criteria.

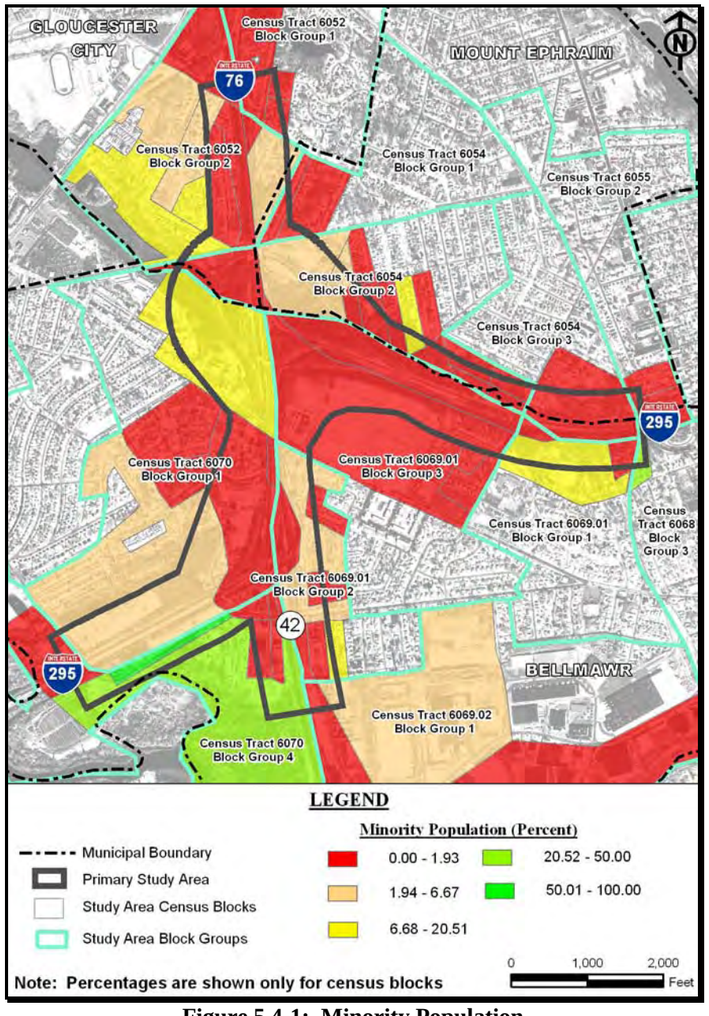


Figure 5.4-1: Minority Population

Senior Citizens

As shown on **Figure 5.4-2**, one census block in Bellmawr, located in an area of proposed improvements (Census Tract 6070, Block 4001), has a percentage of senior citizens higher than the DVRPC regional threshold of 2%. However, none of the improvements would affect buildings or access to the property within the census block.

As shown on **Figure 5.4-2**, none of the census tracts in the primary study area in Mount Ephraim had a senior citizen population over the DVRPC regional threshold of 2%. The Mount Ephraim Senior Housing located along the west side of I-76 along Kings Highway is in the primary study area, but was built after the 2000 Census. Currently, this facility has approximately 111 residents.

Census data indicated that 136 persons (1.18%) over the age of 85 resided in Gloucester City in 2000. This is below the DVRPC regional threshold of 2%. No areas within the primary study area had a population over the age 85 above the 2% DVRPC regional threshold.

Disabled Population

As shown on **Figure 5.4-2**, five census block groups within Bellmawr had disabled populations that met or exceeded the DVRPC regional threshold. Only a small portion of Census Tract 6069.02, Block Group 1 and Census Tract 6068, Block Group 3, lie within the primary study area and are not considered representative of the project area.

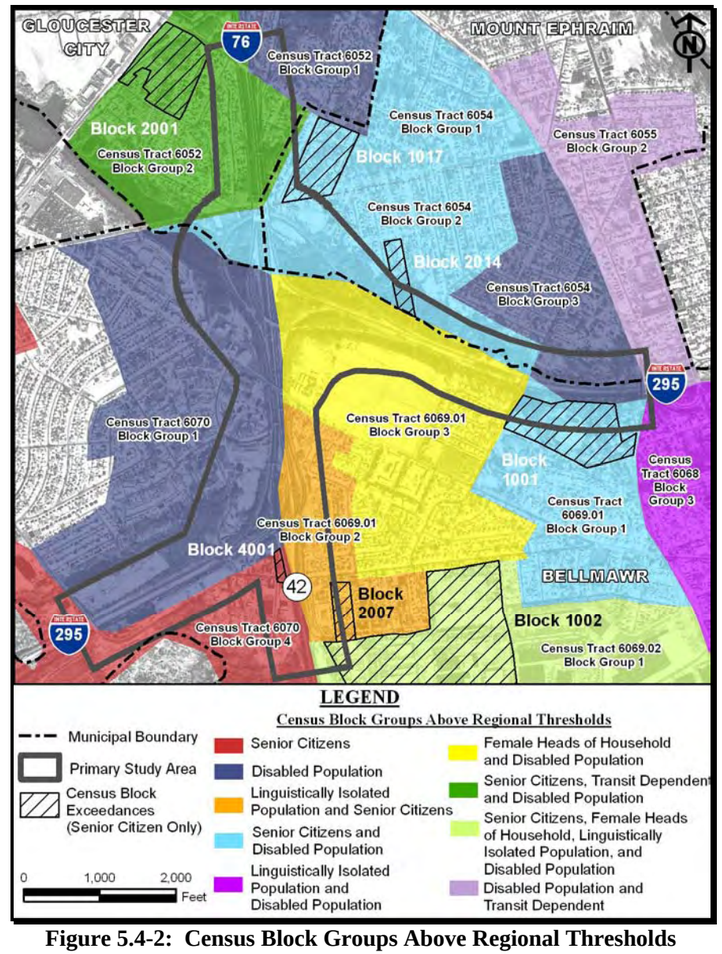


Figure 5.4-2: Census Block Groups Above Regional Thresholds

In Mount Ephraim, four census block groups had a disabled population that met or exceeded the regional threshold (see **Figure 5.4-2**). However, only a small portion of Census Tract 6055, Block Group 2 lies within the primary

study area and is not considered representative of the study area. In addition, approximately 80% of residents within the Mount Ephraim Senior Housing are disabled.

As indicated in **Figure 5.4-2**, two census block groups within Gloucester City contained disabled populations that met or exceeded the DVRPC regional threshold—Block Groups 1 and 2 of Census Tract 6052—and both are within the primary study area. For more information, see the discussion on potential impacts and mitigation measures included in Section 5.4.3.

Linguistically Isolated Population

As shown on **Figure 5.4-2**, three census block groups within Bellmawr had linguistically isolated populations that met or exceeded the DVRPC regional threshold. However, only a small corner of Census Tract 6069.02, Block Group 1, and Census Tract 6068, Block Group 3, lie within the primary study area and are not considered representative.

As shown on **Figure 5.4-2**, Mount Ephraim had 15 linguistically isolated households, which represented 0.35% of the total number of households within the borough. No census tracts or census block groups met or exceeded the DVRPC regional threshold of 2%.

Gloucester City contained 67 linguistically isolated households, which represents 0.62% of the total number of households. As depicted on **Figure 5.4-2**, no census tracts or census group blocks met or exceed the 2% DVRPC regional threshold.

Female Heads of Household

As shown in **Figure 5.4-2**, two census block groups within Bellmawr had proportions of female heads of households that met or exceeded the DVRPC regional threshold. However, only a small corner of Census Tract 6069.02, Block Group 1, lies within the primary study area and is not considered representative.

Mount Ephraim has 53 households, or 2.91%, with the female listed as the head of household. As shown in **Figure 5.4-2**, no census tracts or census block groups within the primary study area met or exceeded the DVRPC regional threshold of 8%.

Gloucester City as a whole has 348 (8.19 %) female heads of household. However, no census tracts or census block groups met or exceeded the DVRPC regional threshold of 8% within the primary study area in Gloucester City.

Transit Dependent

Within Bellmawr, 7% of the population was transit dependent. No census tracts or block groups within the study area met or exceeded the DVRPC regional threshold.

Census data indicated that 206 households, or 11.33% of the occupied housing units in Mount Ephraim, were transit dependent. One census block group within the study area met or exceeded the regional threshold of 16% (Block Group 2 of Census Tract 6055). However, the majority of this census tract lies outside the primary study area and therefore, this block group does not require further review (see **Figure 5.4-2**). In addition, the residents of the Mount Ephraim Senior Housing either have access to cars or rely on the Sen-Han bus service.

Census data indicated that 701 households, or 16.62% of the occupied housing units in Gloucester City, were transit dependent. One census block group within the study area met or exceeded the DVRPC regional threshold of 16%. Block Group 2 of Census Tract 6052 had 70 transit dependent households out of a total of 433 (16.17%).

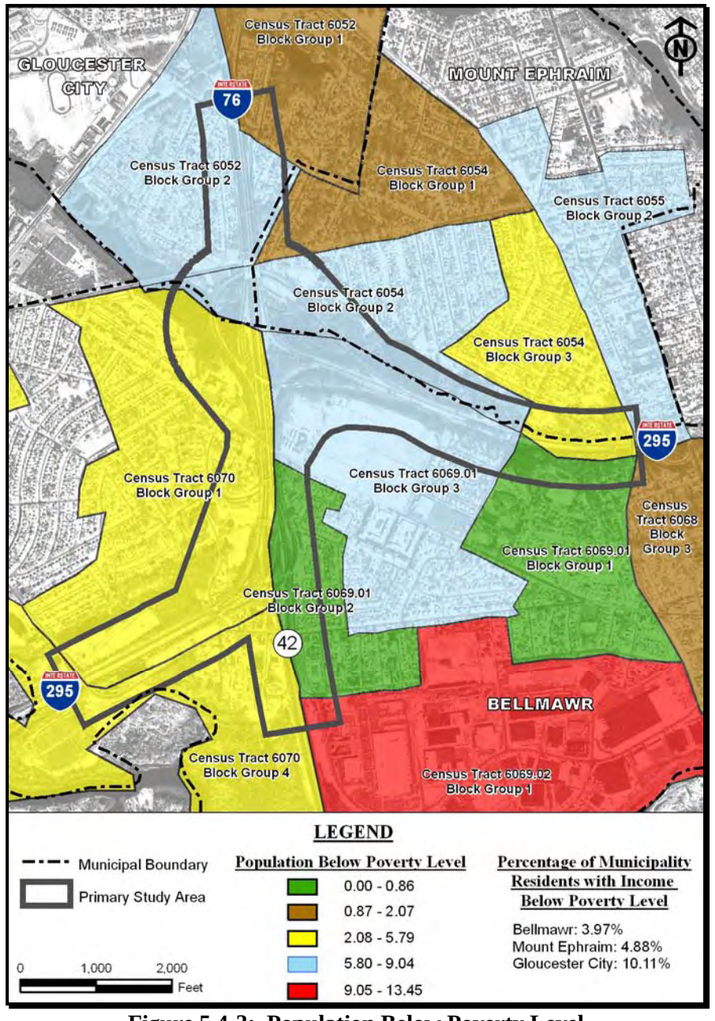


Figure 5.4-3: Population Below Poverty Level

Income

Within Bellmawr, 3.97% of the municipality's residents had a household income below the poverty level. On a census tract level, the percentage of impoverished households within the primary study area in Bellmawr runs the entire range as depicted in **Figure 5.4-3**. No areas within the primary study area in Bellmawr had poverty levels that met the criteria set by EO 12898. The highest concentration of households below the poverty level was 13.45% in Block Group 1 of Census Tract 6069.02. However, only a small portion of this block group falls within the primary study area.

The TES report showed that 4.88% of Mount Ephraim's residents had a household income below the poverty level. Within the primary study area, Census Tract 6055 contained an impoverished population of 4.49% and Census Tract 6054 contained an impoverished population of 5.18%. Neither exceeds the criteria set by EO 12898.

According to the TES report, 10.11% of the residents in Gloucester City had a household income below the poverty level. Census Tract 6052 contained an impoverished population of 8.94%. Block Group 2 within Census Tract 6052 had the second highest proportion of households below the poverty level with 8.85%. Its percentage of low income populations does not meet the criteria set by the EO 12898.

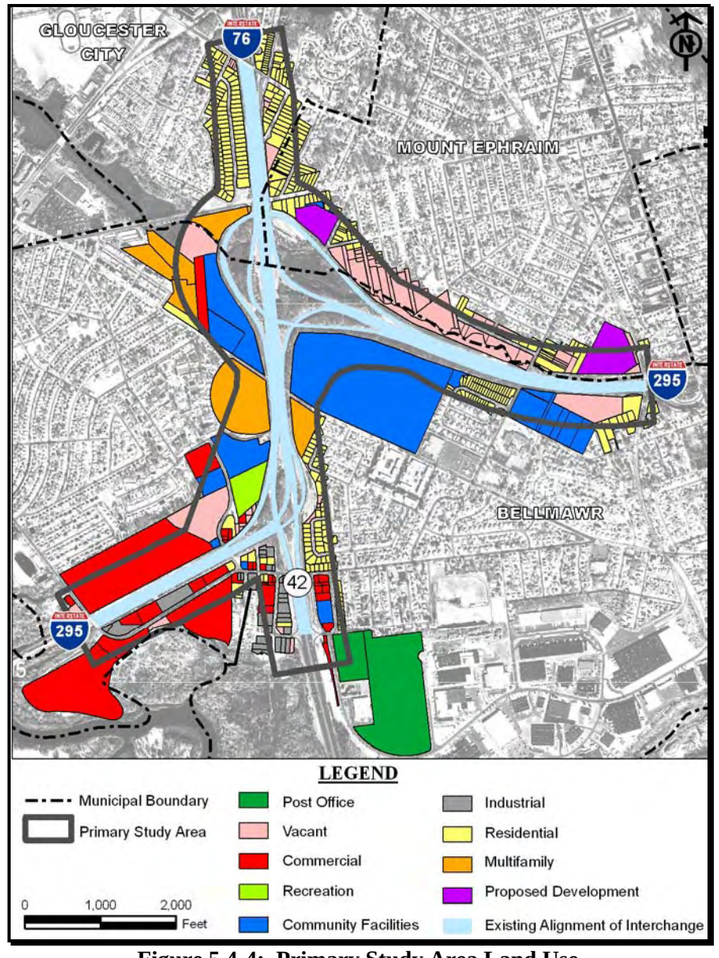


Figure 5.4-4: Primary Study Area Land Use

Residential Neighborhoods

Residential neighborhoods in the primary study area within Bellmawr are characterized as either single-family detached or multi-family dwellings.

- The area north of Browning Road, east of the interchange abutting the south side of I-295, and west of the railroad line, contains single-family detached dwellings.
- The area east of the I-295/Route 42 interchange, south of Browning Road and west of Midway Avenue, is comprised largely of single-family detached residences.
- The residential area located directly to the west of the I-295/I-76/Route 42 interchange contains multi-family apartments and townhouses. This area is known as the Bellmawr Park Mutual Housing Historic District, and each of the residential units is occupied by individuals who are part of the Bellmawr Mutual Housing Corporation. The majority of the apartments are located within the area south of Princeton Avenue, east of Carter Avenue, north of Peach Road, and along the south side of Browning Road. Additional apartments are located within the area north of Browning Road, south of Kings Highway, and west of the I-295/I-76/Route 42 interchange.

Residential neighborhoods within the Mount Ephraim portion of the primary study area are characterized as one and two-story single family detached dwellings. In addition, there is the Mount Ephraim Senior Housing located on the west side of I-76 along Kings Highway.
In Gloucester City and, as shown in **Figure 5.4-4,** within the primary study area, is a residential area north of Kings Highway on the west side of I-76. It consists entirely of one- and two-story single family detached dwellings.

Community Facilities

As shown on **Figure 5.4-5**, in Bellmawr, there are 10 community facilities located within the primary study area:

- New St. Mary's Cemetery;
- Resurrection of Christ Cemetery;
- Annunciation B.V.M Church and Annunciation Regional School;
- Bellmawr Park Elementary School;
- Bellmawr Baseball League Fields;
- Crescent Park VFW;
- Bellmawr Volunteer Fire Company No. 33;
- Anderson Avenue Recreation Area;
- State Police Complex; and
- State Police Administrative Office.

As identified in **Figure 5.4-5**, in Mount Ephraim, two community facilities are located within the primary study area:

- Mount Ephraim Girls Softball Field; and
- Mount Ephraim Sewage Treatment Facility.

No community facilities are located within the Gloucester City portion of the primary study area.

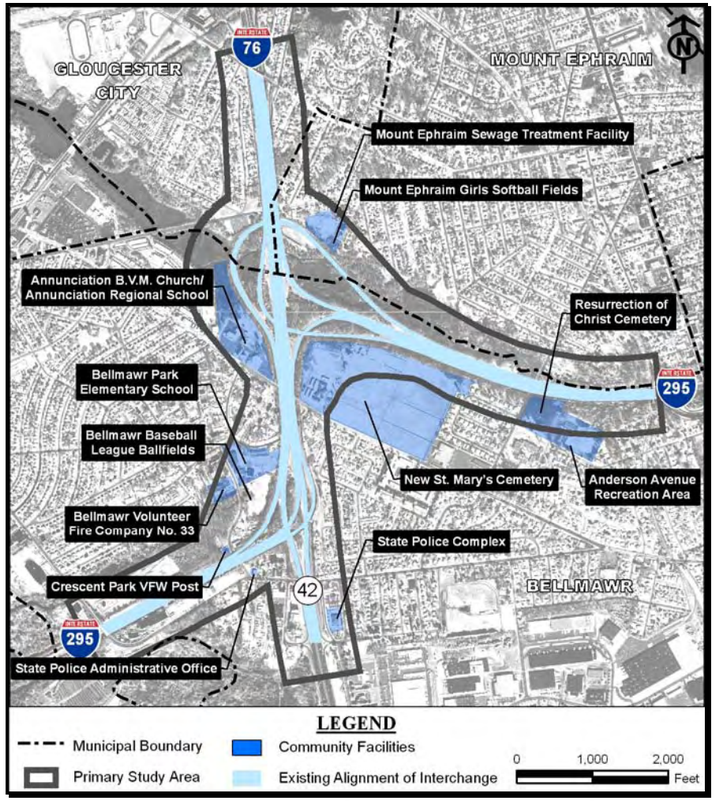


Figure 5.4-5: Primary Study Area Community Facilities

Section 4(f) Recreational Facilities: There are two locally-significant, publicly-owned recreation facilities in the primary study area within Bellmawr:

- Bellmawr Park Elementary School Playground (playground and ballfields); and
- Anderson Avenue Recreation Area (ballfields, basketball courts, an outdoor ice rink, and open play areas).

There are no locally-significant, publicly owned recreation facilities within Mount Ephraim or Gloucester City that would be affected by the proposed project.

Green Acres: The Bellmawr Park Mutual Housing Historic District is listed on the Green Acres Program Open Space Database. The listing refers to the undeveloped land along Peach Road, which contains wetlands.

According to the database, this parcel was locally funded; no Green Acres funds were used. Coordination with the NJDEP Green Acres Program will confirm the jurisdiction of the Borough-owned properties.

5.4.2.2 Economic Conditions

Business Activities and Economic Profile/Economic Development

As shown in **Figure 5.4-4**, the primary study area within Bellmawr includes commercial, retail and industrial development. For a complete listing of the businesses within the primary study area, please see the TES report.

The primary study area within Mount Ephraim does not include any businesses or industrial properties.

The primary study area within Gloucester City does not include any businesses or industrial properties. Gloucester City is designated as an Urban Enterprise Zone (UEZ) and, according to local and county officials (August 12 and 25, 2005), Gloucester City has numerous development projects occurring. For a description of the UEZ and other development projects within Gloucester City, please see the TES report.

Municipal Tax Base

The total assessed net valuation of taxable properties in Bellmawr for 2004 was $425,385,400. Bellmawr's tax rate of $4.43 per hundred dollars includes $1.15 per hundred dollars for municipal purposes and a school tax rate of $2.23 per hundred dollars.

The total assessed net valuation of taxable properties in Mount Ephraim for 2004 was $171,126,600. The township's tax rate of $4.46 per hundred dollars includes $1.26 per hundred dollars for municipal purposes and $2.16 per hundred dollars for the local school district.

The total assessed net valuation of taxable properties in Gloucester City for 2004 was $355,363,900. The township's tax rate of $3.49 per hundred dollars includes $1.62 for municipal purposes and $0.945 for the local school district.

5.4.2.3 Accessibility and Safety

Within the secondary study area, and as described in the TES report, accessibility pertains to the ease with which travelers may get to a specific destination. Accessibility depends on the degree of directness for getting to the destination, the simplicity of finding it, and the availability of parking facilities.

Travel Time through the Interchange

A savings in travel time is a significant benefit of a transportation project. The value of travel time savings and of the reduced variability of travel time can be thought of in terms of dollars saved. Transportation projects can directly affect the amount of time required for traveling by reducing congestion, and the uncertainty about the length of the trip.

Congestion on major access routes was directly related to traffic conditions that exist within the I-295/I-76/Route 42 interchange. Collector roads to destinations in the secondary study area, which include shopping along Route 168 and Route 130, are congested due to the interchange traffic overflow. Destinations in the secondary study area include the post office/industrial park area in Bellmawr which has approximately 300 to 400 daily truck trips. Within Gloucester City, the port area (Gloucester Terminal) is a destination of many commercial and residential vehicles. The

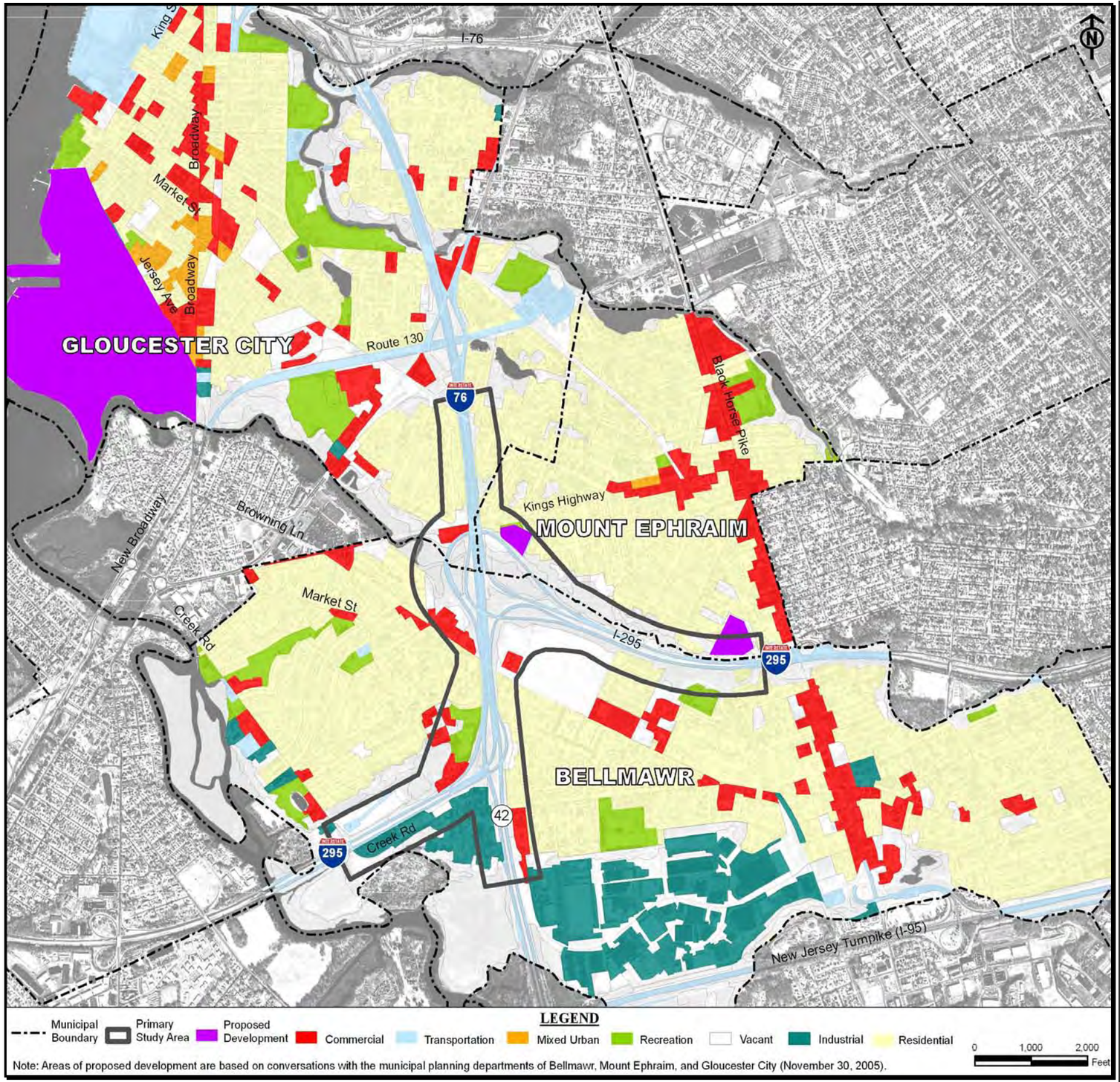


Figure 5.4-6: Secondary Study Area Land Use

Gloucester City Planning Board has designated Morgan Avenue in Camden as the major access point to the port area. However, local officials indicated that various local streets throughout Gloucester City are used to access the port area (Gloucester Terminal).

Mass transportation in the primary study area consists primarily of buses. Bus ridership is low. Bus service schedules are disrupted by congestion within the I-295 interchange during rush hour. Pedestrian access is not prevalent due to typical suburban residential development of single-family dwellings and commercial/retail establishments being situated along state roads (Route 168 or Route 130).

In the 30-month period from January 2002 through June 2004, there were 1,864 recorded accidents through the I-295/I-76/Route 42 interchange, of which two were fatal and 631 involved injuries. During this same period, approximately 50 million vehicles passed through this interchange, yielding rates of approximately 7.5 accidents, 2.5 accidents with injuries, and 0.008 accidents with fatalities per million vehicles. These rates are much higher than rates for standard interchanges at other interstate highways in New Jersey.

5.4.2.4 Land Use and Zoning

Bellmawr's current zoning ordinance was adopted in 1990. The portion of the project's primary study area within Bellmawr contains nine zoning districts that are not entirely consistent with the land use designations set forth in the master plan. These zoning districts include: Residence A; Residence B; Business A; Business B; Light Industrial; Heavy Industrial; Institutional; Municipal Government and Educational; and Recreation-Open Space (see **Figure 5.4-6**). For a complete description of the zoning districts, please refer to the *Socioeconomic, Land Use and Environmental Justice TES.*

Residential development represents the largest portion of Bellmawr's land use, followed by vacant land, which is mostly wetlands. The portion of the primary study area in Bellmawr is about 14% of Bellmawr's total acreage. According to the NJDEP Bureau of Geographic Information Land Use and Land Cover data layer and site reconnaissance, no identified farmland is located within Bellmawr. **Figure 5.4-4** indicates the distribution of land use within the primary study area. **Figure 5.4-6** indicates the distribuition of land use within the secondary study area. Land use in Bellmawr within the primary study area includes:

- residential land use;
- multi-family residential properties;
- industrial development;
- commercial use;
- community facilities;
- vacant land; and
- recreational use.

Zoning in the primary study area within Mount Ephraim is comprised of R1 and R2 residential district areas. Zoning is generally consistent with existing land uses. Residential development represents the largest portion of Mount

Ephraim's land use, followed by transportation and vacant land which includes wetlands. About 8% of Mount Ephraim's total acreage is in the primary study area. According to the NJDEP Bureau of Geographic Information Land Use and Land Cover data layer and site reconnaissance, no identified farmland is located

within Mount Ephraim. Land use in Mount Ephraim within the primary study area includes:

- residential land use;
- multi-family residential properties;
- community facilities;
- recreational use; and
- vacant land.

The Gloucester City Zoning Ordinance indicates that the primary study area within Gloucester City is comprised of low-density residential areas. Residential development represents the largest portion of Gloucester City's land use, with approximately 42.2%, followed by vacant land, with approximately 22.3%. The Gloucester City portion of the primary study area is about 1.5% of Gloucester City's total acreage. According to the NJDEP Bureau of Geographic Information Land Use and Land Cover data layer and site reconnaissance, no identified farmland is located within Gloucester City. Land use in Gloucester City within the primary study area includes residential land use and vacant land.

5.4.2.5 Environmental Justice

EO 12898 requires federal agencies to take appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. The *Socioeconomic, Land Use and Environmental Justice TES* and this section of the DEIS identify minority and low-income populations. Impacts and possible mitigation measures are discussed later in this section.

5.4.2.6 Visual Quality/Aesthetics

Three categories of viewsheds exist for consideration of aesthetic impacts: highly sensitive sites, moderately sensitive sites, and low sensitivity sites. Highly sensitive areas are those protected by federal or state law, such as natural areas, parks and recreation areas, coastal views, unique man-made features and historic properties. Moderately sensitive sites include buildings such as residences and religious sites, or areas that are partially blocked by vegetation, such as wooded areas and hedgerows. Sites of low visual sensitivity include developed areas such as urban and industrial settings. Viewsheds of each sensitivity are present within Bellmawr. Those portions of the primary study area that abut the Big Timber and Little Timber Creeks are areas of high visual sensitivity. Residential, community and commercial development are situated throughout most of the primary study area beyond the interchange in Bellmawr and are areas classified as being of moderate visual sensitivity. The southern portion of the project area that abuts industrial development along Creek Road is an area of low visual sensitivity. See Section 5.7 for information regarding visual impacts on historic properties.

Viewsheds of high and moderate sensitivity occur within Mount Ephraim. Those portions of the primary study area that abut Little Timber Creek are areas of high visual sensitivity. Areas of residential and community development that comprise most of the primary study area in Mount Ephraim, are areas of moderate visual sensitivity. Areas of residential development that comprise most of the primary study area in Gloucester City are areas of moderate visual sensitivity.

5.4.3 Potential Impacts and Mitigation

5.4.3.1 Impact Evaluation Criteria

The *Socioeconomic, Land Use and Environmental Justice TES* identified that all build alternatives would have impacts due to right-of-way acquisitions and easements. Visual impacts would also occur under all the build alternatives. Positive economic benefits from improved safety and travel time savings would occur under all build alternatives. Below is a list of the impact criteria, as well as definitions of the metrics used to determine potential impacts.

- *Community Profile and Environmental Justice* were evaluated for each population group. The census tract, block and block group, and the percentage of the population that exceeded the criteria set by EO 12898 and DVRPC were determined.

- *Residential Acquisition Impacts* were evaluated for each of the alternatives by counting the number of discrete residential buildings that would require taking. For multi-family buildings, each individual residential unit was counted separately.

- *Community Facility Acquisition Impacts* were evaluated for each alternative. Each build alternative would affect four community facilities (not including the 4(f) property discussed below). Although impacted, all facilities would function normally after project completion. Some unavoidable impacts to support facilities would result from permanent easements/acquisitions.

- *4(f) Property Acquisition Impacts* were evaluated for each alternative. Each build alternative would impact one property that is protected by 4(f) regulations. Although impacted, the functionality of this property would not be impaired after project completion.

- *Local Fiscal Resources* were evaluated to identify any significant loss of revenue resulting from property acquisitions.

- *Emergency Services* were evaluated to determine the increase in response times within the primary study area.

- *Cost Benefit from Reduction in Accidents Impacts* capture the annual benefit realized by increased safety features and improved road design. The dollar amount reflects the financial benefits of reduced accidents.

- *Regional Accessibility Impacts* pertain to the ease with which travelers may get to a specific destination. The build alternatives would generally result in improved accessibility within the secondary study area (Bellmawr, Mount Ephraim, and Gloucester City) by reducing congestion on most segments of the principal access roads used for regional destinations. The value of travel time savings and of the reduced variability of travel time can be thought of in terms of dollars saved. Annual dollar cost savings were calculated for trucks and automobiles. The sum of these is annual vehicle dollars saved.

- *Visual Impacts* were assessed by conducting an evaluation of whether an alternative would introduce a visual intrusion that would not fit into the context of the project area. A balloon study, in which weather balloons were floated at the heights of the proposed structures, was used to evaluate the range of potential viewshed impacts. Photo simulations were created at selected viewsheds to illustrate the change. The visual quality of the area would be changed under all build alternatives. All build alternatives would require the construction of a new structure throughout the interchange while some would require the construction of new double-decker structures. New noise walls would be constructed on top of these structures to mitigate the noise impacts.

5.4.3.2 No Build Alternative

Under the No Build Alternative, the lack of a direct connection for through-movement on I-295, significant weaving problems, deficient connecting ramps, and high volumes of traffic all result in operational deficiencies (or congestion) within and near the interchange. The diverted traffic, in turn, causes congestion on local roads, compromises traffic and pedestrian safety, lowers air and noise quality in the community, and disproportionately taxes the capacity and life of local roadways. The current land use patterns throughout the interchange would continue if the No Build Alternative is chosen. Some of the State Development and Redevelopment Plan (SDRP) goals and objectives would not be met throughout this interchange area.

With the No Build Alternative, no residential displacement would occur nor would there be any business displacements or revenue loss within the municipalities. Also, the viewsheds within the I-295/I-76/Route 42 interchange area would not change.

5.4.3.3 Build Alternatives

Community Profile

Census blocks and census block groups with populations above the DVRPC regional thresholds or that meet the EO 12898 environmental justice criteria were studied to determine if they contained the proposed improvements, and, if so, to identify the location of the proposed improvements in relation to the existing populations. Any impacts, along with potential mitigation measures, are discussed below.

Community Cohesion: None of the alternatives would have impact on community cohesion or stability. The proposed right-of-way acquisitions are located at the edge of a residential development (Bellmawr Park) and are not anticipated to impact the cohesion of the community. Accessibility would be maintained within Bellmawr Park. In Mount Ephraim, proposed right-of-way acquisitions are limited to minor strip takings along local roadways that would not require any residential relocation because the acquisitions are located at the edge of residential development. In Gloucester City, only a permanent easement on publicly-owned land is proposed.

Additional information on acquisitions and accessibility can be found in the

PARCEL	PROPERTY OWNER NAME/OCCUPANT	BLOCK	LOT	LAND USE CATEGORY	STREET LOCATION	EXISTING ACREAGE	ACQUISITIONS ACREAGE					TEMPORARY EASEMENTS ACREAGE					PERMANENT EASEMENTS ACREAGE				
							D	D1	G2	H1	K	D	D1	G2	H1	K	D	D1	G2	H1	K
1A	Bellmawr Mutual Housing Corporation (West of I-295/Rt. 42)	49	1	Apartments	1 Hickory Place	13.560	1.224	1.224	0.536	0.536	1.302	1.126	1.126	0.941	0.941	1.122	0				
					3 Hickory Place																
					6 Hickory Place																
					8 Hickory Place																
					9 Willow Place																
					11 Willow Place																
					38 Victory Drive																
					40 Victory Drive																
					45 Victory Drive																
					47 Victory Drive																
					49 Victory Drive																
					51 Victory Drive																
1B	Bellmawr Mutual Housing Corporation (East of I-295/Rt. 42)	49	1	Apartments	Fir Place	3.930	0.188					0.027					0.167*				
2	Borough of Bellmawr/Bellmawr Baseball League	49	1.02	Ballfields	Essex Avenue	4.700	0.824	0.302	0.839	0.824	0.302	0					0.036	0	0.036		0
3	Bellmawr Board of Education/Bellmawr Park School	49	3	Public School	27 Peach Road	6.286	0.697	0.321	0.714	0.697	0.321	0					0				
4	New St. Mary's Cemetery	50	1.01	Cemetery	615 West Browning Road	49.770	6.260					0.418					0				
5	Shane Helm	50.01	57	Residential	201 Kennedy Boulevard	0.088	0					0					0				
		50.01	58.01			0.175						0.049					0.049				
6	Annunciation B.V.M. Church	50.04	1.01	Church	601 West Browning Road	3.441	0					0					0				
		50.04	1.02			9.051		0.045		2.540	2.540	0.266					0.675*			0.607	0.607
7A	Borough of Bellmawr	50.05	1.01	Vacant	Bell Road	8.800	0.254	0	1.059	0.254	0	0				0.021	0				
7B	Borough of Bellmawr	50.05	3	Vacant	Bell Road		0					0.032					0.088*				
7C	Borough of Bellmawr	51.11	15	Vacant	488 Windsor Drive	0.208	0					0.001					0.001				
8	Marilyn and William Orchard	51.13	1	Residential	486 Windsor Drive	0.137	0					0.012					0.012				
9	John and Dana Scarborough	51.13	2	Residential	482 Windsor Drive	0.137	0					0.002					0.002				
10	Edward Shaen	51.13	25	Residential	461 Creek Road	0.137	0					0.018					0.018				
11	Joanne Keleher and Mark Fisher	51.13	26	Residential	465 Creek Road	0.156	0.156					0					0				
12	VFW (Crescent Park Post 9563)	53	1	Community Facility	52 Essex Avenue	0.144	0					0.026					0				
13	T&T Real Estate Investments LLC	53.01	1	Residential	701 Creek Road	0.270	0					0.019					0				
14	Southern New Jersey Housing Corporation	55	1	Business	100 Essex Avenue	0.366	0					0					0				
		55	2			0.159	0.007	0	0.007	0											
15	Antonio and Vita La Sala	55	3	Residential	48 Essex Avenue	0.684	0.045	0	0.045	0		0					0				
		56	1	Vacant	153 Essex Avenue	0.074	0.091	0.004	0.091	0.004		0					0				
		56	2			0.088	0.050	0.006	0.050	0.006											
16	William G. and Cindy L. Seas	56	3	Business	44 Essex Avenue	0.245	0.245	0	0.245	0		0					0				
7D	Borough of Bellmawr	56	4	Vacant	Abutting I-295/Route 42	0.171	0.075	0.013	0.075	0.013		0					0				
		56	5			0.132	0.118	0.047	0.118	0.047		0					0				
17	Sadiq and Irene Ali	57	8	Residential	80 Coolidge Avenue	0.325	0.002					0					0				
	Paper Road (Coolidge Avenue)				West of I-295/Route 42	0.105	0.113	0.069	0.113	0.069		0					0				
18	H and R Oil Corporation	61	1	Residential	628 Creek Road	0.091	0					0.010					0.010				
		61	2			0.137	0					0.015					0.015				
19	Marie Recupero	61	3	Business	620 Creek Road	0.137	0					0.015					0.015				
20	Bellmawr Creek LLC	61	4	Business	616 Creek Road	0.070	0					0.001					0.001				
		61	5			0.090						0					0				
		61	6			0.046															
		61	7			0.046															
21	Bellmawr Coolidge LLC	62	1	Business	629 Creek Road	0.145	0					0.016					0.016				
22	Jerry S. Thomas and Martha Delosso	62	1.01	Industrial	625 Creek Road	0.139	0.003					0.018					0.018				
		62	12		621 Creek Road	0.072	0.005					0.009					0.009				
23	73 Coolidge LLC	62	3	Industrial	73 Coolidge Avenue	0.091	0					0					0				
		62	4			1.360															
		62	5			0.429	0.030														
7D	Borough of Bellmawr	63	6	Vacant	Abutting I-295/Route 42	0.004	0.004					0					0				
		63	7			0.031	0.032					0					0				
24	James F. Ryan Jr.	67	1	Industrial	612 Creek Road	0.073	0					0					0.008				
25	Harleigh Cemetery Association	80	3	Cemetery	Bell Road/Anderson Avenue	3.803	0.032					0.037					0.037				
Bellmawr Totals							**10.500**	**8.022**	**11.414**	**12.994**	**10.542**	**2.117**	**1.932**	**2.113**	**2.117**	**1.953**	**1.177**	**1.141**	**1.177**	**1.109**	**1.073**

***** The number represents the sum of multiple easement types (i.e., utility easement, slope easement, drainage easement, bridge easement). Shading represents full acquisitions N/A Not Applicable

Table 5.4-1: Displacement and Proximity Impacts in Bellmawr

PARCEL	PROPERTY OWNER NAME/OCCUPANT	BLOCK	LOT	LAND USE CATEGORY	STREET LOCATION	EXISTING ACREAGE	ACQUISITION ACREAGE					TEMPORARY EASEMENTS ACREAGE					PERMANENT EASEMENTS ACREAGE				
							D	D1	G2	H1	K	D	D1	G2	H1	K	D	D1	G2	H1	K
26	Joan and Larry Lefczik	75	12.01	Residential	1209 W. Kings Highway	0.090	0					0					0.014				
			12.03			0.232	0					0					0.010				
27	State of New Jersey	104	2.02	Vacant	Bell Road	0.784	0					0.088					0.088				
28	Albert L. Bisaga	120.01	7	Residential	904 Bell Road	0.854	0.023					0.023					0.023				
			11			0.126	0.002					0.003					0.003				
29	Ruth Rowan	123.01	2.02	Residential	1204 W. Kings Highway	0.350	0					0					0.030				
30	Dolores Cucinotti	123.01	2.05	Residential	1200 W. Kings Highway	0.247	0					0					0.014				
31	John D. West Senior Center	123.02	1.01	Residential	1242 W. Kings Highway	3.500	0					0					0.025				
32	Borough of Mount Ephraim	123.02	1.02	Vacant	W. Kings Highway	0.086	0					0					0.011				
Mount Ephraim Totals							0.025					0.114					0.218				
33	State of New Jersey	273.01	26	Public	1499 Chestnut Avenue	0.112	0					0					0.049				
Gloucester City Totals							No Impact					0					0.049				

Table 5.4-2: Displacement and Proximity Impacts in Mount Ephraim and Gloucester City

TES report. Barriers in the form of proposed structures and noise walls would be located along the edge of Bellmawr Park and are discussed in further detail later in this section.

Minority Population: No census blocks or block groups within Bellmawr had a minority population greater than 50%. Only one census block contained a greater proportion of minorities than the overall borough. Block 1000 within Census Tract 6070 contained a minority population of 9.91%, which is 25% greater than the overall borough minority population. However, none of the alternatives would have an impact in this census block.

In Mount Ephraim, only one listed block contained a greater proportion of minorities than the overall borough. Block 2008 within Census Tract 6054 had a minority population of 4%. However, none of the alternatives would have an impact in this census block.

Within Gloucester City, Census Tract 6052, Block 2007, had a minority population of 12.85%. None of the alternatives would have an impact on this census block.

Senior Citizens: In Bellmawr, only in Census Tract 6070, Block 4001 was the population of senior citizens higher than the DVRPC regional threshold of 2%. However, none of the alternatives would affect buildings or access to the property within this census block, and no impact to the senior citizen population is anticipated.

In Mount Ephraim, the Mount Ephraim Senior Housing complex is located along the west side of I-76 and south of Kings Highway (Census Tract 6054, Block Group 2). The proposed improvements would not have an impact on the senior housing building or access to the facility. Alternatives D, G2 and K include the removal of Al Jo's Curve, which would potentially benefit the residents of the senior housing complex. By removing Al Jo's Curve, the residents would be able to congregate behind the facility without the close proximity of vehicles and/or the noise associated with the vehicles.

In Gloucester City, as there are no census tracts that meet or exceed the DVRPC regional threshold, no impacts are anticipated.

Disabled Population: In Bellmawr, Census Tract 6070, Block Group 1 and Census Tract 6069.01, Block Group 3 had percentages of physically disabled persons of 8.82% and 9.15% respectively, which is higher than the DVRPC regional threshold of 7%. However, none of the proposed improvements would have an impact on any residential buildings within this block group. Alternatives D, D1 and K would require the relocation of 13 residences in Block Group 1 of Census Tract 6070, while Alternatives G2 and H1 would require the relocation of five residences. As it is anticipated that all of the residents would be relocated within the same community, no significant impacts to disabled persons are anticipated. In Mount Ephraim, Census Tract 6054, Block Groups 1, 2 and 3 had percentages of physically-disabled persons of 13.94%, 11.74% and 7.87% respectively, higher than the DVRPC regional threshold of 7%.

However, the proposed improvements would not have an impact on any residential buildings or access to the proposed properties. All of the acquisitions are on undeveloped portions of the property and access in and out of these residences would be maintained. Therefore, there would be no impacts from the proposed alternatives to disabled persons living in this area.

In Gloucester City, Census Tract 6052, Block Group 2, 15.74% of the population was physically disabled, which is higher than the DVRPC regional threshold of 7%. None of the alternatives would have an impact on any residential building or access within this block group.

Linguistically Isolated Population: In 2000, Census Tract 6069.01, Block Group 2, in Bellmawr had a percentage of linguistically isolated residents of 2.85%, which is higher than the DVRPC regional threshold of 2%. No impacts to linguistically isolated populations in this block group are anticipated.

Neither Mount Ephraim nor Gloucester City had census blocks or census block groups with populations above the DVRPC regional threshold.

Female Heads of Household: According to the 2000 Census Data, Census Tract 6069.01, Block Group 3 in Bellmawr had one block group in the primary study area with a percentage of female heads of households of 8.07%. This percentage is greater than the DVRPC regional threshold of 8%. However, the proposed improvements would not have an impact on any residential buildings within this block group. Therefore, none of the residents within this census block group would be relocated by the proposed alternatives and no impacts to female heads of household in this block group are anticipated.

Neither Mount Ephraim nor Gloucester City had census blocks or census block groups with populations above the DVRPC regional threshold.

Transit Dependent: In Gloucester City in Census Block 2, within Census Tract 6052, 16.17% of the population was transit dependent commuters, which is higher than the DVRPC regional threshold of 16%. However, the proposed improvements would not have an impact on any residential structure within this block group or any transit facilities, such as buses. Therefore, no impacts to transit dependent populations in this block group are anticipated. In general, the proposed improvements would reduce regional congestion which would result in fewer delays for public transit.

Neither Bellmawr nor Mount Ephraim had census blocks or census block groups with populations above the DVRPC regional threshold.

Income: Three of the block groups within Bellmawr had poverty levels higher than the overall borough. Block Group 3 within Census Tract 6069.01 had a level of 7.49%. Block Group 1 within Census Tract 6070 had an impoverished population of 5.53% and Block Group 4 within Census Tract 6070 had a level of 5.79%. However, the proposed improvements would not impact residents within Block Group 3 of Census Tract 6069.01 or Block Group 4 within Census Tract 6070. Under Alternative D, D1 and K, 13 residences in Census Tract 6070, Block Group 1 would be relocated.

Under Alternatives G2 and H1, five residences in Census Tract 6070, Block Group 1 would be relocated. While these families would be temporarily inconvenienced, there would no long-term impact as they would be relocated within the same neighborhood.

In Mount Ephraim, one block group had a poverty level higher than the overall borough. Block Group 2 within Census Tract 6054 had a level of 9.04%. The proposed improvements would not impact any residents or businesses within Block Group 2 of Census Tract 6054.

In Gloucester City, the proposed project would not require the relocation of any residents or businesses. Therefore, no impacts are anticipated.

Right-of-Way Property Impacts: All five alternatives would require permanent easements and minor strip takings. These strip takings would include the partial acquisition of several properties, but would not affect their continued use. Alternatives D and K would require 1.177 acres in permanent easement impacts within Bellmawr; Alternative D1 would require 1.109; Alternative G2 would require 1.141; and H1 would require 1.073.

Alternatives D, G2, and K would require the removal of Al Jo's Curve and there is the potential to reconnect open space that would no longer be divided by the roadway.

Under Alternatives D, D1, and K, Willow Place would be shortened from its existing southern end and its connection with Browning Road would be moved west. Parking in front of the 12-15 Willow Place properties would be relocated to the redesigned Willow Place. Also, Alternatives D, D1 and K would require the southeast portion of Victory Drive to be shortened with a curve that connects to the north with Hickory Place. After connecting to Hickory Place, Victory Drive would then extend north to terminate south of the 12-15 Willow Place properties where parking and access would also be available. Therefore, parking would be available for the 12-15 Willow Place properties on either Willow Place or Victory Drive.

For Alternatives G2 and H1, the Willow Place intersection with Browning Road would be moved west. Additionally, Alternative G2 would require the shortening of Hickory Place but still maintain access to the residences located at the western end of the street. The Victory Drive and Hickory Place connection would be moved west of its existing configuration.

In Mount Ephraim, all the alternatives require 0.025 acres for a property acquisition and 0.218 acres for permanent easements. The properties where these takings and easements occur are residential and are minor impacts. A list of the acquisition and easements are listed in **Tables 5.4-1 and 5.4-2**.

All driveway access to residential properties would be maintained and any non-conforming use pertaining to the Mount Ephraim zoning ordinances would be addressed during the NJDOT right-of-way acquisition process.

Each of the five build alternatives would require a permanent easement on one state-owned property in Gloucester City. Access to this property would not be affected.

Residential Displacements: Alternatives D, D1 and K would require 13 residential property acquisitions in Bellmawr. Of these 13 properties, 12 are located within the Bellmawr Park Mutual Housing Historic District. The 13th acquisition would be located at 465 Creek Road. Alternative G2 and H1 would require five residential property acquisitions. Four of the properties would be located within the Bellmawr Park Mutual Housing Historic District. The fifth would be a residence located at 465 Creek Road.

In Mount Ephraim and Gloucester City, there would be no residential displacements under any alternative.

Mitigation: All residential relocations would be conducted pursuant to the Uniform Relocation Assistance and Real Property Acquisition Policies for Federal and Federally Assisted Programs Act of 1970, as amended in the Federal Uniform Relocation Act Amendment, effective March 2, 1989 (Chapter 50, NJ Public Laws of 1989). This law is designed to ensure the prompt and equitable relocation of persons displaced as a result of the implementation of federally funded projects. Relocation resources are available to all residential and business relocatees without discrimination. The services and payments provided to affected residents include the following:

- assistance in finding replacement dwellings;
- moving expense reimbursement;
- payment of replacement housing supplements, mortgage interest rate differentials, and closing costs to assist in the purchase of a new home;
- payment of rent supplements that may be converted to a down payment, enabling a tenant to become a homeowner;
- last resort housing, if needed; and
- provision of related support services and assistance.

As the Bellmawr Park Mutual Housing Corporation owns the Bellmawr Park Mutual Housing Historic District residences, the corporation would be responsible for relocating residents who wish to remain in corporate housing within Bellmawr Park. New residences could be built within the existing Bellmawr Park Mutual Housing Corporation property. An extensive public participation program has been conducted with the Bellmawr Park Mutual Housing Corporation, including numerous meetings with affected families. Based upon input received from this outreach effort, it is assumed that those displaced residents who wish to remain in Bellmawr Park will be afforded an opportunity to do so. A portion of Bellmawr Park is depicted in **Photograph 5.4-1**.

Within the context of the remaining stable residential neighborhoods and the availability of nearby relocation opportunities, the proposed displacement of 13 residential properties is not considered a significant adverse impact.

Community Facilities: In Bellmawr, all build alternatives would have a permanent impact on five community facilities, including:

- Bellmawr Baseball League Fields;
- Bellmawr Park Elementary School Playground;
- New St. Mary's Cemetery;
- Annunciation B.V.M. Church and Annunciation Regional School; and
- Resurrection of Christ Cemetery.

Photograph 5.4-1: Bellmawr Park and New St. Mary's Cemetery

Despite the proposed impacts to these community facilities, all facilities would still be operational; therefore, these partial acquisitions are not considered to be significant impacts. Context sensitive designs, including public participation, fencing, and other architectural techniques, would be developed during the final design of the project to the greatest extent possible to preserve the aesthetic, historic, community, and natural environment.

Section 4(f) Recreational Facilities: Publicly-owned recreational facilities of local significance have been identified in the Bellmawr portion of the primary study area. The proposed project would require the use of one Section 4(f) recreational facility—a ballfield located in the Bellmawr Park Elementary School Playground. Since there would be adequate space for relocation of the ballfield on the school property, it is anticipated that the impact on the playground will be minimal and that the playground will continue to serve its same function as a recreational facility after project construction and after mitigation measures are implemented. As the use of this ballfield would not adversely affect its activities, features and attributes, this use would result in a *de minimis* finding.

Economic Impacts

Local Fiscal Resources: The loss of tax revenues in Bellmawr would be small (no more than approximately $59,700 or 0.42% of municipal tax revenue). Local fiscal impacts are not considered to be a significant adverse impact. In Mount Ephraim the loss of tax revenue would be approximately $281 (0.0048% of total municipal purposes and school tax revenue). In Gloucester City, the proposed improvements include a permanent easement on a state-owned property in Gloucester City; therefore, Gloucester City would not lose any tax revenue as a result of the proposed project.

Business Displacement: Alternative D, D1, and K would require the relocation of one business located within the Bellmawr portion of the primary study area, a towing service located at 44 Essex Avenue (see **Table 5.4-1**). The towing company employs 10 workers with two of the employees being minority. All of the employees drive to work within a 15-mile radius.

Mitigation: All project-related relocation payments and services are provided pursuant to the Federal Uniform Assistance and Real Property Acquisition for Federal and Federally Assisted Programs Act of 1970, as amended in the Federal Uniform Act Amendment, effective March 2, 1989 (Chapter 50, New Jersey Public Law of 1989). This law is designed to ensure the prompt and equitable relocation and reestablishment of businesses displaced as a result of federally funded projects. In view of the requirements of this law, the NJDOT Bureau of Property and Relocation offers a Relocation Assistance Program. This program offers services to businesses, including assistance in finding new locations, reimbursement of moving expenses, and allowances in lieu of moving expenses. Since only one business and a small number of employees would be affected, business relocation impacts are not considered to be significant.

Accessibility and Safety

Emergency Services: Response time of emergency services within the primary study area may increase during construction of the highway improvements. However, according to construction staging information developed for each of the build alternatives, all local roads would remain accessible. All efforts will be made to coordinate construction activities so delays are avoided. Coordination with the local emergency services will be an ongoing process in order to mitigate any complications resulting from construction. Response time should improve as congestion on local roads would be reduced, once the proposed project is completed.

Cost Benefit from Reduction in Accidents: Assuming that the redesigned I-295/I-76/NJ-42 interchange would have similar accident rates to the four standard interchanges listed in the TES report, the number of annual accidents would be reduced by approximately 550, the number of annual accidents involving injuries would be reduced by about 180, and the average number of annual accidents involving fatalities would be reduced by approximately 0.6, even if no growth in traffic occurs. The annual economic benefit of such reductions is approximately $11 million in 2005 terms, based on approximate unit costs determined by NJDOT 2005 Crash Costs (see Appendix D of the TES report).

Travel Time Savings: The transportation model developed for this project predicts travel time savings for the 2030 Build Year. The total annual travel time savings would be approximately $39 million. All of the build alternatives would result in the same savings.

Land Use and Zoning

The proposed improvements would not have an impact on zoning or land use within the Borough of Bellmawr. The proposed project is consistent with the goals of the 1996 re-examination of the master plan in that the proposed project will reduce congestion on local roadways within the borough. The proposed improvements would not require any adjustments to the existing zoning and no impacts are anticipated.

The proposed improvements would not have an impact on zoning or land use within the Borough of Mount Ephraim. Because of the limited improvements within the City of Gloucester City, the proposed improvements would not have an impact on zoning or land use.

Environmental Justice

As discussed earlier, the proposed project would not result in any disproportionate impacts to project area residents or businesses that are considered to be minority or low income. For Alternatives D, D1, and K, the proposed project would require the acquisition of 13 residential properties, while Alternatives G2 and H1 would require the acquisition of five residential properties. None of the potentially affected blocks contains a minority population greater than 50%. Only Census Block 1000 in Census Tract 6070 contains a percentage of minority population meaningfully greater than Bellmawr as a whole (about 25% greater). However, the affected residents can be readily relocated within Bellmawr, likely within the same neighborhood. Therefore, these residents would not incur significant long-term impacts.

The proposed project would also require the acquisition of one commercial property for Alternatives D, D1, and K which is not located in an area which meets the EO 12898 criteria. The business to be acquired and displaced by the proposed project is not a large employer and its function and service can be relocated to other parts of the community.

The proposed project is not expected to have any adverse impacts that would disproportionately affect minority or low-income populations. Rather, the proposed project would be beneficial to minority populations in the project area by reducing congestion. The principal intent of the project is to eliminate the existing traffic congestion conditions experienced within the study area, especially during the peak travel hours.

In Mount Ephraim or Gloucester City, there would be no relocation of residents or businesses; residents would not be impacted by any of the alternatives.

Visual Quality/Aesthetics

The proposed project would introduce numerous structures throughout the interchange. These structures would include bridges, elevated roadways on fill with retaining walls and noise walls. Most of the proposed structures would be elevated roadways. To assess visual impacts, a balloon survey was conducted on April 27, 2004. A description of the balloon survey can be found in Appendix C of the TES report.

The balloon test was conducted to assess the potential visual impacts of the alternatives on the local community and historic architectural resources. The balloon test involved the floating of helium-filled balloons from securely anchored locations to depict the height of the tallest proposed structures at four locations: 1) Bellmawr Baseball Fields (see **Photograph 5.4-2**) 2) the Browning Road overpass 3) New St. Mary's Cemetery near the Harrison-Glover House (see **Photograph 5.4-3**); and 4) along I-295 northbound, across from Shining Star Park. At each location, a minimum of two four foot (4') diameter balloons were floated. Red balloons represented the approximate height of the tallest structures for Alternatives D and D1, while black balloons were used for Alternatives G2 and H1.

During the balloon test, architectural historians photographed the balloons from potentially significant historic locations to identify whether the different alternatives would be visible from each resource. Similarly, photographs were taken from a variety of other locations within the surrounding communities to determine the visibility of the balloons from those sites. Photographic simulations depicting the proposed roadway improvements were then generated to analyze the visual impact of these alternatives on the local communities. The balloon test was advertised to the public through newspaper publication and the distribution of flyers throughout the community.

Photograph 5.4-2: Balloon Survey at Bellmawr Baseball League Fields

Based on the findings of the balloon study, photographic simulations were developed to represent the study area and illustrate the height of the proposed structures. The simulations were developed at seven locations: five in Bellmawr and two in Mount Ephraim. The visual impact analysis of roadway structures and noise walls were based on the balloon station locations, as represented by the photographic simulations, and are described below. For reference, a one-story building is approximately 10-feet high; therefore, a structure 30-feet high is approximately three stories high.

In general, for Alternatives D, D1, and K, the proposed roadway structures would be visible in the Bellmawr Park community on the west side of the I-295 interchange in the vicinity of Victory Drive and Peach Road and on the east side of I-295 in the vicinity of Dewey Road. The proposed structures would also be visible across New St. Mary's Cemetery. In Mount Ephraim, they would be visible from Shining Star Park and in the vicinity of Emerson Avenue between Shining Star Park and Bell Road, and from the Mount Ephraim Girls Softball Field located off of Kings Highway.

The proposed roadway structures would not be visible from Gloucester City. In general, for Alternatives G2 and H1, the proposed structures would be visible in the Bellmawr Park community on the west side of the I-295 interchange in the vicinity of Victory Drive and Peach Road. However, on the east side of I-295, they would be visible beyond Dewey Road to the vicinity of Midway Lane, and across New St. Mary's Cemetery to the vicinity of North

Photograph 5.4-3: Balloon Survey at New St. Mary's Cemetery

Bell Road. They would also be visible beyond Shining Star Park to the vicinity of Linwood Avenue and from the Mount Ephraim Girls Softball Field located off of Kings Highway. The proposed structures would not be visible in Gloucester City. The following paragraphs provide a discussion of the visual impacts as viewed from each of the photosimulation locations.

Bellmawr Baseball League Fields (Bellmawr): This area is classified as being moderately sensitive. Ramp F for Alternatives D, D1, and K would replace the existing overgrown vegetation (see **Photograph 5.4-4**) beyond the ballfields with an elevated roadway with a retaining wall approximately 30-feet high (see **Photographs 5.4-5** and **5.4-7**). Noise walls would be constructed on top of the proposed retaining wall for Alternatives D and D1. For Alternative K, a noise wall would be constructed just beyond the outfield fence and the noise wall would be visible on the far side of Route 42.

The height of the noise walls in this location would be 18 feet for Alternatives D and D1 and 18 feet in the foreground. For Alternative K, the height of the noise walls would be 21 feet in the background. The combined height within this viewshed of the proposed retaining walls, and/or bridges and noise walls would be 48 feet for Alternatives D and D1. Due to the placement of noise walls located in both the foreground and background for Alternative K, the combined height would range from 48 feet to 51 feet.

Ramp F for Alternatives G2 and H1 would also replace the vegetation with a structure which would include piers beyond the outfield fence at a height of approximately 60 feet (see **Photograph 5.4-6**).

Photographs 5.4-4 through 5.4-7: Essex Avenue Looking East at Bellmawr Baseball League Fields

Noise walls would be constructed on top of the proposed roadway structures. The height of the noise walls in this location would be 18 feet. The combined height of the proposed roadway structures and the noise walls located along the elevated roadway (Ramp F) would be 78 feet. The support structures and unoccupied area beneath the elevated roadway would result in an intrusive view.

Bellmawr Park Elementary School (Bellmawr): This area is classified as being moderately sensitive. Presently, beyond the school property is overgrown vegetation (**Photograph 5.4-8**). For Alternatives D and D1, Ramp F would be in the foreground and supported on the retaining wall. Southbound I-295 elevated roadway would be in the background and would replace the vegetation beyond the ballfields and playground. These structures would have a proposed height of approximately 30 feet (see **Photograph 5.4-9**). Under Alternative K, a noise wall would be constructed along Ramp F near the roadway that is closest to the school as well as an elevated roadway structure on the far side of Route 42. The maximum height of this structure would be approximately 30 feet (see **Photograph 5.4-11**).

Noise walls would be constructed on top of the proposed roadway structures. The highest portions of the noise walls in this location would be 18 feet for Alternatives D and D1, and 13 feet in the foreground and 25 feet in the background for Alternative K. The combined height within this viewshed of the entrance ramp in the foreground, an elevated road behind this ramp, and the noise walls would be 48 feet for Alternatives D and D1 and 43 to 55 feet for Alternative K.

For Alternatives G2 and H1, the proposed improvements include an elevated road with a pier-supported entrance ramp (Ramp F) at a height of approximately 60 feet (see **Photograph 5.4-10**) as well as both northbound and southbound I-295 in the background. Noise walls would be constructed on top of both the entrance ramp and the proposed roadway structures. The highest portions of only the noise walls in this location would be 12 feet. The combined height of the entrance ramp, proposed elevated roadway and the noise walls would be 72 feet. The presence of the supporting structures beneath the elevated roadway and the various retaining walls would result in a confining and intrusive view by creating an underutilized and permanently compromised area.


PHOTOGRAPH 5.4-8 – EXISTING CONDITIONS


PHOTOGRAPH 5.4-9 – ALTERNATIVES D, D1


PHOTOGRAPH 5.4-10 – ALTERNATIVES G2, H1

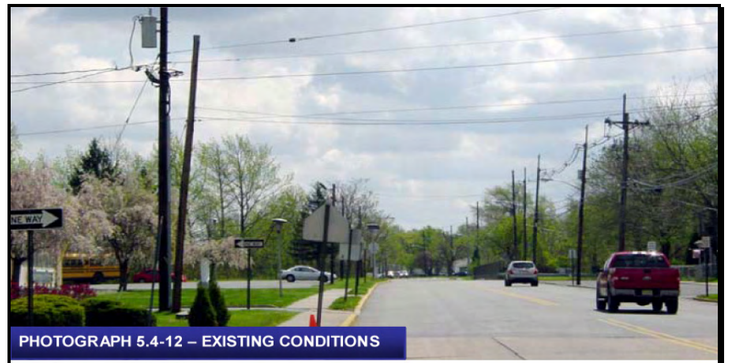

PHOTOGRAPH 5.4-11 – ALTERNATIVE K

Photographs 5.4-8 through 5.4-11: Victory Drive Looking South at Bellmawr Park Elementary School

Browning Road from Annunciation B.V.M. Church (Bellmawr): This area is classified as being moderately sensitive. Browning Road traverses the I-295 interchange. To the south, commercial development is located along both sides of the road. Residential development is located to the north as well as beyond the road (see **Photograph 5.4-12**). For Alternatives D and D1, the I-295 mainline would be constructed approximately 30 feet above Browning Road (see **Photographs 5.4-13**). On the far side of I-76/Route 42, for Alternative K, a two-lane ramp would be constructed approximately 30 feet above Browning Road on the near side of I-76/Route 42 (see **Photograph 5.4-15**). Noise walls are proposed on the south side of Browning Road to the west of I-76 and on the north side of Browning Road on the east side of I-76. In addition, noise walls would be constructed on top of the proposed roadway structures. The highest portions of the noise walls in this location would be 15 feet above the roadway surface for Alternatives D and D1 and 13 feet for Alternative K. Noise walls would be constructed on both sides of the proposed roadway for Alternatives D and D1 and only on a portion of the structure crossing over Browning Road for Alternative K. The combined height within this viewshed of the elevated roadway and the noise walls would be 45 feet for Alternatives D and D1 and 43 feet for Alternative K. For Alternatives G2 and H1, the proposed improvements include a double-decker roadway (I-295 mainline), with support columns over Browning Road at a height of 60 feet (see **Photograph 5.4-14**). Noise walls would be constructed on top of the proposed roadway structures. The highest portions of the noise walls above the roadway surface in this location would be 11 feet. The combined height of the proposed roadway structures with noise walls would be 71 feet. The view within this area would include two levels of elevated roadway structures with supporting columns and noise walls provided on each level of the proposed elevated roadway. The stacked roadway structure and noise walls would substantially restrict the line of vision along Browning Road.

Browning Road from New St. Mary's Cemetery Driveway (Bellmawr): This area is classified as being moderately sensitive. Browning Road currently traverses the I-295 interchange. To the south, commercial development is located along both sides of the road. Residential development is located to the north as well as beyond the road (see **Photograph 5.4-16**). For Alternatives D, D1 and K, an elevated road at approximately 30 feet is proposed over Browning Road (see **Photographs 5.4-17** and **5.4-19**). For Alternatives D and D1, the elevated roadway would be the I-295 mainline and an entrance ramp (Ramp A). For Alternative K, the elevated roadway would be a two-lane roadway on the west side of I-76/Route 42 (Ramp C). Noise walls would be constructed on the ground behind the mausoleums as well as on top of the proposed roadway structures. The greatest height of the noise walls in this location would be 19 feet above the roadway surface for Alternatives D and D1, and 13 feet for Alternative K. The combined height within this viewshed of the proposed elevated roadway with the noise walls would be 49 feet for Alternatives D and D1, and 43 feet for Alternative K.

For Alternatives G2 and H1, a double-deck roadway (I-295 mainline) and an entrance ramp (Ramp A) with support columns is proposed in this area over Browning Road (see **Photograph 5.4-18**). The height of this structure would be approximately 60 feet. Noise walls would be constructed on the ground behind the mausoleums, as well as on top of the roadway structures, with a height of 12 feet.

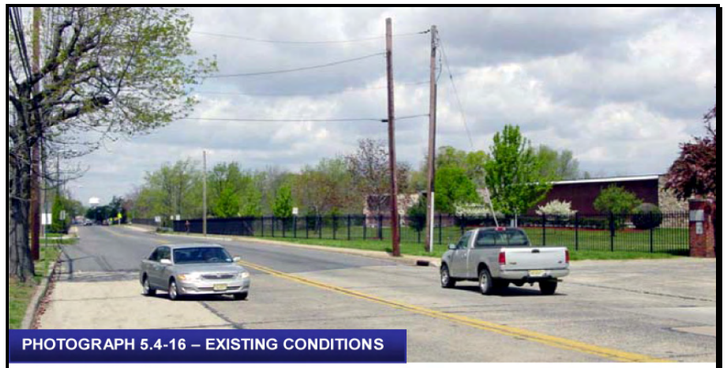

PHOTOGRAPH 5.4-12 – EXISTING CONDITIONS


PHOTOGRAPH 5.4-13 – ALTERNATIVES D, D1


PHOTOGRAPH 5.4-14 – ALTERNATIVES G2, H1


PHOTOGRAPH 5.4-15 – ALTERNATIVE K

Photographs 5.4-12 through 5.4-15: Browning Road Looking East from Annunciation B.V.M. Church


PHOTOGRAPH 5.4-16 – EXISTING CONDITIONS


PHOTOGRAPH 5.4-17 – ALTERNATIVES D, D1


PHOTOGRAPH 5.4-18 – ALTERNATIVES G2, H1


PHOTOGRAPH 5.4-19 – ALTERNATIVE K

Photographs 5.4-16 through 5.4-19: Browning Road Looking West from New St. Mary's Cemetery

The combined height of the proposed roadway structures with noise walls would be 72 feet. The view within this area would include two levels of elevated roadway structures with supporting columns and noise walls provided on each level of the proposed elevated roadway. The stacked roadway structure and noise walls would substantially restrict the view along Browning Road.

Ramp E from Flanders Road (Bellmawr): This area is designated as being moderately sensitive. Vegetation and a noise wall on an embankment exist along the roadway (see **Photograph 5-4-20**). For all build alternatives (see **Photographs 5.4-21** and **5.4-23**), a larger retaining wall, closer to the adjacent homes, is proposed at a height of approximately 25 feet. Noise walls would be constructed on top of the retaining wall. The highest portions of the noise walls above the roadway surface in this location would be 23 feet. The combined height within this viewshed of the proposed retaining wall and the noise walls would be 48 feet. The top level of I-295 would be visible from this location for Alternatives G2 and H1 (see **Photograph 5.4-22**).

Shining Star Park (Mount Ephraim): This area is classified as being highly sensitive. Vegetation exists beyond the park property (see **Photograph 5.4-24**). Residential development is located north of this location. No elevated roadway structure is proposed within this viewshed for Alternatives D and D1 (see **Photograph 5.4-25**). Alternative K would be minimally elevated with vegetation (see **Photograph 5.4-27**). Noise walls would be constructed across the interchange on the bluff of the cemetery along proposed I-295 northbound at a height of 15 feet above the roadway surface for Alternatives D and D1 and 11 feet for Alternative K.

For Alternatives G2 and H1, from this viewshed, the I-295 mainline northbound with southbound above, would be constructed at a height of approximately 50 feet (see **Photograph 5.4-26**). Support columns would also be visible within this viewshed. No noise walls are proposed on these structures in this location for either alternative. However, noise walls are proposed beyond these structures along I-295 northbound on the bluff of the cemetery.

Bell Road from North of Emerson Avenue (Mount Ephraim): This area is classified as being moderately sensitive. Residential development is located along Bell Road as it traverses over I-295 (see **Photograph 5.4-28**). For Alternatives D, D1 and K, existing Bell Road would be raised slightly and no noise walls are proposed within the viewshed (see **Photographs 5.4-29** and **5.4-31**). For Alternatives G2 and H1, an elevated road (I-295 mainline southbound) is proposed at a height of approximately 30 feet above a slightly raised Bell Road (see **Photograph 5.4-30**). No noise walls would be built in this location for either alternative within the view shown in the photographic simulation.

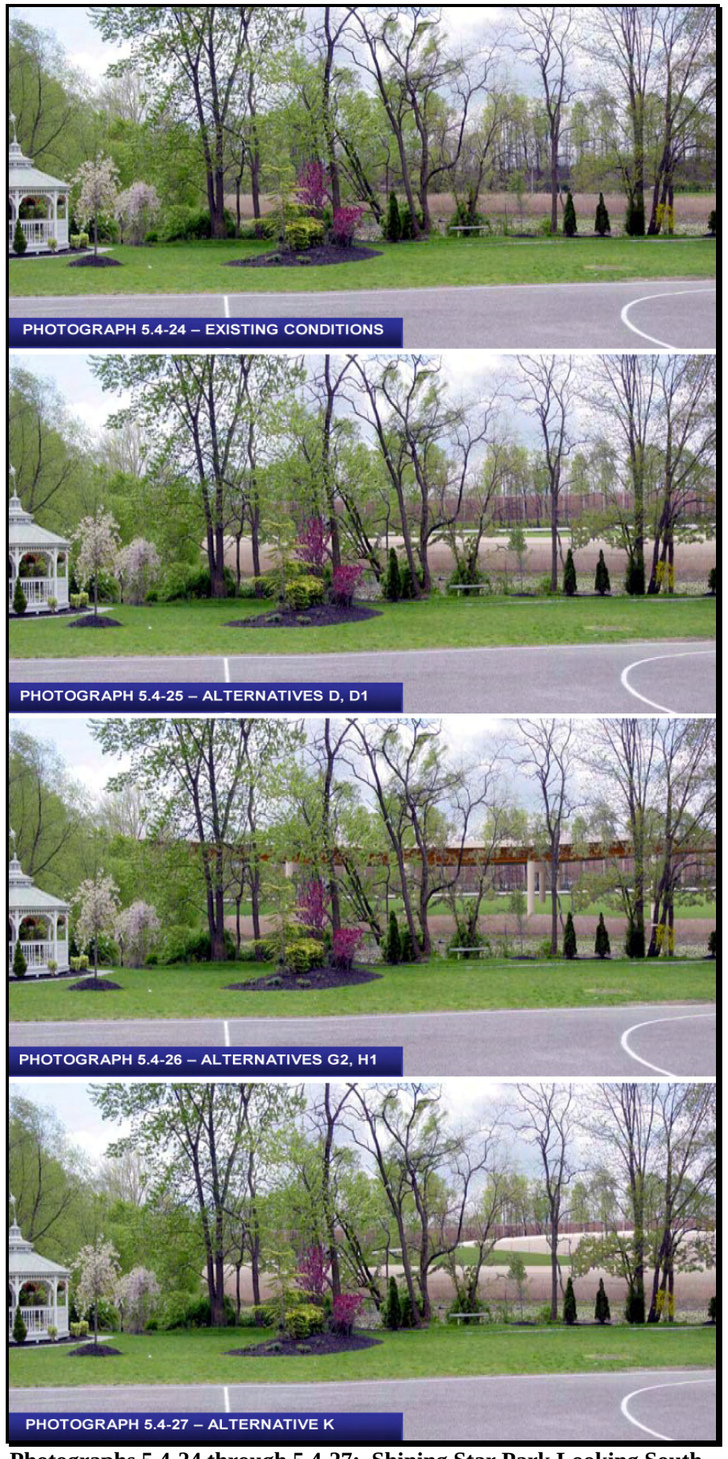

PHOTOGRAPH 5.4-20 – EXISTING CONDITIONS


PHOTOGRAPH 5.4-21 – ALTERNATIVES D, D1


PHOTOGRAPH 5.4-22 – ALTERNATIVES G2, H1


PHOTOGRAPH 5.4-23 – ALTERNATIVE K

Photographs 5.4-20 through 5.4-23: Flanders Road Looking Northwest at Ramp E



Photographs 5.4-24 through 5.4-27: Shining Star Park Looking South

Mitigation: The overall effect of the proposed project on the current visual context would be to replace the existing interchange roadway network with numerous elevated roadway structures and noise walls. For Alternatives D and D1, the combined height within Bellmawr of the proposed retaining walls and/or bridges and noise walls would range from 43 to 49 feet. For Alternative K, the combined height would range from 48 to 51 feet. Due to the distance, the 11- to 15-foot high noise walls along the cemetery would not create a negative visual impact. For Alternatives G2 and H1, new structures in Bellmawr would range from 48 feet east of Ramp E to 78 feet at Ramp F.

The noise walls proposed as part of this project can be considered to have a positive visual impact in that they will block the view of the high-volume roadway. The community would have the opportunity to decide whether the noise walls should be constructed. Several options are available in terms of noise wall types, textures, patterns, and colors. Various treatments are also available for retaining walls, bridge abutments, and piers. Context sensitive designs, including public participation to determine architectural techniques would be developed during the final design phase of the project to the greatest amount possible to preserve the aesthetic, historic, community and natural environment. Landscaping may also be used to partially screen these structures from view. Such mitigation measures would be incorporated during the final design phase for the project.

Photographs 5.4-28 through 5.4-31: Bell Road Looking South from North of Emerson Avenue

5.5 NATURAL ECOSYSTEMS

Natural Ecosystems are the collection of living and non-living components of the environment. Healthy and well-functioning natural ecosystems are necessary for the protection of our diverse biological resources (see **Photograph 5.5-1**) and for sustaining our economies and communities that rely on these resources. This section of the DEIS is based on the findings of the *Natural Ecosystems TES*. The TES report included three major tasks: inventory/data collection, field reconnaissance, and assessment of potential impacts to the natural ecosystems for the No Build Alternative and each of the five build alternatives. This section will summarize the findings of the TES report and conclude with a comparison of the alternatives. More detailed information concerning the natural ecosystems within the study area, as well as the methodology used to measure and assess the potential impacts, can be found in the *Natural Ecosystems TES* (see Attachment 5).

Photograph 5.5-1: Little Timber Creek Marsh Area Looking Southwest from Shining Star Park

5.5.1 Methodology

The study area is comprised of portions of the drainage areas of Little Timber Creek and Big Timber Creek. These waterways are tidally influenced up to the head-of-tide. Included in the study area are several residential, commercial, industrial, and public/recreational areas in Bellmawr, Mount Ephraim, and Gloucester City. The study area boundary for this natural ecosystems analysis is the project limits for the proposed project, as defined in Chapter 2.

This analysis was conducted pursuant to the requirements set forth in 23 CFR Part 771 and FHWA Technical Advisory T-6640.8A, as well as the NJDOT scope of work for an ecology TES report. It was also conducted pursuant to Sections 401 and 404 of the Clean Water Act, Wetlands Act of 1970 (NJAC 7:7 and 7:7E), Freshwater Wetlands Protection Act (NJAC 7:7A), Tidelands Act (NJAC 12:3-1), Waterfront Development Act (NJAC 7:7 and 7:7E), Flood Hazard Area Control Act (NJAC 7:13), New Jersey Pollutant Discharge Elimination System (NJPDES) rules (NJAC 7:14A), and Section 307 of the Coastal Zone Management Act of 1972 as amended (16 USC 1456(c)). In addition, potential impacts to floodplains were evaluated according to the FHWA's guidelines for floodplain encroachment (23 CFR 650, Subpart A) and FEMA's Executive Order 11988, entitled *Floodplain Management*.

5.5.2 Existing Conditions

5.5.2.1 Geology

The overall study area can be described as lying within the New Jersey Coastal Plain portion of the Coastal Plain physiographic province. The Coastal Plain consists of a thick wedge of gently southeast-sloping, unconsolidated deposits on top of Pre-Cambrian crystalline bedrock. In the study area, the Coastal Plain formations are of Upper Cretaceous age and consist of the following, from youngest to oldest:

- **Marshalltown Formation:** This formation makes up a very small portion of the southeastern section of the study area. It is generally made up of sand, quartz, and glauconite.
- **Englishtown Formation:** This formation makes up the second largest portion of the study area and covers a large majority of the southern and part of the eastern portion of the study area. It is generally made up of fine- to coarse-grained quartz sand.
- **Woodbury Formation:** This formation makes up the majority of the study area and extends from the southwestern portion northward, and then to the eastern edge of the study area. It is generally made up of clay-silt.
- **Merchantville Formation:** This formation makes up a portion of the northwestern section of the subject area. This formation is generally made up of sand and glauconite.

The descriptions of the above formations are obtained from the *Bedrock Geologic Map of Central and Southern New Jersey* (USGS, 1998, Investigations Series Map I-2540-B). See **Figure 5.5-1**, which represents the NJDEP Bureau of Geographic Information and Analysis data layer, for more information.

5.5.2.2 Soil

The largest contiguous soil type mapped is Urban Land, which is found to the north of the Little Timber Creek corridor in the northern portion of the study area (See **Figure 5.5-1**). Urban land soils have been developed or disturbed by human activity in such a way that the natural arrangement of the particles and the soil horizons have been destroyed. These soils cannot be classified on the basis of form and properties, such as acidity or natural layers.

Freehold soils are mapped both in the southeastern portion and west central portion of the study area. A typical profile of Freehold soil has a dark grayish-brown, fine sandy loam plow layer nine inches thick; a yellowish-brown, fine sandy loam subsurface layer six inches thick; a dark yellowish-brown, sandy clay loam subsoil 20 inches thick; and underlying layers of mostly stratified loamy sand and sandy loam. Freehold soils contain little gravel and the soils are moderately fertile, moderately permeable, and have a moderate to good water-holding capacity. The pH value ranges from 3.6 to 5.5 and these soils are designated as being extremely acidic to strongly acidic.

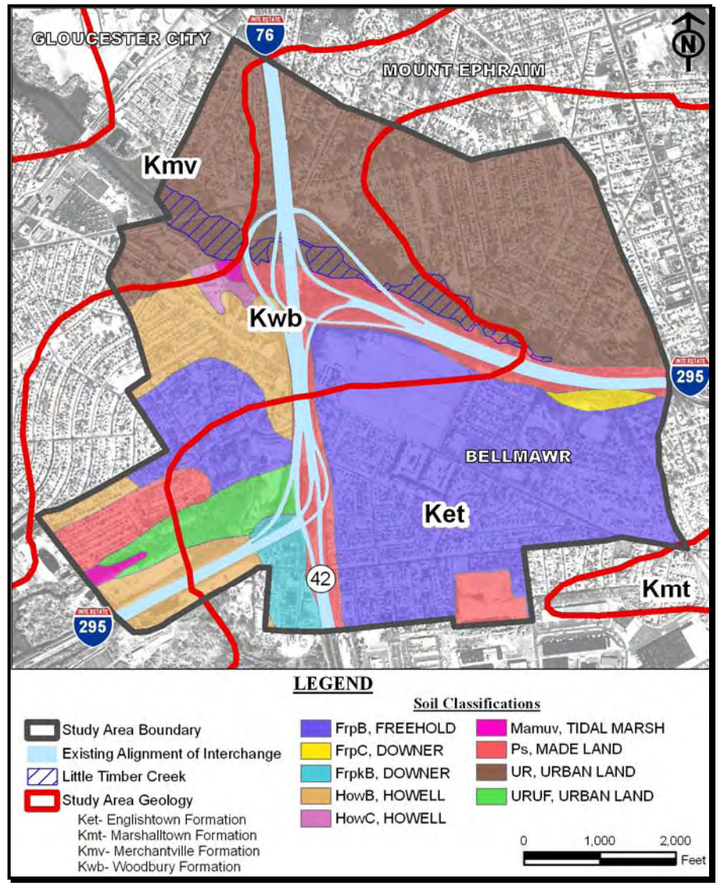


Figure 5.5-1: Study Area Soils and Geology

Howell soils are mapped in the western portion of the study area. They consist of thick, yellowish-brown, silty clay soils that are well- to moderately well-drained and contain a small amount of glauconite. The pH value ranges from 3.6 to 5.0 and these soils are designated as being extremely to very strongly acidic.

Small areas of Downer soils, the state soil of New Jersey, are found in the eastern and southern portions of the study area, along I-295 and Route 42.

Made Land soils are mapped within the highway corridor. Made Land soils consist of areas where the soil material has been so thoroughly mixed by excavation, filling, or other disturbances that the original soil horizons have been destroyed. Many recent residential and commercial building sites are in this mapping unit. The pH value ranges from 3.6 to 5.0 and these soils are designated as being extremely to very strongly acidic.

The abundance of Made Land and Urban Land shows the extent of disturbance to the native soil types that formerly were found within the study area.

Two tidal marsh areas are shown on the map. One area is west of Al Jo's Curve and the second is within the tidally influenced region of the unnamed tributary to Big Timber Creek in the southwest portion of the study area.

Except for Tidal Marsh, none of the soils in the study area are listed as being hydric on the Natural Resources Conservation Service (NRCS) hydric soils list for Camden County, New Jersey. More detailed information on the soils within the study area can be found in the *Natural Ecosystems TES*.

5.5.2.3 Groundwater

Groundwater quality within the study area has been reviewed from database records and public documents, as described below. While no site-specific water quality analyses were performed for this project, more detailed information on groundwater quality can be found in the *Natural Ecosystems TES*.

Public Water Supply

The three municipalities within the study area are serviced by public water supplies. The source of public water is primarily supply wells, some of which are located within the study area boundaries. However, none of these wells are located near the proposed improvements.

Based on an NJDEP well search, no private potable wells were identified within the study area. All public supply drinking water is from the Potomac-Raritan-Magothy (PRM) aquifer (2004 Annual Reports for Bellmawr and Gloucester City). This aquifer is a sole source confined aquifer and is discussed further below.

According to the 2004 New Jersey Annual Water Quality Report, Mount Ephraim purchases its water from New Jersey American Water Company. All contaminants tested were below the Maximum Concentration Level (MCL). The contaminants tested include barium, various volatile organic compounds (VOCs), copper, lead, and radioactive constituents.

Sole Source Aquifer

A sole source aquifer is designated by the USEPA as the "sole or principal source" of drinking water for a given aquifer service area. According to the NJDEP New Jersey Geologic Survey Sole Source Aquifer GIS data layer, the study area is within the New Jersey Coastal Plain Sole Source Aquifer. The recharge zone is defined as the New Jersey Coastal Plain physiographic province. Its stream-flow source zone includes all upstream parts of the Delaware River watershed in New Jersey, Delaware, Pennsylvania, and New York.

The PRM aquifer, which is the water supply source for Bellmawr and Gloucester City, is part of the Coastal Plain Aquifer. According to the United States Geological Survey (USGS), the PRM is a confined aquifer with alternating layers of sand, gravel, silt, and clay. The aquifer is characterized as highly productive and it is the most used confined aquifer in the Coastal Plain. The aquifer system extends throughout the Coastal Plain and attains a maximum thickness of 4,100 feet at the southeast portion of New Jersey. The water is described as excellent in quality, although it may contain elevated iron concentrations in some areas.

Information pertaining to groundwater recharge was available only within Bellmawr. Along the west side of I-295/Route 42, the area is generally characterized as having a groundwater recharge of one to eight inches per year. The majority of the east side of I-295/Route 42 and the south side of I-295 parallel to Little Timber Creek has a groundwater recharge of nine to 12 inches per year.

The outcrop recharge zone of the PRM aquifer is along the Delaware River, located approximately two miles northwest of the study area. An aquifer's outcrop recharge zone is an area where surface water percolates into the soil and seeps to a depth where it replenishes the aquifer. Since the study area is outside the aquifer outcrop recharge area, the study area does not represent a significant source of recharge to the PRM aquifer.

5.5.2.4 Surface Water

NJ Surface Water Classification

The highest quality waters (i.e., "waters of exceptional recreational or ecological significance") in New Jersey are designated as "Outstanding National Resource Waters" (ONRW). Waters designated as ONRW include: Fresh Water One (FW1) and Pinelands waters (PL). All remaining waters are categorized as Fresh Water Two (FW2). There are three sub-categories within the FW2 designation:

- **FW2-TP—**Trout production waters for trout spawning or nursery during their first summer.
- **FW2-TM—**Trout maintenance waters for the support of trout throughout the year.
- **FW2-NT—**Non-trout waters; these are not considered suitable for trout, but may be suitable for many other fish species.

Both the Big Timber Creek and Little Timber Creek have been designated as FW2-NT waters in the Lower Delaware Watershed Management Area (WMA), also known as WMA 18. Neither Little Timber Creek nor Big Timber Creek are classified as Scenic Rivers, according to the National Park Service National Wild and Scenic Rivers System.

PARAMETER	RESULTS
pH	5.5 to 7.5
Nitrates	0.88 to 4.4 mg/L
Phosphate	0.2 to 0.5 mg/L
Dissolved Oxygen Concentration	4.6 to 11.9 mg/L
Dissolved Oxygen Saturation	52.6 to 112.9%
Source: Delaware Riverkeeper Network	

Table 5.5-1: Surface Water Quality Records

Surface Water Chemistry

Surface water quality records were reviewed for Big Timber Creek from the NJDEP and the Delaware Riverkeeper Network (DRKN) databases. Based on the data reviewed, runoff from non-point sources is a primary concern since it results in elevated levels of nutrients and bacteria at numerous points within the Big Timber Creek watershed. The DRKN monitoring results indicate that pH, nitrates, and phosphate are at concentrations considered acceptable to support wildlife; however, dissolved oxygen (DO) concentrations and DO saturation results are some of the lowest ranges observed in the region (see **Table 5.5-1**). These two parameters are very important in maintaining a diverse aquatic habitat and appear to be impacted by continuing land development stresses on this ecosystem.

According to the New Jersey 1996 State Water Quality Inventory Report [305(b) Report] for Big Timber Creek, "Water quality is fair to good, with nutrients mildly elevated and bacteria elevated. Lead may be a problem with regard to aquatic life support." The report also states: "Fazzio Landfill also has been suspected of contaminating Big Timber Creek with organic chemicals." This landfill site is just upstream of I-295 on Big Timber Creek. The NJDEP Site Remediation Program (SRP) Status Report 2000 indicates that surface water is adversely impacted by semi-VOCs and metals from the landfill.

No comparable surface water quality data is available for Little Timber Creek. However, based on field reconnaissance and aquatic ecology data discussed in Section 5.5.2.5, it is apparent that the water quality of Little Timber Creek is degraded by stormwater runoff from existing development in the study area.

Stream Morphology

Little Timber Creek: Historical mapping shows that prior to the construction of I-295 in the 1950s, the Little Timber Creek meandered throughout what is now the highway corridor. The stream was relocated to the north to allow for construction of the highway (see **Photograph 5.5-2**). This is apparently the reason why the existing stream channel is relatively straight and its width relatively consistent from the head-of-tide upstream

Photograph 5.5-2: Little Timber Creek within Highway Corridor

within the study area. However, there are downstream areas where Little Timber Creek meanders within the existing floodplain. Within this downstream area, three sections of the stream flow through culverts beneath

I-295 and I-76. Sections of this portion of the stream contain culverts and the banks are relatively stable.

Portions of the stream between Bell Road and the railroad crossing are identified as non-tidal; the stream corridor in this area has noted bank erosion and is severely incised. Downstream of Bell Road to the edge of the tree line within Wetland TF (tidal), there are eroded banks and severely incised channels. The channel bed is covered with soft clay sediments. Clay also is present in the stream channel from Bell Road upstream to the railroad.

The width of the stream is relatively consistent upstream of the treeline in Wetland TF. Downstream of the treeline in Wetland TF, the stream width varies and the stream has dendritic characteristics. No significant pooling, ponding or riffles were observed throughout the entire stretch of Little Timber Creek within the study area. Additionally, debris dams were observed in several locations between Bell Road and the Grenlock Secondary Railroad, resulting in obstructions to flow, as well as bank erosion.

Photograph 5.5-3: Stormwater Culvert beneath Bellmawr Park Baseball Fields

Tributary of Big Timber Creek: The southern portion of the study area is within the Big Timber Creek watershed. Within the study area, a freshwater tributary flows into a tidally influenced mudflat wetland, which continues to the main stem of the Big Timber Creek. The tidal influence is affected by the blockage of sediment and silt, which has been deposited within the conveyance pipe beneath Creek Road.

The headwaters of the unnamed tributary appear to be small seeps and surface drainage from areas east of I-295/Route 42. This water is conveyed via a culvert underneath this portion of the I-295/I-76/Route 42 interchange near the Bellmawr Baseball League Fields (see **Photograph 5.5-3**). At this point, it is once again conveyed via a series of pipes to the west of Essex Avenue where it discharges to the tributary. The unnamed tributary has eroded banks and severely incised channels. The channel bed primarily consists of sand and gravel. The unnamed tributary is relatively straight until just prior to the mudflat tidal wetland, at which point it becomes dendritic in flow pattern.

5.5.2.5 Aquatic Ecology

Macro Invertebrate Species

The 2000-2001 Ambient Biomonitoring Network (AMNET) benthic macroinvertebrate sampling conducted in Big Timber Creek by the NJDEP reveals that significant portions of the Big Timber Creek watershed are moderately impaired. Moderately impaired watersheds have reduced macroinvertebrate richness, in particular the Ephemeroptera, Plecoptera, and Trichoptera (EPT) species, and there is a reduction in the community balance and number of pollutant intolerant species present. The lack of or low number of EPT species observed suggest that physiochemical impacts, as well as habitat degradation, are contributing to biological impairment.

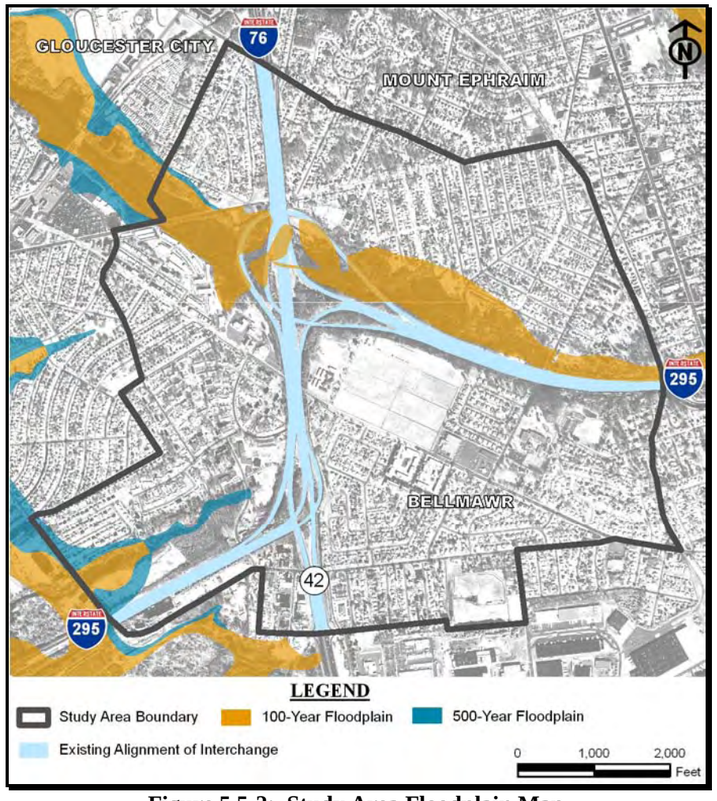
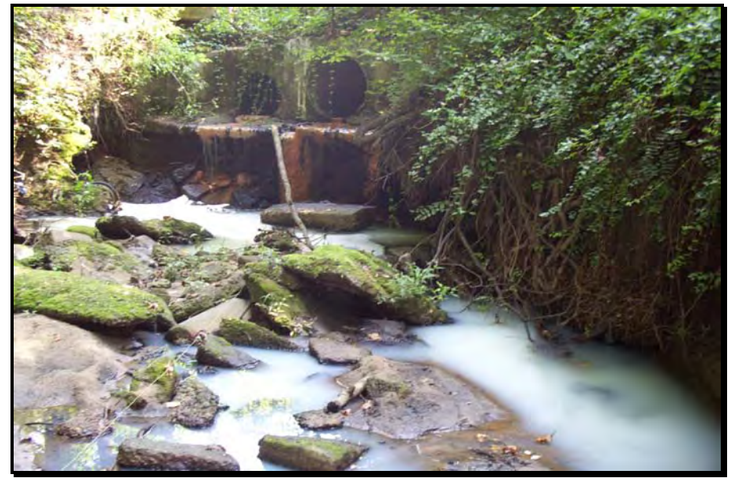


Figure 5.5-2: Study Area Floodplain Map

The AMNET results for the Little Timber Creek reveal that it is moderately impaired and exhibits the same characteristics as those described above for Big Timber Creek. The deficiencies noted within the report indicate that there is significant organic pollution and a low number of clean water organisms within the Little Timber Creek. These conditions likely result from degraded water quality caused by urban stormwater runoff (see **Photograph 5.5-4)**.



Photograph 5.5-4: Stormwater Culverts beneath Essex Avenue

Freshwater Fish Species

The National Marine Fisheries Service (NMFS) and NJDEP were consulted regarding the freshwater fish species in both the Big and Little Timber Creeks. According to the NMFS, no Essential Fish Habitat (EFH) occurs within the study area. EFH is defined as "those waters and substrate necessary for fish spawning, breeding, feeding, or growth to maturity." In addition, Little Timber Creek contains no fishery resources of concern and no construction restrictions are necessary. Big Timber Creek was identified as containing numerous fish species such as striped bass, American shad, blueback herring, and alewife.

In 2002, a statewide health advisory for eating fish from New Jersey freshwaters was issued. This advisory was implemented due to the elevated levels of mercury found in edible fish tissue throughout many portions of the state. In addition, Camden County has issued a Fish Consumption Advisory for Big Timber Creek. There are currently no county restrictions within the Little Timber Creek watershed.

5.5.2.6 Floodplain and Floodway

Little Timber Creek

In the study area, Little Timber Creek is crossed by I-76 and Ramps B, C, and D. Little Timber Creek is not a "State Studied" or "FEMA Studied Stream" in regard to flooding, and consequently a floodway and floodplain have not been established by these agencies within the project area. However, the September 1996 FEMA Flood Insurance Rate Map (FIRM) for the study area was reviewed (see **Figure 5.5-2**).

The respective 100-year floodplain and floodway limits were established during initial field studies for the Little Timber Creek channel reach beginning upstream of Bell Road, approximately 6,000 feet east of the I-295/I-76/Route 42 interchange, and continuing 7,000 feet west of the interchange to a point downstream of Route 551. Little Timber Creek is a

tidally influenced tributary to Big Timber Creek and the Delaware River. The waterway is subject to both tidal backwater inundation and fluvial flooding within the project study area. Based upon the analysis of field investigations, the Little Timber Creek 100-year floodplain limits are controlled by tidal backwater from Big Timber Creek and the Delaware River for the reach extending downstream from Bell Road. Upstream of Bell Road, the 100-year flood limits are controlled by fluvial flooding from the 1.6-square-mile drainage area to the roadway culvert.

The Little Timber Creek drainage area to Bell Road is 1.6 square miles and increases to 2.2 square miles at the I-295/I-76/Route 42 interchange. No published or studied information on "average" annual flows and velocities has been gathered and no USGS information is published for Little Timber Creek. However, calculations for peak annual flow range from 160 cubic feet per second (cfs) at Bell Road to 240 cfs at the interchange with corresponding flow velocities ranging up to approximately two feet-per-second.

Big Timber Creek

Big Timber Creek is a State Studied Stream upstream of I-295, but the detailed study does not include the unnamed tributary that is part of this project. However, the FEMA flood mapping indicates that the 500-year floodplain extends up to or slightly beyond Essex Avenue within the unnamed tributary to Big Timber Creek. Some residential dwellings may be subject to flooding in extreme storm events, especially when coupled with tidal influences. The 100-year floodplain appears to extend approximately to the field established head-of-tide within this area.

It should be noted that placement of fill materials downstream of the study area and along or within the two creek corridors may have altered the floodplain from that shown on the FEMA mapping.

5.5.2.7 Wetlands

NJDEP Wetland Mapping

The NJDEP Wetland Mapping, which uses high-resolution aerial photography in combination with field studies to classify wetlands within the state, has determined that freshwater tidal marshes, deciduous wooded, deciduous scrub/shrub, mixed scrub/shrub, and herbaceous wetlands are present within the study area. In addition, right-of-way (modified) wetlands are mapped within the Little Timber Creek corridor north of I-295. Wetland right-of-way is defined as a former wetland area, which still exhibits evidence of soil saturation on the photography. Due to alterations associated with creating the highway right-of-way, these areas may not support the typical natural wetland vegetation found in adjacent unaltered natural areas. The NJDEP wetland mapping is shown on **Figure 5.5-3**. NJDEP determined that tidal areas are present along the Little Timber Creek and within the unnamed tributary to the Big Timber Creek located in the western portion of the study area. Tidal areas are under the jurisdiction of the NJDEP Division of Land Use Regulation and under the authority of the USACE. The two head-of-tide locations are found: 1) in the eastern portion of the study area within the Little Timber Creek corridor, east of

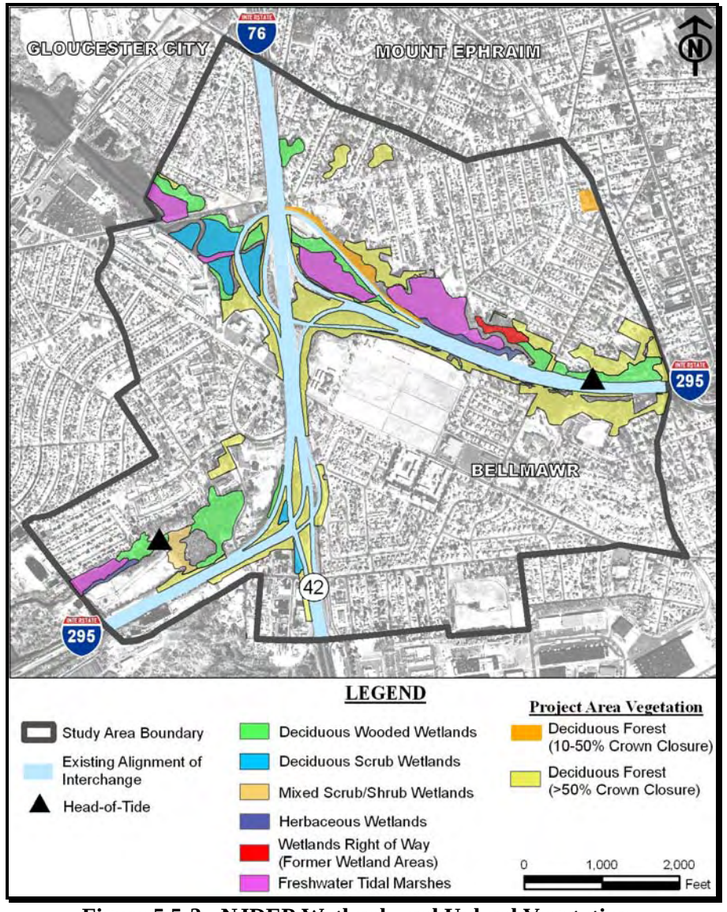


Figure 5.5-3: NJDEP Wetlands and Upland Vegetation Communities Map

Bell Road and west of the railroad bridge; and, 2) in the western portion of the study area to the east of Creek Road within the Big Timber Creek tidally influenced tributary, west of the forested wetland area. The head-of-tide location for Little Timber Creek was provided by the NJDEP and verified by field observations. The head-of-tide for the unnamed tributary to Big Timber Creek was field observed during the wetland delineation effort. These head-of-tide locations are shown on **Figure 5.5-3**.

National Wetlands Inventory Mapping

National Wetlands Inventory (NWI) maps produced by the USFWS were reviewed as part of the delineation efforts within the study area. Wetlands on the NWI maps are classified using the methods described in "*A Classification of Wetlands and Deepwater Habitats of the United States*" by L. Cowardin. Study area wetlands are primarily classified as Palustrine, with limited Riverine systems on the NWI maps (see **Figure 5.5-4**).

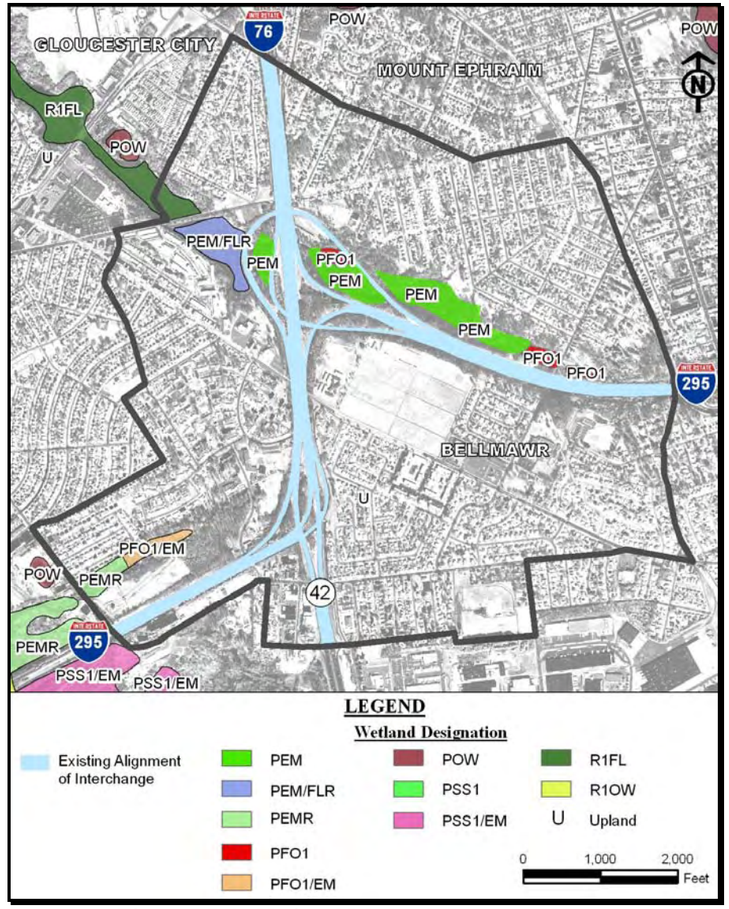


Figure 5.5-4: National Wetlands Inventory Map

The classifications shown on the NWI maps were not always consistent with the wetland types that were observed during the field delineation efforts. These differences are discussed in more detail in the *Natural Ecosystems TES*.

Wetland Delineation

Prior to the commencement of the wetlands delineation effort, coordination with state and federal environmental review agencies was established. This coordination included the establishment of field methodologies and protocols to satisfy the requirements of both the NJDEP and the USACE.

Differences were found between the NJDEP wetland mapping and the areas identified and delineated as wetlands during the field investigation. Extensive on-site investigations and coordination with the NJDEP and USACE were performed in order to refine and/or verify the NJDEP wetland mapping designations. The results of these refinements and/or verifications of the wetland areas are depicted in **Figure 5.5-5.**

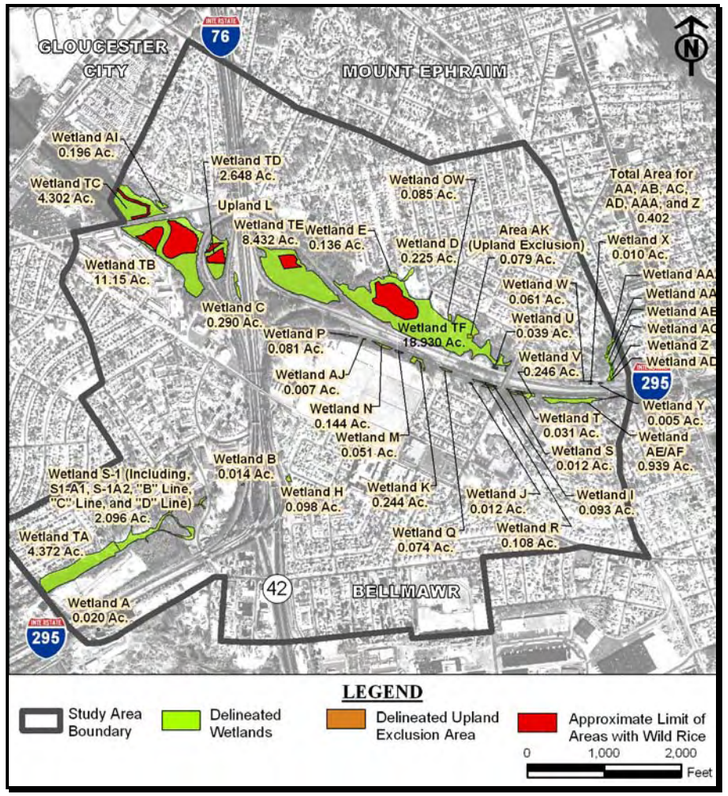


Figure 5.5-5: Field Delineated Study Area Wetlands

Approximately 5.851 acres of non-tidal freshwater wetlands and approximately 49.835 acres of tidal freshwater wetlands were delineated. No specimen trees or unique plant communities, other than wild rice, as described below, were observed during the wetland delineation effort.

The functions and values of the wetlands within the study area were determined by field observations and the professional judgment of the wetland scientists who performed the jurisdictional wetland delineation effort. All delineated wetlands were classified by NJDEP as having "Ordinary" or "Intermediate Resource Values."

In the summer of 2004, NJDEP Letter of Interpretation (LOI) and USACE Jurisdictional Determination (JD) applications were submitted to those agencies for review and approval of the wetlands delineation lines. These submissions were based on field delineations and field meetings with NJDEP, USACE and USEPA. The NJDEP and USACE provided technical assistance in the field delineation effort. The LOI/JD submissions were approved by the agencies in early 2005. Copies of the LOI and JD letters are included in Appendix B.

Tributary to Big Timber Creek

The wetlands associated with the unnamed tributary to the Big Timber Creek are divided into two different sections, based on the delineation findings. One is tidal, designated as Tidal Area (Wetland TA, approximately 4.372 acres) and one is non-tidal, designated as Stream 1 (Wetland S-1, approximately 2.096 acres). The total acreage of delineated wetlands associated with the unnamed tributary to the Big Timber Creek is 6.468 acres (see **Figure 5.5-5**).

The unnamed tributary to Big Timber Creek was designated as S-1 and is the only wetlands area with a watercourse within the Big Timber Creek watershed included within the study area. The stream corridor was delineated, as well as ephemeral channels and small wetlands associated with seeps, drainage patterns, and areas where sufficient water was observed to sustain wetland vegetation.

The area to the south of the wetlands appears to have been altered by soil excavation activities and the construction of two radio towers. The northern limits of the wetlands consist of residential development. Even though impacts to the surrounding areas appear to have been significant, Wetland S-1 seems to be relatively undisturbed.

The soils within the stream corridor appear to be highly eroded, with scouring from storm and high water events cutting steep slopes in many areas. Residential and other development may have changed or altered soil conditions from the original soil types that may have previously existed within this area.

The wetland hydrology in this area is complex, due to a number of factors, including the configuration of the stream channel, impacts from tides, the presence of seeps and intermittent storm events. However, in the upstream portion of this tributary to Big Timber Creek, near Essex Avenue, flooding from tidal influence is negligible.

Little Timber Creek Watershed

The Little Timber Creek flows from the east to the west toward the Delaware River. Almost the entire studied length of the Little Timber Creek, except the far eastern portion of the watershed, is tidally influenced. Embankments placed to build the I-76 and I-295 highways, residential development, disturbances for construction of the noise barrier wall, and numerous other encroachments have altered the natural habitat and nature of this watershed.

Little Timber Creek is a plentiful, perennial source of fresh water that flows through broad marshy areas in portions of the watershed. This source of water is supplemented by the daily tidal cycle in the tidal marshes. A large number of wetland areas within the watershed are supported by seeps located along the slopes of the stream corridor. Collectively, these seeps amount to a considerable contribution of flow to the Little Timber Creek.

The wetland delineation effort identified 45.462 acres of tidal freshwater wetlands (Wetlands TB, TC, TD, TE, and TF, as shown on **Figure 5.5-5**) in the Little Timber Creek portion of the study area. These wetlands are located in the northern portion of the study area in the vicinity of Al Jo's Curve and Kings Highway. They contain a diverse community of deciduous hardwoods, shrubs, and herbaceous species. Wild rice stands were found to be especially prevalent in the central portions of Wetland TF and TB.

Little Timber Creek provides freshwater to these wetlands; however, they are also influenced significantly by tidal fluctuations. The tidal wetlands provide long-term storage of surface water and habitat for diverse vegetation and common types of wildlife. However, given the degraded water quality, Little Timber Creek does not provide significant aquatic ecology habitat.

The remaining wetlands in the Little Timber Creek portion of the study area are non-tidal freshwater wetlands totaling 3.257 acres. A total of 28 separate non-tidal freshwater wetlands were identified, the largest of which is Wetland AE/AF (0.939 acres). Stormwater and seeps are the predominant sources of water for these wetlands. Typical vegetation includes mixed hardwoods and stands of common reed. Most of these wetlands are isolated, i.e., not connected to the nearby wetlands adjacent to the stream. Their primary function is short-term storage of stormwater, although the largest of these wetlands also provides habitat for common forms of wildlife.

Wetland Vegetation

Hydrophytic vegetation consists of species that can tolerate anaerobic conditions for at least a portion of the growing season. Vegetation was observed, identified, and characterized at each of the data points and along the transition zones of the wetland areas. For a complete list of vegetation identified during the wetland delineation effort, please refer to the *Natural Ecosystems TES*.

Photograph 5.5-5: Wild Rice Stands in Little Timber Creek Tidal Area

Wild rice (*Zizania aquatica)* is found in stands throughout the Little Timber Creek tidal area (see **Photograph 5.5-5**). It is found throughout the study area in association with pickerel weed (*Pontederia cordata*) and common smartweed (*Polygonum hydropiper*) or marshpepper smartweed (*Polygonum hydropiperoides*).

An aggressive invasive species, common reed (*Phragmites australis*), is opportunistic and found throughout the study area from areas of high topography with xeric (dry) conditions down to low lying wet areas with hydric conditions. Japanese knotweed (*Polygonum cuspidatum*), another

aggressively invasive species, is also found throughout the study area, sometimes in thick stands, and generally in the outer perimeter of the wetlands.

5.5.2.8 Upland Vegetation and Wildlife

The vegetation in the upland areas, other than those landscaped by homeowners or the NJDOT, typically contains a successional, deciduous forest assemblage with an increasingly strong presence of invasive species (see **Figure 5.5-3**). Based on the NJDEP GIS data layer, a total of approximately 72 acres of upland vegetation are identified within the study area. Approximately 17 acres of the total amount are located within the roadway medians or are isolated upland areas and are not part of large contiguous forests. All of the wetland transition areas, or buffers, are located within the upland areas. Depending on location, the transition areas contain disturbed roadway areas or forest fringe areas.

Trees, Shrubs, and Herbs

The upland forest canopy consists of a mix of tulip poplar (*Liriodendron tulipifera*), northern red oak (*Quercus rubra*), and red maple (*Acer rubrum*), with the invasive Norway maple (*Acer platanoides*) common in some areas. A typical upland forest canopy is shown in **Photograph 5.5-6.** The shrub understory is dominated by flowering dogwood (*Cornus florida*), several varieties of honeysuckles (*Lonicera dioica, L. canadensis, and L. tatarica*), and maple-leaf viburnum (*Viburnum acerifolium*). The highly aggressive and invasive multiflora rose (*Rosa multiflora*) is rapidly overtaking portions of the study area, as is the invasive common reed. While the latter is considered to be an herbaceous species, it is competitive in both the middle and understory levels.

Herbaceous ground covers include goldenrods (*Solidago spp.*), asters (*Asteraceae*), white snake root (*Ageratina altissima*), violets (*Viola spp.*), and shade-tolerant grasses such as panic grass (*Panicum spp.*). A strong presence of invasive species is widely represented by garlic mustard (*Alliaria petiolata*), which is predominant throughout the area.

Birds, Mammals, Amphibians, and Reptiles

Only those birds, mammals, reptiles, and amphibians expected to be found in urban/suburban areas have been observed by project team scientists during the study area reconnaissance or during numerous study area visits conducted in all seasons of the year over a two-year period. The New Jersey Division of Fish and Wildlife (NJDFW) has prepared species lists for mammals, birds, amphibians, turtles, lizards, and snakes that may potentially be found within the study area. All species observed during site work are included on these lists. More information on the mammals, birds, amphibians and reptiles commonly found in the vicinity of Big Timber Creek can be found in the *Natural Ecosystems TES*.

Many bird species utilize the Delaware River corridor as their migratory route and the study area is considered to be located within this route. Wild rice and similar species contribute to the importance of this area as a foraging site for migratory species.

5.5.2.9 Threatened and Endangered Species

Based upon extensive fieldwork performed within the study area by qualified scientists (i.e., wetland delineation, LOI, agency field checks, ecological studies, bird surveys, turtle surveys, etc.), no threatened and endangered species were identified. Furthermore, the project team fieldwork was conducted throughout the study area, during both the spring and fall migratory periods as well as the breeding season, and there were no observations of threatened and endangered species.

Photograph 5.5-6: Upland Forest Canopy Typical of Project Area

Even though potential habitat may exist within the study area, there are no unique habitat niches that exist within any portion of the study area, except for stands of wild rice in the Little Timber Creek tidal area, which were discussed earlier. The TES report includes more detailed information regarding surveys performed concerning potential threatened and endangered species in the study area. A brief summary of the studies conducted is provided below.

Bird Survey

The primary purpose of the bird surveys conducted was to establish a species presence/absence list for the Essex Avenue portion of the study area. The bird surveys, conducted between June 8 and June 21, 2004, were conducted during the breeding season to establish resident species or native nesters rather than transient, temporary, or migratory species that may visit an area. No threatened or endangered bird species were observed during these surveys, nor were they observed during the course of numerous visits to the study area by qualified scientists.

Bog Turtle Surveys

Habitat evaluation surveys, conducted June 8, 11, and 14, 2004, were utilized to determine whether suitable habitat for the bog turtle (*Clemmys muhlenbergii*) exists within the Essex Avenue portion of the study area. None of the habitats surveyed within the study area contain sphagnum, tussocks, low grasses, or other early successional vegetation typically preferred by the bog turtle and no bog turtles were observed during the project area activities. In addition, no bog turtles were observed during the course of other fieldwork performed within the study area by qualified scientists.

5.5.3 Potential Impacts and Mitigation

5.5.3.1 Impact Evaluation Criteria

The criteria summarized below were chosen for discussion because impacts to them differ between alternatives. The difference between alternatives for geology, soil, groundwater, upland vegetation, and wildlife were either minimal or showed negligible differences.

There is no feasible build alternative that would avoid impacts to wetlands and floodplains. The NJDOT evaluated 26 possible alternatives in an extensive screening process that included representatives from the USACE, USEPA and NJDEP. All of the alternatives evaluated would have resulted in wetland impacts. The five build alternatives studied in the *Natural Ecosystems TES* were selected as having the least potential adverse impacts, including those related to wetlands, while still meeting the project purpose and need.

As the proposed project would result in impacts to natural ecosystems, several permits are anticipated (see **Table 5.5-2**).

Floodplain and Floodway

Impacts to the floodplain and floodway would be due to the placement of pilings, footings, and fill associated with roadway structures throughout the interchange. Permanent impacts to floodplains were measured as the actual acreage of floodplain lost due to fill and construction activities. The relocation of the existing ramps would result in minimal fill placed in the floodway

Wetlands

Wetlands were delineated within the project area in accordance with NJDEP and USACE requirements. Impacts to State Open Waters (SOW), tidal wetlands and non-tidal wetlands were quantified as the actual acreage of permanent and temporary wetland and SOW impacts. Wetland impacts are related to the placement of pilings, roadway fill, and shading. The assumptions developed for quantifying wetland impacts are described in the *Natural Ecosystems TES*. With the exception of wetlands impacts authorized by the USACE and NJDEP, waste and borrow operations would occur in uplands at sites reviewed by FHWA to ensure compliance with Federal Laws.

PERMIT	DESCRIPTION
Section 404 Individual Wetlands Permit	This USACE permit is required for the discharge of dredged or fill material into waters of the United States, including wetlands. A Section 404 Individual Wetlands Permit Application has been prepared to outline the approximate impacts to wetlands and waters under federal jurisdiction. Details on specific construction impacts will be submitted following the approval of this DEIS and completion of the final engineering design.
Section 10 of the Rivers and Harbors Act Permit	This Act requires authorization from the USACE for the construction of any structure in or over any navigable water of the United States, the excavation/dredging or deposition of material in these waters or any obstruction or alteration in a navigable water. This permit is applied for and granted concurrently with the Section 404 Permit.
Water Quality Certification	Coordination will be conducted through NJDEP as part of the wetland and stream encroachment permit approval process.
NJDEP Freshwater Wetlands Permit	This state permit is required prior to engaging in a regulated activity in and around state open waters, freshwater wetlands, and associated transition areas.
NJDEP Tidelands Conveyance (Riparian Grant)	Tidelands grants, leases, and/or licenses are required for the use of state-owned riparian lands, which are lands presently, or formerly, covered by the mean high tide.
NJDEP Waterfront Development Permit	This permit is required for development at or below the mean high water line in tidal waters of the state and extends from the mean high water line to the first paved road, railroad, or surveyable property line. At a minimum, the zone extends at least 100 feet, but no more than 500 feet, inland from the tidal water body.
NJDEP Stream Encroachment Permit	NJDEP requires a permit for construction within and proximate to flood hazard areas to reduce flood damage to and from new development, and to protect the flood storage capacity and ecology of floodplains.
Pollution Discharge Elimination System Permit	This permit is required by the NJDEP for the discharge of wastewater associated with the proposed project, such as construction dewatering.
Coastal Zone Management Program, Consistency Certification	The Federal Coastal Zone Management Act requires that Federal agency activities, including development projects directly affecting the coastal zone, must be consistent with approved state coastal management programs to the maximum extent practicable. New Jersey has a Coastal Zone Management Program, which would require a consistency certification.

Table 5.5-2: Required Permits

On-Site Wetland Mitigation Opportunities

Impacts to wetlands must be mitigated in accordance with USACE and NJDEP regulations. Required acres for mitigation for each alternative were estimated within the *Natural Ecosystems TES*. The actual acreage available for on-site mitigation is dependent on final design of the selected alternative and is measured as the percentage of total required acreage available for on-site mitigation. On-site mitigation is preferred because the mitigation is in close proximity to the areas of impact. Thus, it will enhance and restore wetland functional characteristics, including water absorptive capacity, improved water quality and enhanced conditions for wildlife habitat, including the potential expansion of wild rice, an important food source for birds and waterfowl.

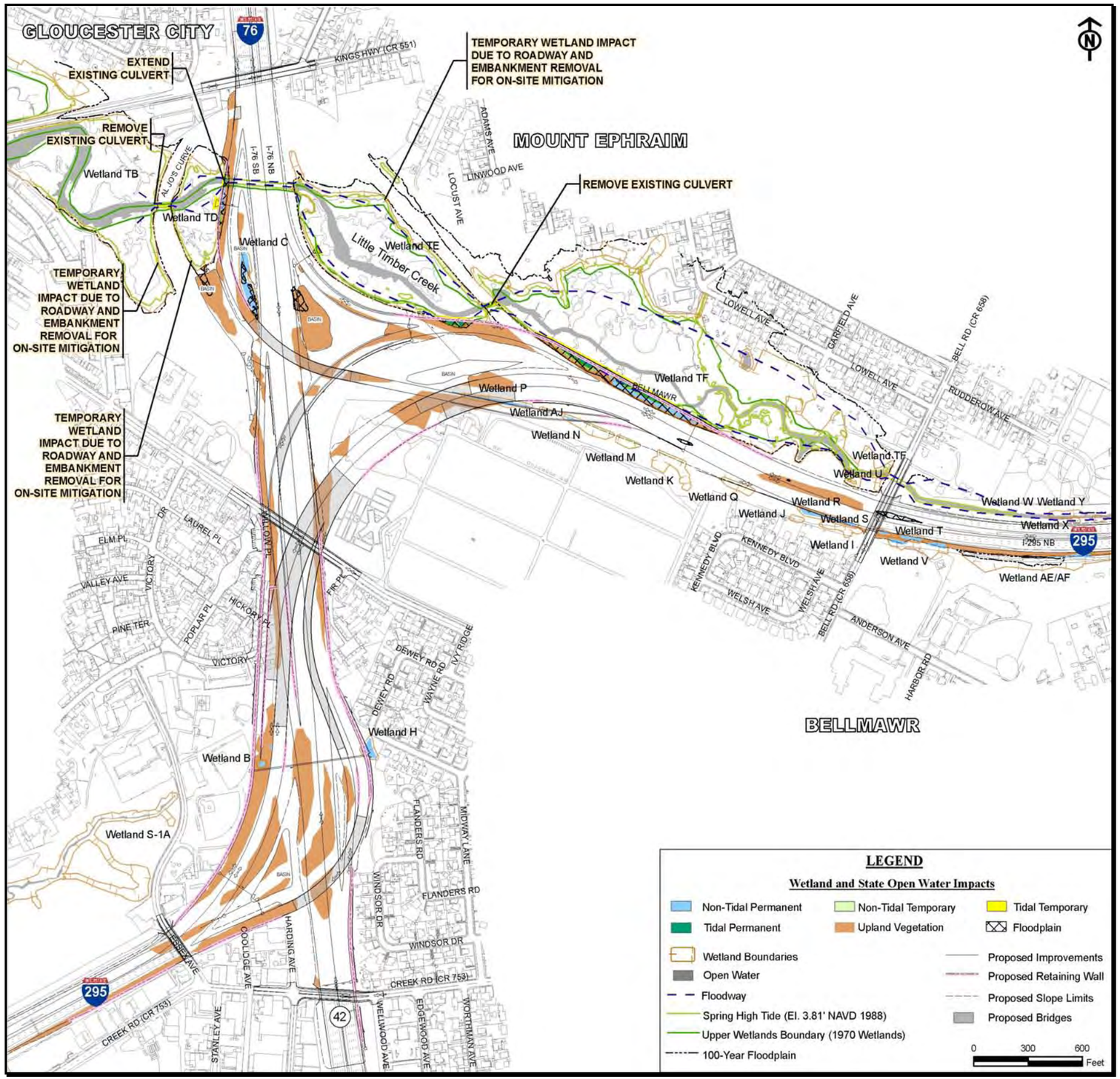


Figure 5.5-6: Alternative D Ecological Impacts

Stormwater Management

Total impervious coverage, measured in acres, provides a good working comparative analysis of the potential effects on stormwater quantity, quality, and recharge within this area of a sole source aquifer.

Waterfront Access

Access to stream corridors for passive recreational opportunities is an enhancement for the community. This access would be realized by the removal of Al Jo's Curve.

5.5.3.2 No Build Alternative

The existing roadway drainage along I-295/Route 42 and exterior drainage on I-76 is an umbrella type with runoff flowing into ditches that drain to culverts, which flow to Little Timber Creek and Big Timber Creek. A limited measure of water quality and groundwater recharge is achieved for those existing areas flowing through ditches prior to discharging into closed storm sewer systems and culverts. The remaining portions of the existing ramps and I-76 interior drainage are conveyed directly into storm sewer systems, and directly to Little Timber Creek and Big Timber Creek, with no measurable groundwater recharge or water quality improvement measures. The No Build Alternative would retain the deficient highway geometry and the substandard stormwater drainage system. The tidal wetlands fragmented by the existing roadway (Wetlands TB, TD, TE, and TF) would remain fragmented because of the continued presence of Al Jo's Curve.

5.5.3.3 Build Alternatives

A more detailed analysis of the potential impacts to natural ecosystems for each build alternative is provided in the *Natural Ecosystems TES*. **Figures 5.5-6 through 5.5-10** show the impacts for the build alternatives.

ALTERNATIVE	FLOODPLAIN IMPACTS (ACRES)	FLOODWAY FILL
D	2.275	Minimal fill for Ramps B and C; offset by the removal of existing Ramp C.
D1	4.449	Minimal fill for proposed Ramp C; offset by the removal of existing Ramp C.
G2	0.900	Insignificant fill associated with the relocation of Ramp C; offset by the removal of portions of the fill embankment for existing Ramp C.
H1	4.263	Insignificant fill for Ramps B and C; offset by the removal of a portion of existing Ramp C.
K	3.036	Minimal fill for Ramps B and C; offset by the removal of a portion of existing Ramp C.

Table 5.5-3: Floodplain Impacts

Floodplain and Floodway

Table 5.5-3 summarizes the floodplain and floodway impacts for each of the build alternatives. All of the floodplain impacts would be within the 100-year floodplain zone. Most of the floodplain impacts would be associated with placement of fill materials. Alternative D1 would have the

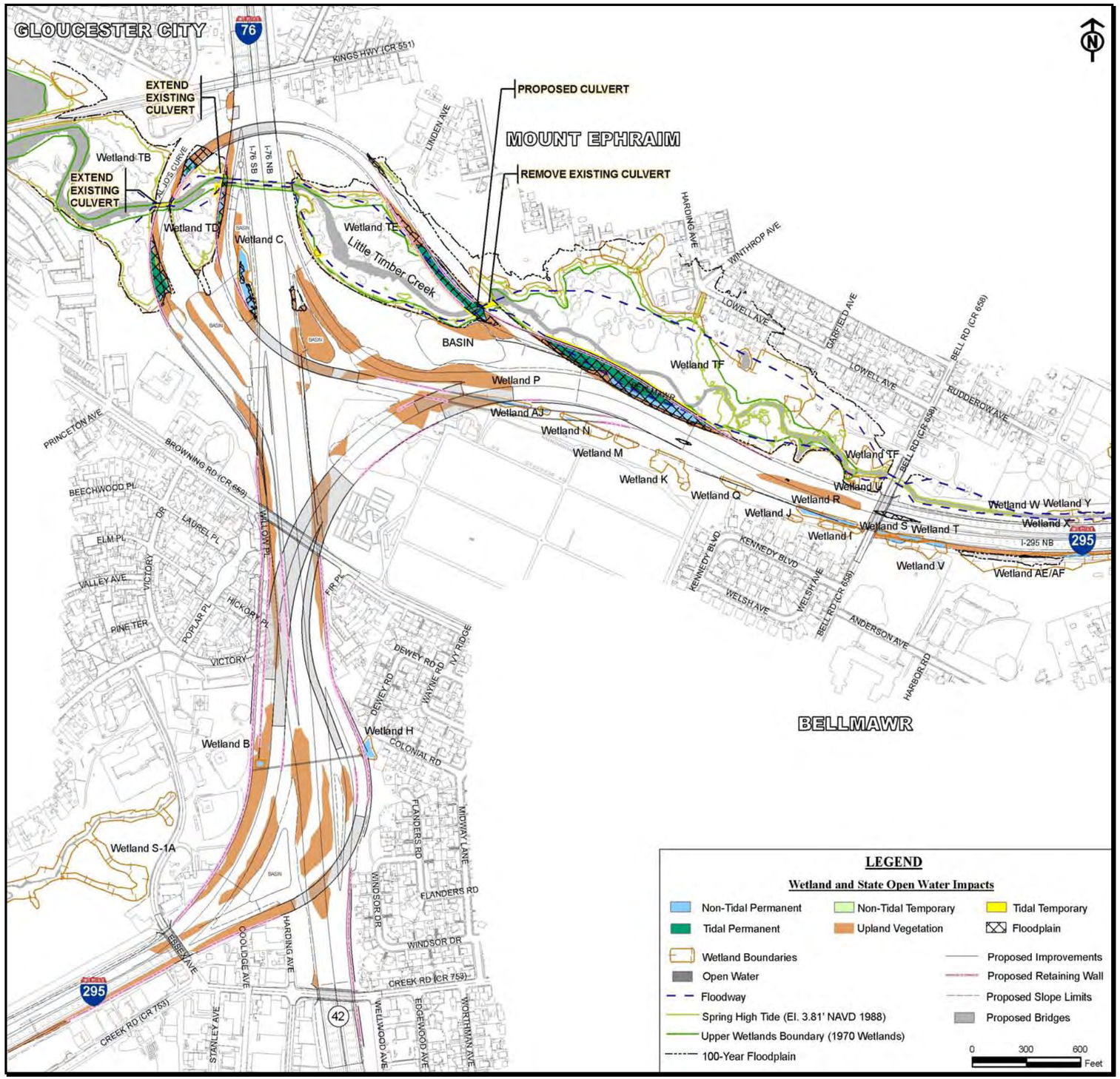


Figure 5.5-7: Alternative D1 Ecological Impacts

greatest impact at 4.449 acres and Alternative G2 would have the least impact with 0.900 acres affected. **Figures 5.5-6 through 5.5-10** show the location of floodplain impacts for each build alternative. Most of the floodplain impacts would be along Little Timber Creek in tidal areas. Fill placed in the floodway would be offset by the removal of an equal or greater quantity of floodway fill under each build alternative. The result would be no net increase in fill within the floodway and no associated flooding impacts.

The build alternatives have been designed to avoid floodplain impacts where practicable, minimize impacts to the greatest extent possible, and to adequately mitigate unavoidable impacts. There is no build alternative that would completely avoid floodplain impacts. However, each build alternative would include measures (floodwalls and/or berms), which would isolate flooding from Little Timber Creek for the 50- and 100-year tidal flood events. Roadway drainage systems and stormwater pumping stations would be designed in accordance with NJDOT drainage design criteria to provide adequate drainage within the study limits.

The build alternatives would result in minimal fill placed in the floodway necessitated by the relocation of the existing ramps. This would be offset by the removal of an equal or greater quantity of floodway fill under each build alternative. The result would be no net increase in fill within the floodway and no associated flooding impacts.

ALTERNATIVE	FRESH WATER TIDAL		STATE OPEN WATER (TIDAL)		FRESH WATER (NON-TIDAL)		STATE OPEN WATER (NON-TIDAL)		TOTAL WETLAND AND SOW IMPACTS		WETLAND BUFFER IMPACT
	P	T	P	T	P	T	P	T	P	T	
D	0.637	0.568	0.010	0.102	1.278	0.313	0.046	0	1.971	0.983	3.586
D1	2.139	0.657	0.064	0.068	1.489	0.110	0.040	0	3.732	0.835	4.199
G2	0.041	0.217	0.010	0.102	0.855	0.255	0.046	0	0.952	0.574	2.479
H1	1.534	0.640	0.195	0.077	1.396	0.156	0.026	0	3.151	0.873	4.674
K	1.443	0.694	0.012	0.134	1.400	0.280	0.045	0	2.900	1.108	3.351

P: Permanent, T: Temporary

Table 5.5-4: Wetland Impacts (Acres)

Wetlands

Alternative D1 represents the greatest permanent wetland impact with 3.732 acres affected (see **Table 5.5-4**). Alternative G2 represents the lowest permanent impact with 0.952 acres affected. Since all of the build alternatives would have wetland impacts, mitigation would be required.

All of the potentially impacted wetlands were classified by NJDEP as having either ordinary or intermediate resource values. None were classified as having exceptional resource values (see **Table 5.5-5).** Alternative G2 would have the least freshwater wetland buffer impact with 2.479 acres affected while Alternative H1 would have the greatest amount of wetland buffer affected (4.674 acres). The buffer area is located within the upland vegetation area discussed earlier.

IMPACTED WETLAND	LOCATION	WETLAND DESCRIPTION	NJDEP APPROVED WETLAND RESOURCE VALUE	TOTAL WETLAND ACREAGE	ACREAGE IMPACTED BY ALTERNATIVE					WETLAND FUNCTIONS/VALUES
					D	D1	G2	H1	K	
Wetland AE/AF	East of Bell Road/west of railroad bridge	North and south side of channel	Intermediate	0.939	0.092	0.092	0.092	0.092	0.092	Short-term surface water storage/reduction of flooding (percent of total wetland impacted is 9.8%)
Wetland AJ	Along I-295 northbound	Seeps along similar elevation of the slope	Ordinary	0.007	0.007	0.007	0.007	0.007	0.007	Short-term surface water storage/reduction of flooding (100% of wetland is impacted)
Wetland B	Near ballfield at Essex Road	Stormwater and high water event flooding and/or saturation	Ordinary	0.014	0.014	0.014	0.014	0.014	0.014	Short-term surface water storage/reduction of flooding (100% of wetland is impacted)
Wetland C	At I-295 southbound ramp from I-76 eastbound	Stormwater is poorly drained from this infield area of I-295	Intermediate	0.290	0.290	0.290	0.290	0.290	0.290	Short-term surface water storage/reduction of flooding (100% of wetland is impacted)
Wetland H	At corner of Colonial Road and Dewey Road	Seep and drainage from upland areas to channel	Ordinary	0.098	0.098	0.098	0.098	0.098	0.098	Short-term surface water storage/reduction of flooding (100% of wetland is impacted)
Wetland K	South of New St. Mary's Cemetery	Seep/spring flow to drop inlet	Intermediate	0.244	0.001	0.001	0.001	0.001	0.001	Short-term surface water storage (less than 1% of wetland is impacted)
Wetland N	Along I-295 northbound	Seeps along similar elevation of the slope	Ordinary	0.144	0.015	0.015	0.015	0.015	0.015	Short-term surface water storage (10.4% of wetland is impacted)
Wetland P	I-295 northbound on ramp from northbound Route 42	Seeps along similar elevation of the slope	Ordinary	0.081	0.081	0.081	0.081	0.081	0.081	Short-term surface water storage/reduction of flooding (100% of wetland is impacted)
Wetland Q	Along I-295 northbound	Seeps along similar elevation of the slope	Intermediate	0.074	*	*	*	0.034	0.034	Short-term surface water storage/reduction of flooding (alternative with largest percent of total wetland impacted is 45.9%)
Wetland R	Along I-295 northbound	Seeps along similar elevation of the slope	Ordinary	0.108	0.108	0.108	0.108	0.108	0.108	Short-term surface water storage/reduction of flooding (100% of wetland is impacted)
Wetland S	Along I-295 northbound east of Bell Road	Seeps along similar elevation of the slope	Ordinary	0.012	0.012	0.012	0.012	0.012	0.012	Short-term surface water storage/reduction of flooding (100% of wetland is impacted)
Wetland T	Along I-295 northbound east of Bell Road	Seeps along similar elevation of the slope	Ordinary	0.031	0.031	0.031	0.031	0.031	0.031	Short-term surface water storage/reduction of flooding (100% of wetland is impacted)
Wetland TB	Near bridge at West Kings Highway	Tidally influenced	Intermediate	11.150	*	0.310	*	0.310	*	Long-term surface water storage and provides habitat for vegetation and wildlife (2.7% of total wetland impacted)
Wetland TD	West of I-76 southbound and east of Al Jo's Curve	Tidally influenced	Intermediate	2.648	0.103	0.238	0.103	0.257	0.103	Long-term surface water storage and provides habitat for vegetation and wildlife (alternative with largest percent of total wetland impacted is 9.7%)
Wetland TE	East of I-76 northbound and west of Al Jo's Curve	Tidally influenced	Intermediate	8.432	0.090	0.744	*	1.204	0.034	Long-term surface water storage and provides habitat for vegetation and wildlife (alternative with largest percent of total wetland impacted is 14.2%)
Wetland TF	Near Shining Star Park	Tidally influenced	Intermediate	18.930	0.930	1.603	*	0.412	1.830	Long-term surface water storage and provides habitat for vegetation and wildlife (alternative with largest percent of total wetland impacted is 9.6%)
Wetland V	Behind noise barrier by Bell Road	Wet area shaded by the noise barrier	Intermediate	0.246	0.040	0.067	0.040	0.067	0.040	Short-term surface water storage/reduction of flooding (alternative with largest percent of total wetland impacted is 27.2%)
*	*Denotes No Wetland Impact*									
	Denotes Entire Wetland Impacted									

Table 5.5-5: Wetland Functions/Values and Impacts by Alternative

On-Site Wetland Mitigation Opportunities

The various build alternatives would require mitigation for the impacts to SOW and wetlands. If the loss of wetlands is compensated by the creation of new wetlands, the NJDEP requires wetland mitigation in the ratio of two acres created for each acre impacted. On-site mitigation is the preferred form of mitigation, since the same ecosystem that is impacted would be benefited by the mitigation. Alternatives D, G2 and K will remove Al Jo's Curve in the areas that cross the marsh adjacent to the Little Timber Creek. The removal of Al Jo's Curve would allow for the construction of wetlands in the former footprint of the roadway ramp. With Alternatives D1 and H1, the proposed Ramp C follows closely to the alignment of Al Jo's Curve, so on-site mitigation opportunities are limited, requiring significant off-site mitigation. Based on the findings of the *Natural Ecosystems TES*, adequate areas for on-site mitigation are present for Alternatives D and G2. With Alternative K, the removed ramp areas of Al Jo's Curve could be utilized for the majority of the mitigation, but an additional area would be required off-site to fully compensate for the total impacts. Alternatives D and G2 are the two designs that more fully meet the recommendations of the NJDEP and USACE for use of on-site mitigation areas, with G2 having fewer impacts to the aquatic resources.

The removal of Al Jo's Curve would also allow the wetlands fragmented by the existing roadway (Wetlands TB, TD, TE, and TF) to be reconnected and provide improved and additional habitat for the stands of wild rice found in these areas. The creation of wetlands in this area would replace the functions and values that would be impacted by construction of the new interchange, including storage of surface water, dissipation of energy, and improvement of water quality. The wildlife species that utilize the wetlands and wild rice associated with Little Timber Creek would in turn be provided a larger, more contiguous riparian corridor. The community will also benefit from opportunities for passive recreation provided by waterfront access to the stream corridor.

Adequate hydrology at or near the ground surface is a vital component of wetlands formation. Without wetlands hydrology, hydric soils do not form, and hydrophytic vegetation cannot grow. When the highway interchange was constructed in the 1960s and the wetlands beneath Al Jo's Curve were filled, the hydrologic component was removed. If the fill were to be removed and the pre-existing grade restored, the surface hydrology would return, thus providing a high likelihood of success for wetland mitigation in this area. Restoration of the former wetlands in this area will provide long-term ecological benefits in the form of improved wildlife habitat, water quality and storage of surface/storm waters. A monitoring plan, written pursuant to NJDEP and USACE regulations, will be provided as part of the mitigation plan in the Individual Freshwater Wetlands Permit Application to be submitted during Final Design in order to provide for the mitigation area's establishment and success into the future.

It should be noted that the removal of Al Jo's Curve would not cause the head-of-tide to migrate upstream or downstream from its current location, and therefore will not increase or decrease the extent of USACE jurisdiction.

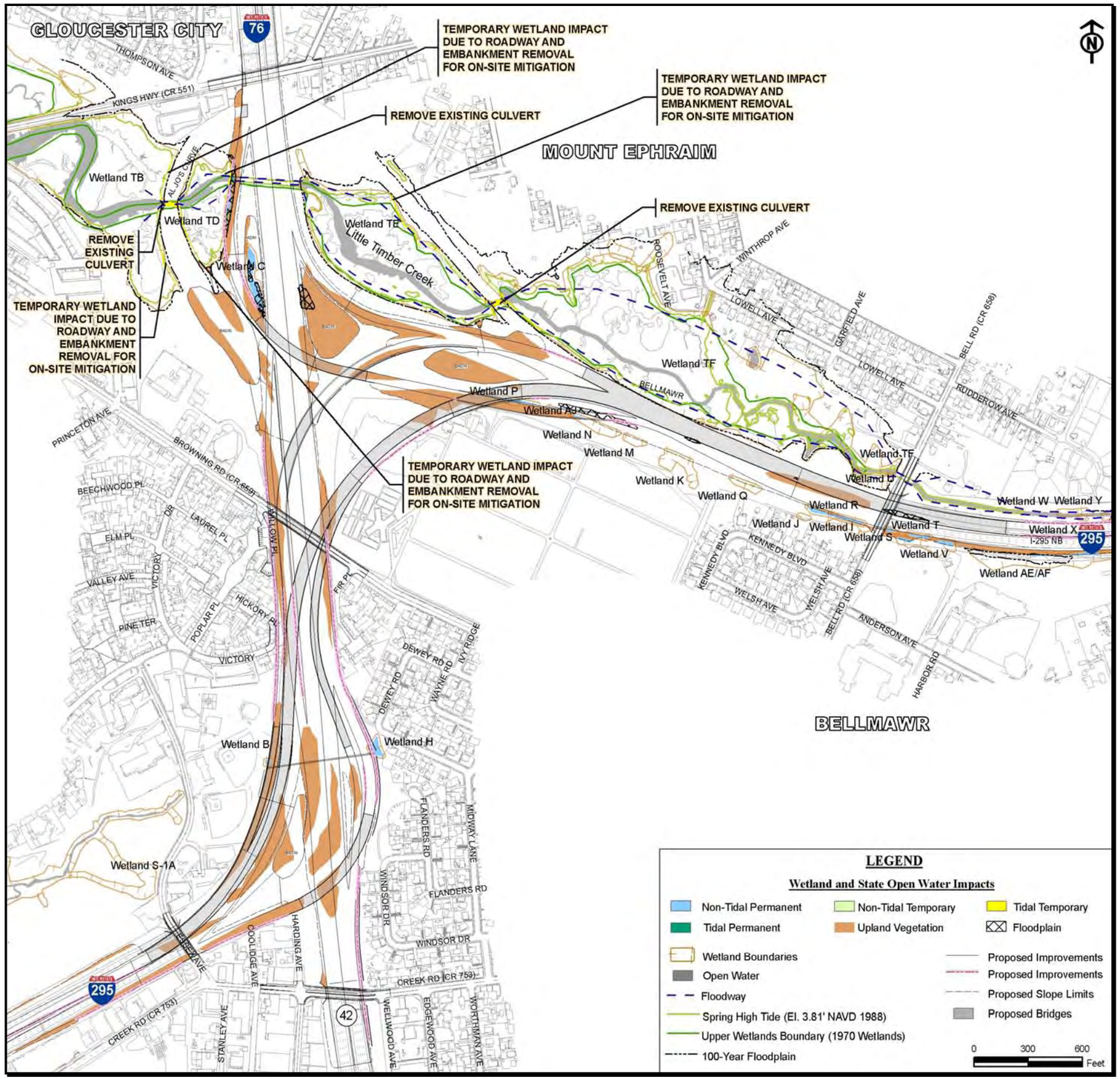


Figure 5.5-8: Alternative G2 Ecological Impacts

Stormwater Management

Each build alternative would result in an overall increase in impervious area and related stormwater runoff (ranging from 19 acres for Alternative D to a high of 25 acres for Alternatives H1 and K). Stormwater runoff from roadways typically contains pollutants generated by vehicular traffic. However, improved traffic operations would reduce conditions of stopping, idling, and delays, and result 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 downstream within the watershed. Based on a 25-acre increase in new pavement, approximately 0.01% of the total Lower Delaware River tributaries watershed would be impacted. Based on the amount of existing pavement in the study area (42 acres), the overall percentage increase of new impervious area ranges from a low of approximately 45% for Alternative D to a high of approximately 59% for Alternatives H1 and K (see **Table 5.5-6**). Appropriate Best Management Practices (BMPs) will be utilized in accordance with USACE and NJDEP permit conditions and recommendations put forth by the USFWS in order to protect the water quality of Little Timber and Big Timber Creeks.

ALTERNATIVE	NEW PAVEMENT (ACRES)	PERCENT INCREASE*
D	19	45%
D1	23	54%
G2	22	52%
H1	25	59%
K	25	59%
* Percent increase is based on existing pavement equaling 42 acres.		

Table 5.5-6: Increase in Impervious Area

The majority of the interchange area would drain to proposed bioretention basins prior to discharging to outfalls. Stormwater treatment facilities within the interchange area would treat the required area/volume of stormwater runoff in accordance with NJDEP stormwater management requirements. There are areas that cannot be treated—such as the areas along I-295 east and west of the interchange, I-76 north of the interchange, and Route 42 south of the interchange—due to right-of-way, elevation, and grade constraints. The remaining untreated drainage would continue to discharge via existing and proposed storm sewer outlets to Little Timber Creek or into conveyance systems discharging to Big Timber Creek. Overall, the project would still meet NJDEP stormwater management requirements. In conjunction with the roadway drainage systems, stormwater pumping stations would be required for each alternative in areas where gravity flow is insufficient. Alternatives D, G2 and K would include one stormwater pumping station north of Browning Road, within the NJDOT right-of-way. Alternatives D1 and H1 would utilize two pumping stations along Ramps D and F, on opposite sides of Little Timber Creek, each discharging into a bioretention basin. The proposed stormwater pumping stations for each build alternative would provide additional water quality treatment measures through screening of runoff and deposition of solids within the wet well areas of each facility.

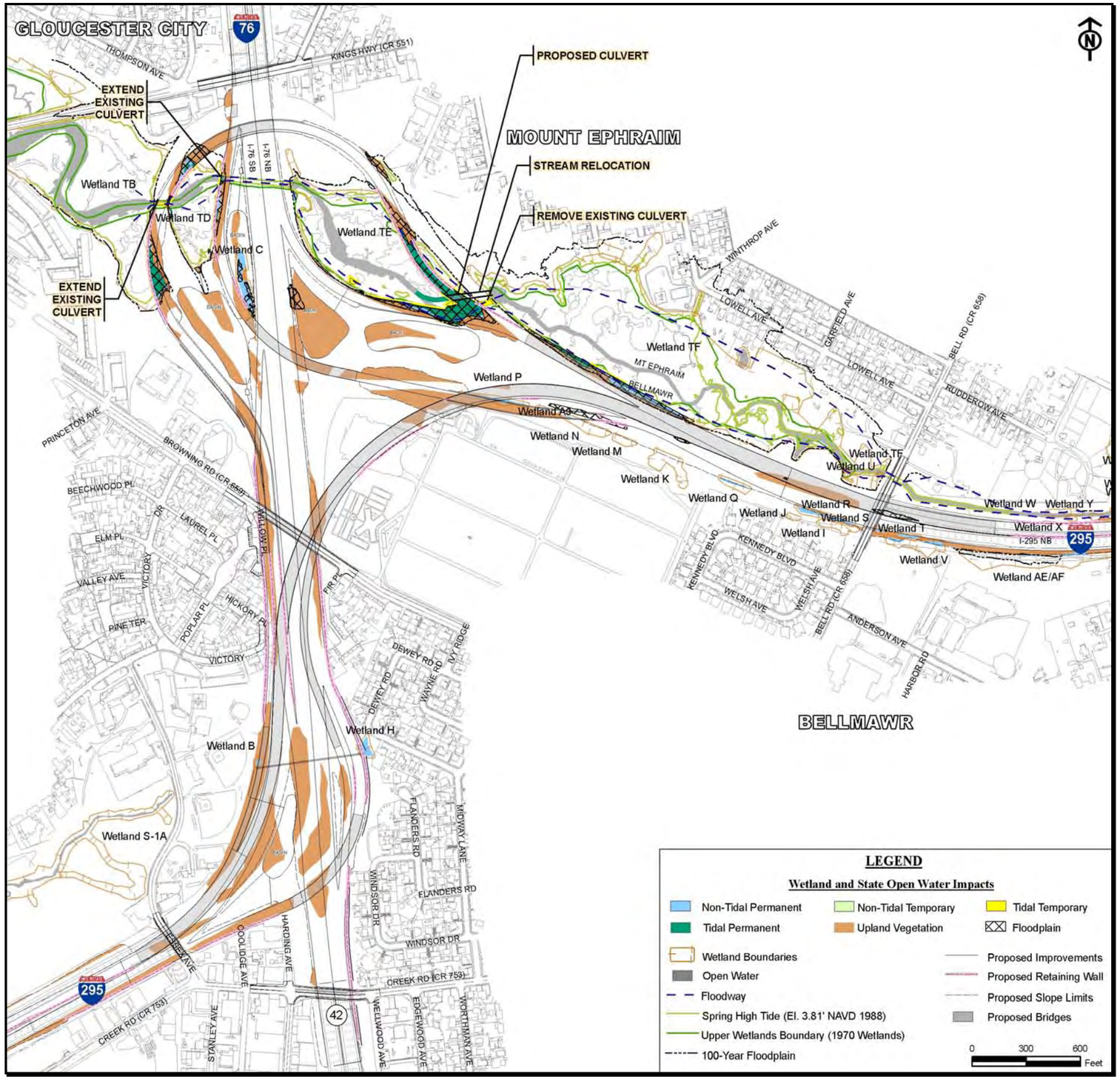


Figure 5.5-9: Alternative H1 Ecological Impacts

Alternative H1 is the only build alternative that would require relocation of approximately 250 feet of the Little Timber Creek channel near Ramp C. A portion of the Little Timber Creek channel relocation (approximately 80 feet) would be confined flow through a culvert. None of the other build alternatives require channel relocation. In fact, Alternatives D, G2, and K would allow for restoration of the stream channel where two existing culverts would be "daylighted" with the removal of Al Jo's Curve (see **Figure 5.5-11**).

A maintenance plan will be prepared for stormwater management basins as required by the New Jersey Stormwater Management Rules. Other drainage facilities (i.e., roadway drainage systems) will be maintained in accordance with NJDOT procedures. The stormwater pumping stations will include operation and maintenance features in accordance with regulatory requirements. A soil erosion and sediment control plan which includes rip rap, inlet protection, silt fence, hay bales, seeding, topsoil, and turbidity barriers will be prepared during the final design according to the *Standards for Soil Erosion and Sediment Control in New Jersey*. Mitigation and monitoring, including BMPs, will be conducted in accordance with the standards.

Since the No Build Alternative proposes no changes to the interchange, there would be no increase in total impervious coverage. However, it would result in a negative impact to surface water quality compared to the build alternatives because any ongoing impacts from the existing roadway and drainage system would continue.

Waterfront Access

The build alternatives that do not include Ramp C in the vicinity of Al Jo's Curve (Alternative D, G2 and K) would provide an enhancement to the community in the form of a public access trail and viewing area at Little Timber Creek (see **Figure 5.5-11**). Alternatives D1 and H1 would provide a viewing area over Little Timber Creek, but no waterfront access since Ramp C would block passage to Little Timber Creek.

5.5.3.4 Build Alternatives Summary

With all of the build alternatives, the use of retaining walls and steepened side slopes along Little Timber Creek would minimize impacts to floodplains and wetlands/open waters. This would also minimize mitigation requirements in the design phase of the proposed project. The surface water quality of the surrounding water bodies would be improved with the new stormwater treatment systems, which would be maintained in accordance with New Jersey Stormwater Management Rules and NJDOT procedures. The findings of the *Natural Ecosystems TES* indicate that, from an ecological perspective, Alternatives D, G2 and K are preferable because all or most of the wetland mitigation could be achieved on-site.

Alternative H1 would cause the second highest impacts to the floodplain and wetlands/open waters of 4.26 acres and 3.15 acres, respectively. This is due in large part to approximately 250 feet of the channel of Little Timber Creek being relocated. In addition, there would be no opportunity for waterfront access and only 12% of the required wetland mitigation would be possible on-site. This alternative, along with Alternative K, would result in the highest total impervious coverage of 67 acres.

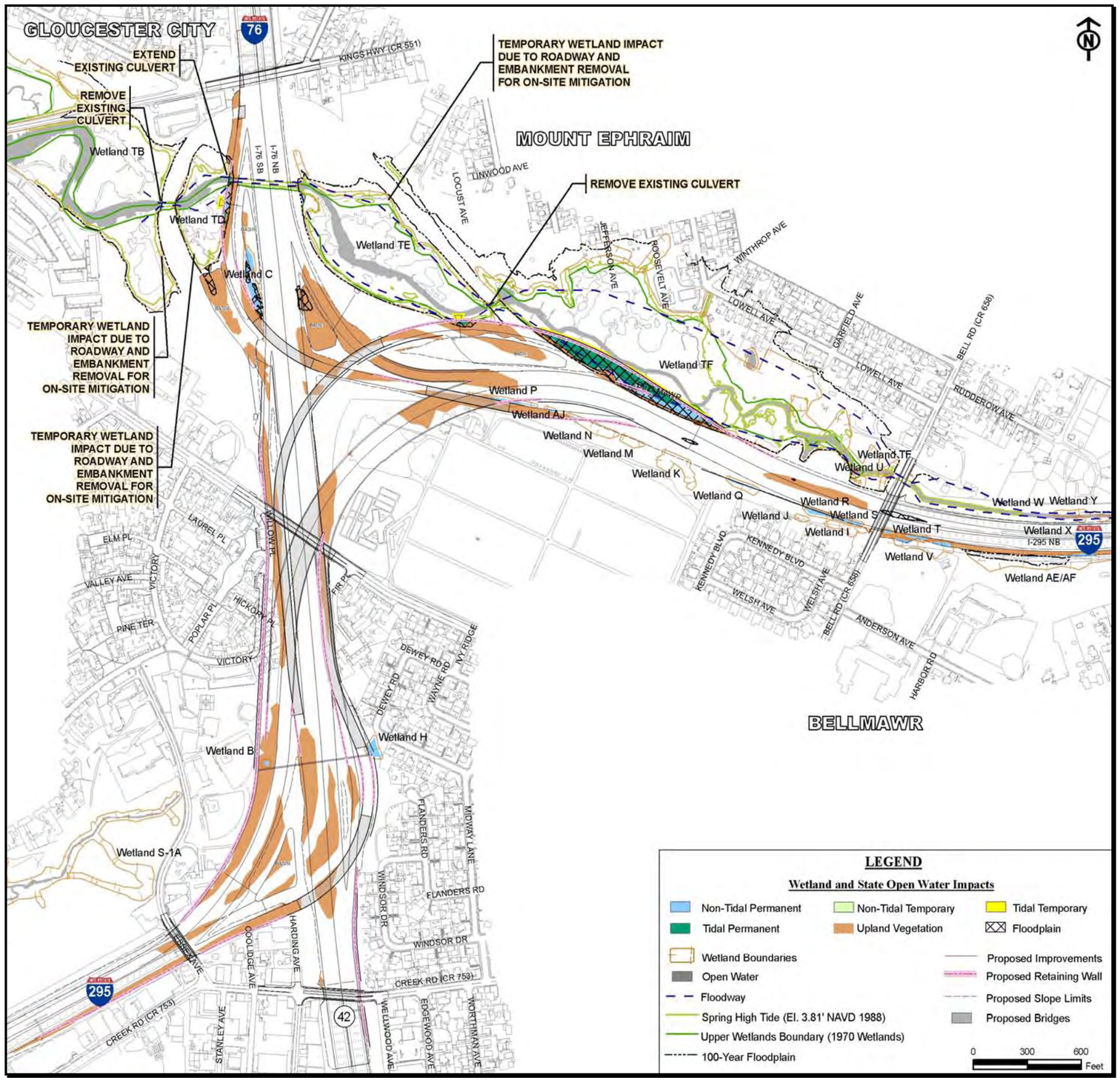


Figure 5.5-10: Alternative K Ecological Impacts

Despite the use of retaining walls and steepening of side slopes, Alternative D1 would cause the greatest impact to the floodplain and wetlands/open waters at 4.45 acres and 3.73 acres, respectively. Since this alternative calls for Ramp C in the vicinity of Al Jo's Curve, it would not provide waterfront access to the public. In addition, it would have the smallest opportunity for on-site wetlands mitigation at only 10% of the total required and would result in the second highest total impervious coverage of 65 acres.

Alternative G2 represents the lowest permanent impacts to the floodplain and wetlands/open waters, with a 0.90 acre and a 0.95 acre impact, respectively. This alternative would also provide for waterfront access to the public and 100% on-site wetland mitigation opportunities with the removal of Al Jo's Curve. Total impervious coverage would be 64 acres.

Impacts to the floodplain and wetlands/open waters for Alternative K would be 3.04 acres and 2.90 acres, respectively. As mentioned above, Alternative K, as well as Alternative H1, would result in the highest total impervious coverage of 67 acres. Most of the wetland mitigation for this alternative would be possible on-site (93%), but off-site wetland mitigation would be necessary as well.

Although Alternative D is similar to D1, it includes reduced impacts to wetlands, open waters, and the floodplain. In addition, the opportunity for on-site mitigation is 100% with the removal of Al Jo's Curve. Alternative D will impact 2.28 acres of floodplain and 1.97 acres of wetland/open waters. It would create the lowest acreage of total impervious coverage at 61 acres, compared to the other build alternatives.

In the interest of continuing its practice of sound environmental stewardship, NJDOT has discussed with the NJDEP the possibility of performing additional stream restoration activities on Little Timber Creek, beyond what would be required by the USACE for mitigation. The location and specifics of these activities have yet to be determined and will be more thoroughly covered in the final design of the project.

5.6 ARCHAEOLOGICAL RESOURCES

The proposed project will require ground disturbance in areas that may be potentially sensitive for archaeological resources. As a result, an archaeological investigation was conducted in order to assess potential impacts that could result from the proposed project. This analysis is based on the findings of the *Phase I and II Archaeological Investigation TES*. The TES report summarized the results of an archaeological investigation conducted in association with the proposed project. For more detailed information, refer to the TES report included in Attachment 6.

5.6.1 Methodology

The Area of Potential Effect (APE) for archaeological resources includes any land surface that may be altered during the course of project construction. Thus, the APE for archaeological resources is limited to the areas of proposed ground disturbance for all build alternatives (see **Figure 5.6-1**).

As summarized in the *Phase I and II Archaeological Investigation TES*, this archaeological investigation included documentary research, field survey,

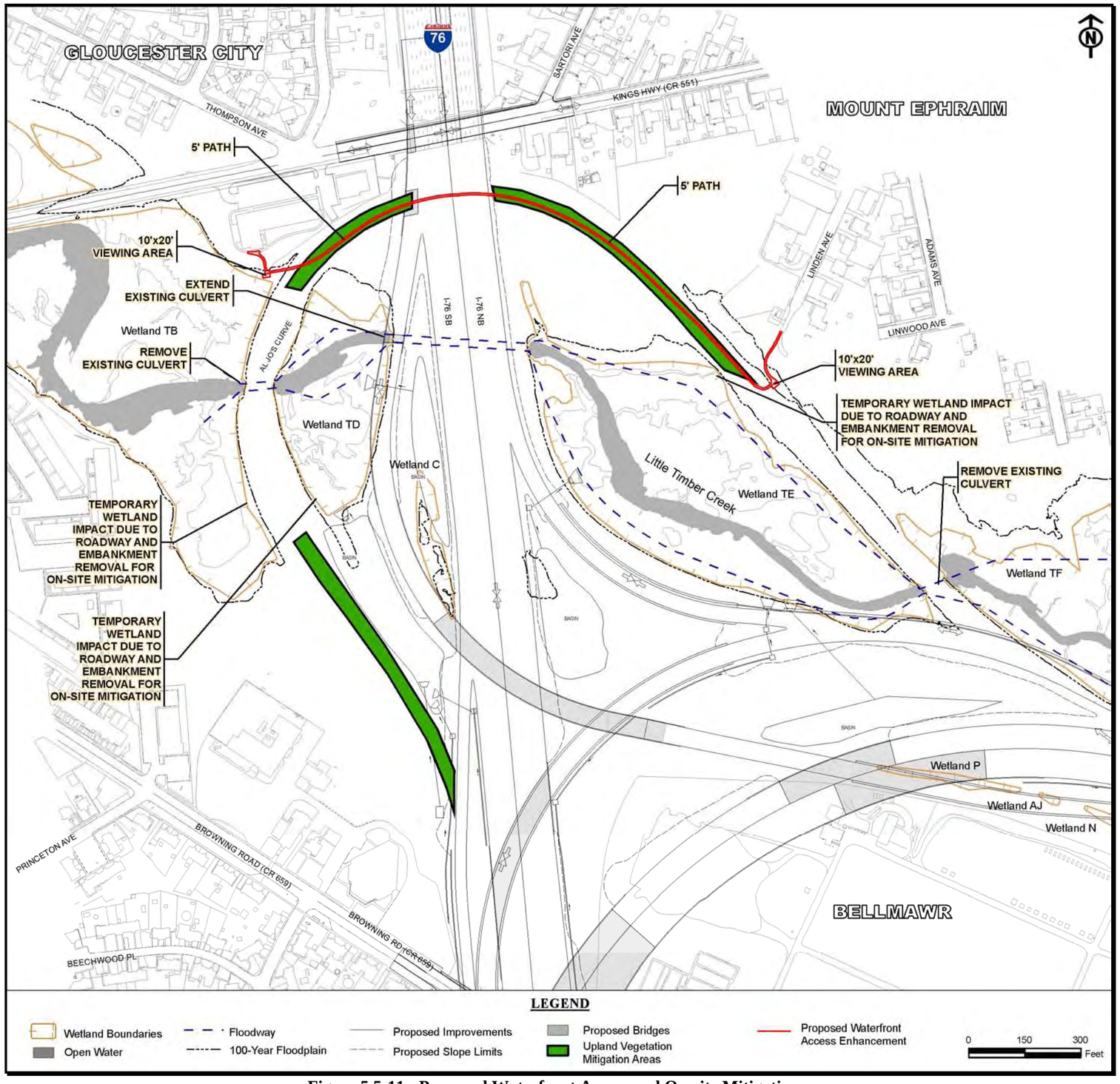


Figure 5.5-11: Proposed Waterfront Access and On-site Mitigation

and analysis. The TES report contains an archaeological survey (Phase I) of the APE and an evaluation (Phase II) of the potentially significant archaeological resources documented in the APE during the Phase I survey. The purpose of the Phase II archaeological investigation was to determine whether significant archaeological resources are present in the APE.

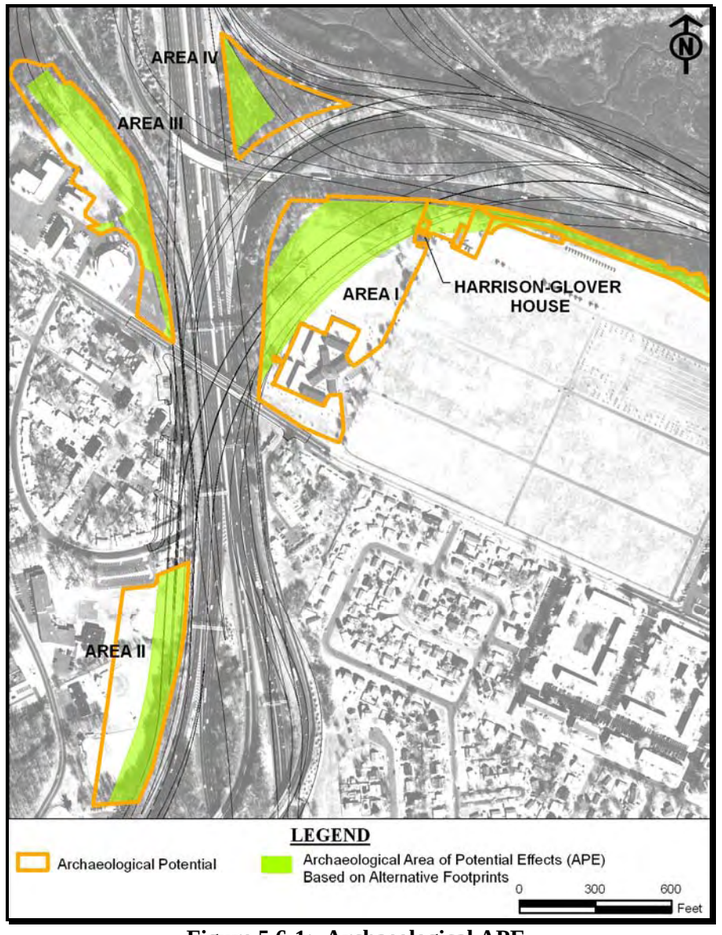


Figure 5.6-1: Archaeological APE

The Phase I archaeological survey was conducted in two parts—Phase IA and Phase IB. The Phase IA assessment identified the sensitivity of prehistoric and historic archaeological resources in the APE based on: the results of previous archaeological investigations conducted in the vicinity; an understanding of the prehistoric and historic background of the project area; and, the level of ground disturbance present in the APE. An historical investigation was performed as part of the Phase IA survey to identify areas of cultural resources sensitivity within the APE, and to provide an appropriate and accurate historic context in which to evaluate the significance of any archaeological deposits within the APE.

Field excavations were performed during the Phase IB archaeological survey in order to identify the presence or absence of archaeological deposits within the APE. The Phase II evaluation-level archaeological investigation was used to assess if the archaeological resources present within the APE contain unique information regarding prehistory or history and warrant inclusion in the National Register of Historic Places (National Register).

5.6.1.1 Regulatory Context

The investigations were conducted pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR Part 800). In addition, the archaeological investigations were conducted in accordance with the New Jersey Historic Preservation Office's (NJHPO) *Guidelines for Phase I Archaeological Investigations: Identification of Archaeological Resources, and Guidelines for Preparing Cultural Resources Management Archaeological Report Submitted to the NJHPO.* Consultation and coordination conducted as part of the Section 106 process is summarized in Chapter 11 of this DEIS.

5.6.1.2 National Register Eligibility Criteria

The primary goal of the archaeological investigation is to identify known or previously unknown, archaeological resources and determine their eligibility for listing in the National Register. Potentially significant historic properties include districts, buildings, structures, objects, or sites that are at least 50 years old and meet at least one National Register criterion. Criteria used in the evaluation process are specified in 36 CFR Part 60.4. To be eligible for inclusion in the National Register, an historic property 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.

The physical characteristics and historic significance of the overall property are examined when conducting National Register evaluations. While a property in its entirety may be considered eligible based on Criteria A, B, C, and/or D, specific data is also required for individual components therein based on date, function, history, physical characteristics, and other information. Resources that do not significantly relate to the overall property may contribute if they independently meet the National Register criteria.

A contributing building, site, structure, or object adds to the historic architectural qualities, historic associations, or archaeological values for which a property is significant because: a) it was present during the period of significance, and possesses historic integrity reflecting its character at that time or is capable of yielding important information about the period; or b) it independently meets the National Register criteria. A noncontributing building, site, structure, or object does not add to the historic architectural qualities, historic associations, or archaeological values for which a property is significant because: a) it was not present during the period of significance; b) due to alterations, disturbances, additions, or other changes, it no longer possesses historic integrity reflecting its character at that time or is incapable of yielding important information about the period; or c) it does not independently meet the National Register criteria.

5.6.2 Existing Conditions

5.6.2.1 Documented Archaeological Sites and Previous Cultural Resources Surveys

No prehistoric archaeological sites have been recorded within the project APE. Multiple cultural resources surveys have been conducted in the area, some that have overlapped into the current APE. More than half of these surveys produced negative results for undocumented and undisturbed prehistoric or historic archaeological resources.

A number of previously conducted cultural resource surveys within a 1.5-mile radius of the project APE did record sites. Two investigations documented prehistoric archaeological resources in close proximity to the current APE. In 1974, Jack McCormick and Associates, Inc., identified two prehistoric sites located along the banks of the Big Timber Creek south of the current APE. One site, referenced as A38, was located at the intersection of I-295 and Creek Road. The second site, referenced as A37, was situated along Creek Road, 0.3-miles northwest of I-295. Both sites were listed as obliterated. In 1996, Hunter Research conducted a survey for a portion of I-295 between the Walt Whitman Bridge and Route 73. Site 28-Ca-92 was identified on the northern side of I-295 on a knoll overlooking Little Timber Creek, 0.9-miles from the Route 168/I-295 interchange. The site consisted of a prehistoric occupation with stone tools and ceramics dating to the Late Archaic/Early Woodland (Hunter Research 1996; Hunter et al. 1999).

Non-systematic archaeological site surveys conducted during the first half of the twentieth century and information provided by avocational archaeologists provide the only site location available for the I-295/I-76/Route 42 interchange area. Although these sources have provided the greatest amount of information on prehistoric sites in the region, the quality of that information is generally limited by site location and possibly a list of artifacts recovered from surface collection. An examination of the Skinner and Schrabisch (1913) survey revealed multiple sites within the drainage areas of the Big and Little Timber Creeks. However, none of the sites were in close proximity to the project APE. Examination of Dorothy Cross' (1941) Indian Site Survey of the 1930s, also identified multiple sites along the Big and Little Timber Creeks' drainage areas. Two sites identified adjacent to the project APE (28-Ca-32 and 28-Ca-33) contained ceramic and flakes, but no cultural affiliation was ascribed to the finds (Cross 1941:239).

Please refer to the *Phase I and II Archaeological Investigation TES* for more detailed information regarding documented archaeological sites and

previous cultural resources surveys.

5.6.2.2 Assessment of Archaeological Sensitivity

Background research in the history and prehistory of the area and region, in conjunction with visual inspection, has been used to evaluate the potential for subsurface cultural resources within the APE (see the *Phase I and II Archaeological Investigation TES* for more detailed information).

Given the ecological setting of the APE, there is a moderate to high probability that temporary resource procurement camps or microband base camps from the Late Archaic through Woodland periods existed within the APE. The APE also contains moderate potential for Paleoindian and Early Archaic archaeological resources. The APE is situated adjacent to Little Timber Creek and Big Timber Creek, two established waterways that contain a variety of faunal, floral, and other natural resources sought out by the local Native Americans. While the construction of the I-295/I-76/Route 42 interchange, and to a lesser extent the surrounding 20th-century urban development of Bellmawr and Mount Ephraim, has impacted the landscape, the APE does contain small sections of ground that may not have been affected by these activities. The segment of the APE encompassing the New Saint Mary's Cemetery has a high sensitivity for historic archaeological resources associated with the 18th- through 20th-century occupation of the Harrison-Glover House. The yard area surrounding the Harrison-Glover House (see **Photograph 5.6-1**) remains intact and has high sensitivity for archaeological deposits associated with the domestic occupation of the residence, including wells, privies, middens, and the structural remains of outbuildings, including pots molds, foundations, and other subsurface features. The remaining sections of the APE exhibit moderate sensitivity for historic archaeological deposits associated with the late-19th and early-20th-century occupation in the project area. Based on these findings, a Phase I Archaeological Survey was recommended.

Photograph 5.6-1: Harrison-Glover House (Area I)

5.6.2.3 Results of the Phase I/II Archaeological Investigation

Based on the reconnaissance survey of the archaeological APE, four separate sections of ground within the APE were determined to be archaeologically sensitive and required a Phase I archaeological survey. These locations were identified as Area I, Area II, Area III and Area IV (see **Figure 5.6-1**). The excavations revealed that a significant portion of the APE has been impacted by landscaping and filling activities associated with the construction of the existing interchange and 20th-century commercial and residential development.

Based on the results of the Phase I survey, three prehistoric artifact concentrations, designated Site 28-Ca-106, 28-Ca-107, and 28-Ca-110, were recorded within the APE in Area I, and one prehistoric artifact concentration, designated Site 28-Ca-105, was recorded within the APE in Area III. These four sites were studied as part of the Phase II evaluation.

The sections below summarize the results of the Phase I/II Archaeological Investigation. Please refer to the *Phase I and II Archaeological Investigation TES* for more detailed information.

New Saint Mary's Cemetery (Area I)

Area I comprises an approximately 6.2-acre parcel of land within the APE located on the north and west sides of the New Saint Mary's Cemetery. Three prehistoric archaeological sites, 28-Ca-106, 28-Ca-107, and 28-Ca-110, were identified within the wooded highway right-of-way in the APE in Area I and were the subject of a Phase II evaluation. These three sites produced diagnostic prehistoric pottery, stone tools, and fire-cracked rock fragments in fill, A-, and E-horizon deposits. In general, diagnostic artifacts indicate a Middle to Late Woodland period association for the sites; although a Middle Archaic to Middle Woodland projectile point was recovered as well. Testing identified late-19 th through 20th-century grading and landscaping in the yard area of the Harrison-Glover House, but no features associated with the 18th-century occupation of the property.

Despite the recovery of diagnostic prehistoric pottery and stone tools, the preservation of the site and context of the artifact collection offers limited new information concerning Native American activities along the Little Timber Creek drainage. Much of the prehistoric artifact assemblage was recovered from disturbed horizons, and provides little evidence of the original context of the collection. The few artifacts found in the subsoil represent the remnants of the original site. The absence of subsurface cultural features further reduces the information potential of these sites. As a result, no further evaluation was recommended.

Photograph 5.6-2: Area II Artifacts

Bellmawr Baseball League Fields (Area II)

Area II is an approximately 2.5-acre parcel located between the Bellmawr Baseball League Fields and the ramp to I-295 southbound. Area II has been severely impacted by the construction of the I-295/I-76/Route 42 interchange. The archaeological survey encountered numerous fill deposits in Area II, with little evidence of the original soil profile present. Numerous mid-19th through 20th-century artifacts, including ceramics, vessel glass, architectural debris, faunal remains, and one prehistoric artifact (see **Photograph 5.6-2**) were recovered from the fill deposits. However, no discernable concentrations or patterns were noted in the fill deposits to suggest the location of structures or subsurface deposits. The fill deposits and cultural materials that comprise the soil profile in Area II do not offer any new information concerning the prehistoric and historic occupation of the landscape. No sites within Area II were the subject of Phase II evaluations and no further archaeological investigations were recommended for this area.

Annunciation B.V.M. Church (Area III)

Area III consists of an approximately 2.7-acre parcel of ground situated between the off-ramp for I-295 and the Annunciation B.V.M. Church (see **Photograph 5.6-3**). One site within Area III—28-Ca-105—was identified on an intact landform and was the subject of a Phase II evaluation. Site 28-Ca-105 produced a large assortment of flakes from fill, plowzone and E-horizon deposits, but no diagnostic materials.

The archaeological investigation of Area III suggests that the landform has undergone significant disturbance associated with grading and landscaping activities for the Annunciation B.V.M. Church and the I-295/I-76/Route 42 interchange. The historic artifact assemblage, consisting of modern debris and mid- to late-19th through early-20th-century artifacts, was recovered largely from the fill and plowzone horizons, and offers little information

Photograph 5.6-3: View of Wooded Area Near Annunciation B.V.M. Church (Area III)

regarding the original context of these materials. Site 28-Ca-105 likely consisted of a larger prehistoric lithic reduction work site at one time, but late 19th- through early-20th-century agricultural use of the landscape, combined with mid- to late-20th-century grading, stripping and redeposition of fill for the church, has disturbed the original context of the site, leaving a very limited portion of the site. The absence of diagnostic materials prohibits assigning a temporal association to the age of the site. As a result, the site was assessed to be ineligible for listing in the National Register and no further archaeological investigations were recommended for Area III.

I-295/I-76/Route 42 Infield Median (Area IV)

Area IV consists of an approximately 1.0-acre parcel located in the infield median east of I-76, north of the ramp from Route 42 northbound to I-295 northbound, and south of the ramp from southbound I-295 to the northbound lane of I-76 (see **Photograph 5.6-4**). Archaeological testing in Area IV documented no potentially significant archaeological resources. The landscape consists of extensive fill deposits associated with the construction of the I-295/I-76/Route 42 interchange. A small area of intact subsoil was exposed in the eastern portion of Area IV. However, no artifacts were recovered from the subsoil horizon, and no subsurface cultural features were identified in the survey. The few artifacts recovered from Area IV consist of mid-19th- through 20th-century architectural and domestic refuse found exclusively in fill deposits. Analysis of the artifact distribution revealed little information to indicate the presence of cultural features in Area IV. No sites within Area IV were the subject of Phase II evaluations and no further archaeological investigations were recommended for this area.

Photograph 5.6-4: Wooded Area (Area IV)

5.6.3 Potential Impacts and Mitigation

5.6.3.1 No Build Alternative

The No Build Alternative would result in no impact to archaeological resources as no ground disturbance would take place.

5.6.3.2 Build Alternatives

Under all build alternatives, the proposed project would impact Site 28-Ca-106, Site 28-Ca-107, and Site 28-Ca-110, specifically with the construction of the roadway carrying traffic on I-295 through the New St. Mary's Cemetery and the construction of a noise wall along the north side of the cemetery. Alternatives D1 and H1 would also impact Site 28-Ca-105 with the construction of a new Ramp C following closely to the existing Ramp C alignment at Al Jo's Curve.

However, the Phase I/II Archaeological Investigation revealed that the project APE has historically been disturbed by agricultural land use, roadway construction activities, and commercial/residential development. Prehistoric archaeological deposits found in the APE represent the remnants of sites impacted by plowing and landscaping, and offer little potential to provide new information about Native American lifeways. Historic archaeological deposits have been dispersed through plowing and the introduction of fill.

Based on this prior disturbance, the four sites evaluated as part of the Phase I/II evaluation were found to be ineligible for inclusion in the National Register. As a result, no impact to archaeological resources would result from the proposed project and no further evaluation is required. In an August 16, 2006 letter, NJHPO concurred with this finding (see Appendix B for more information).

5.7 HISTORIC ARCHITECTURAL RESOURCES

Many important historic and cultural resources are located in New Jersey. Thus, numerous properties within the state have been identified as historically significant. In order to assess potential impacts to historic architectural resources that could result from the proposed project, this analysis is based on the findings of the *Historic Architectural Resources TES*. The TES report summarized the results of a historic architectural resources survey conducted in association with the proposed project. For more detailed information, refer to the TES report included in Attachment 7.

5.7.1 Methodology

The APE for historic architectural resources has been defined as the geographic area within which the proposed project may directly or indirectly cause changes in the character or use of identified National Register-listed or eligible resources, if any such properties exist. The APE for historic architectural resources (see **Figure 5.7-1**) takes into consideration the potential visual and audible effects that the proposed undertaking may have on the character and setting of any National Register-listed, eligible, or potentially eligible resources in the area.

As part of the proposed project, a balloon test was conducted in April 2004 in order to assess the potential visual impacts of the proposed alternatives on the local community and historic architectural resources. The balloon test involved the floating of helium-filled balloons from secured anchoring locations to specified heights in order to depict the height of the proposed structures. The results of this balloon test were used to help develop and refine the APE for visual effects.

As summarized in the *Historic Architectural Resources TES*, this investigation included documentary research, field survey, and analysis. The purpose of the architectural investigation was to assess the presence of historic buildings, structures, districts, sites, or objects within the APE, to evaluate the eligibility of resources for inclusion in the National Register, and to assess the potential effects of the proposed project on historic properties (those that are listed in or eligible for listing in the National Register) within the APE.

5.7.1.1 Regulatory Context

The identification and assessment of potential effects were conducted pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR Part 800). In addition, the architectural survey was conducted in accordance with NJHPO's *Guidelines for Architectural Survey*. Consultation and coordination conducted as part of the Section 106 process is summarized in Chapter 11 of this DEIS.

5.7.1.2 National Register Eligibility Criteria

The primary goal of the historic architectural resources investigation was to identify known or previously unknown, architectural resources and determine their eligibility for listing in the National Register. Potentially significant historic properties include districts, buildings, structures, objects, or sites that are at least 50 years old and meet at least one National Register criterion. Criteria used in the evaluation process are specified in 36 CFR

Part 60.4. To be eligible for inclusion in the National Register, a historic property(s) 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.

There are several criteria considerations. Ordinarily, cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

A. a religious property deriving primary significance from architectural or artistic distinction or historical importance, or
B. a building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event, or
C. a birthplace or grave of a historical figure of outstanding importance if there is no other appropriate site or building directly associated with his/her productive life, or
D. a cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events, or
E. a reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived, or
F. a property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own historic significance, or
G. a property achieving significance within the past 50 years if it is of exceptional importance.

The physical characteristics and historic significance of the overall property are examined when conducting National Register evaluations. While a property in its entirety may be considered eligible based on Criteria A, B, C, and/or D, specific data is also required for individual components therein based on date, function, history, and physical characteristics, and other information. Resources that do not significantly relate to the overall property may contribute if they independently meet the National Register criteria.

REF.	RESOURCE NAME	APPROXIMATE YEAR BUILT
1	Bellmawr Park Mutual Housing Historic District	1942
2	Bellwood Park District	1955
3	Crescent Park District	1925-1945
4	Linwood Tract District I	1925-1935
5	Linwood Tract District II	1925-1945
6	Linwood Tract District III	1925-1935
7	Linwood Tract District IV	1940-1955
8	West Browning Road District	1950
9	Camden County Railroad	1890
10	Polish National Catholic Church of Resurrection of Christ Cemetery (Anderson Avenue)	1916
11	80 Coolidge Avenue	1945
12	612 Creek Road	1946
13	620 Creek Road	1940
14	628 Creek Road	1953
15	640 Creek Road	1946
16	700 Creek Road	1945
17	701 Creek Road	1940
18	708 Creek Road	1948
19	716 Creek Road	1946, 1994
20	Bellmawr Little League (Essex Avenue)	1953
21	48 Essex Avenue	1925
22	VFW Post No. 956 (52 Essex Avenue)	1948
23	171 Essex Avenue	1930
24	82 Harding Avenue	1955
25	151 Harding Avenue	1947
26	153 Harding Avenue	1940
27	112-116 Stanley Avenue	1955
28	121 Stanley Avenue	1940
29	Harrison-Glover House/New Saint Mary's Cemetery (515 West Browning Road)	1764
30	Annunciation B.V.M. Church and School Complex (601-605 West Browning Road)	1951-1965
31	Johnnie's Liquor Store (834 West Browning Road)	1950
32	846-856 West Browning Road	1950
33	39 Adams Avenue	1940-1946
34	202-206 Baird Avenue	1946-1949
35	713 Bell Road	1928-1939
36	715 Bell Road	1939-1949
37	101 Cleveland Avenue	1918
38	102 Cleveland Avenue	1926
39	106 Cleveland Avenue	1926
40	110 Cleveland Avenue	1926
41	328 Emerson Avenue	1928
42	101 Harding Avenue	1946-1949
43	102 Harding Avenue	1930s
44	105 Harding Avenue	1946-1949
45	106 Harding Avenue	1930s
46	115 Harding Avenue	1946-1949
47	116 Harding Avenue	1946-1950
48	Mount Ephraim Borough Dept. of Public Works (33 Linden Avenue)	1925-1950
49	128 Roosevelt Avenue	1955
50	129 Roosevelt Avenue	1926
51	135 Roosevelt Avenue	1918-1925

Table 5.7-1: Summary of Architectural Survey

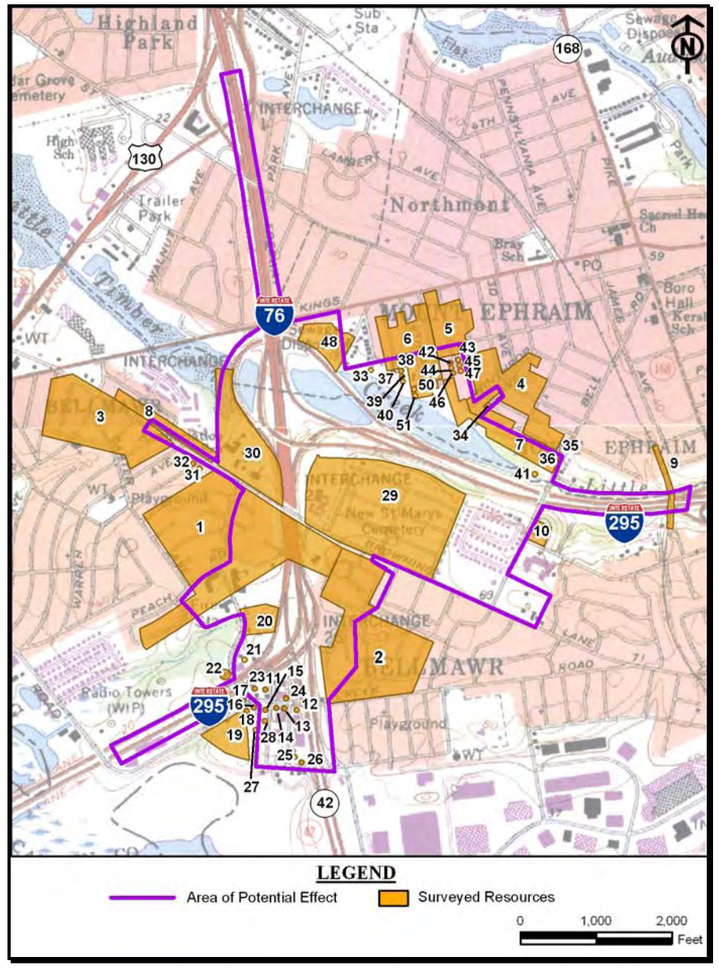


Figure 5.7-1: Historic Architectural Resources Identified Within or Adjacent to the APE

A contributing building, site, structure, or object adds to the historic architectural qualities, historic associations, or archaeological values for which a property is significant because: a) it was present during the period of significance, and possesses historic integrity reflecting its character at that time or is capable of yielding important information about the period; or b) it independently meets the National Register criteria. A noncontributing building, site, structure, or object does not add to the historic architectural qualities, historic associations, or archaeological values for which a property is significant because: a) it was not present during the period of significance; b) due to alterations, disturbances, additions, or other changes, it no longer possesses historic integrity reflecting its character at that time or is incapable of yielding important

information about the period; or c) it does not independently meet the National Register criteria.

5.7.2 Existing Conditions

Background research revealed that no historic resources within the APE are listed in the National Register. The following properties within the APE were recommended as potentially eligible for listing in the National Register in "Sites and Structures: The Camden County Inventory of Historic Places" (Greenberg 1992): the Bell Farm, the Harrison House (Harrison-Glover House), and the Bellmawr Park Mutual Housing Historic District. No additional resources within the proposed APE were identified during previous cultural resources investigations.

An intensive-level historic architectural field survey was conducted within the proposed APE in May 2004. Approximately 400 individual properties were evaluated as part of the architectural survey. The survey revealed that one previously identified resource, the Bell Farm, is no longer extant. A total of 51 architectural resources aged 50 years or older were identified within the APE during the intensive-level survey, including two extant, previously documented resources (the Harrison-Glover House and the Bellmawr Park Mutual Housing Historic District). The resources identified include eight residential historic districts and 43 individual properties. The intensive-level survey included evaluations of the Camden County Railroad, the Polish National Catholic Church of Resurrection of Christ Cemetery, and the Annunciation B.V.M. Church and School Complex. The properties evaluated as part of the intensive-level architectural survey are listed in **Table 5.7-1** and are shown on **Figure 5.7-1**.

As a result of the investigations, one resource—the Bellmawr Park Mutual Housing Historic District—was recommended as eligible for listing in the National Register. The remaining 50 resources lacked historic or architectural significance and/or sufficient architectural integrity to qualify for National Register eligibility.

5.7.2.1 Bellmawr Park Mutual Housing Historic District

The Bellmawr Park Mutual Housing Historic District comprises one municipal tax parcel (Block 49, Lot 1) upon which the Division of Mutual Ownership Defense Housing and the Bellmawr Park Mutual Housing Authority constructed 176 multi-unit residential and support buildings for defense workers at Camden's New York Shipbuilding Corporation in 1942. Although the Bellmawr Park School is located within the historic district boundary, it is located on a separate lot owned by the Borough of Bellmawr Board of Education.

The development is located immediately adjacent to the I-295/I-76/Route 42 interchange, and Route 42 divides the community into two sections just south of the interchange (see **Figure 5.7-2**). The majority of the resource is situated within an area bounded by West Browning Road to the north, Princeton Avenue to the west, and the highway interchange to the east. A small section of the development is located immediately east of the interchange and south of West Browning Road. In addition to the 175 residential buildings within Bellmawr Park, a housing office is located at the intersection of Peach Road and Essex Avenue.

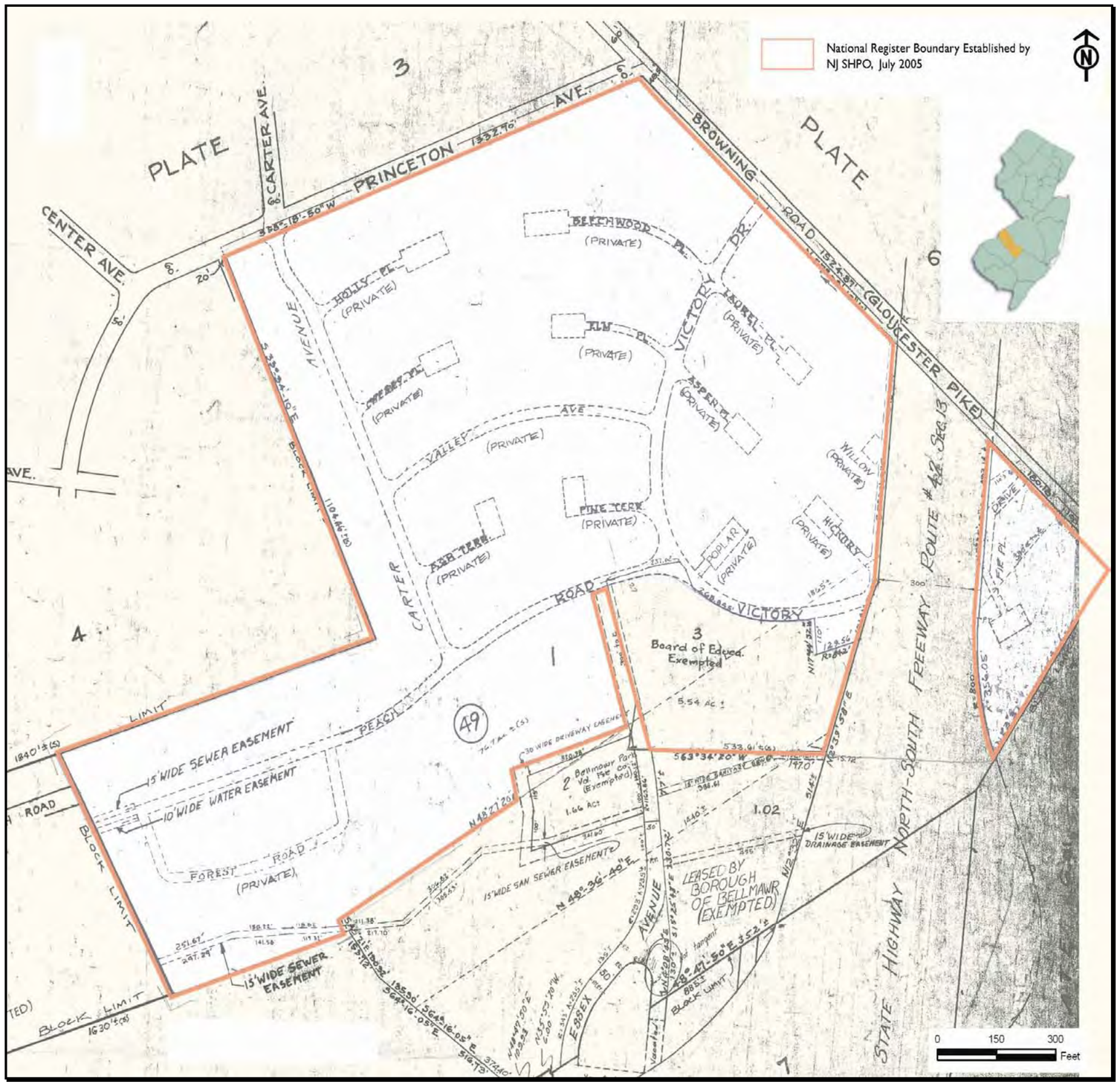


Figure 5.7-2: Bellmawr Park Mutual Housing Historic District National Register Boundary Impacts and Mitigation

ALTERNATIVE	ANTICIPATED ADVERSE EFFECT
D and D1	Five contributing buildings (12 dwelling units) would be demolished, diminishing the district's integrity of materials, design, location, and setting. Five new buildings would possibly be constructed, diminishing the district's integrity of materials, design, and setting. 2.11 acres (8.87% of the district's total acreage) would be acquired for right-of-way, diminishing the district's integrity of design and setting. The introduction of a modern highway and associated highway features within or immediately adjacent to the district would result in adverse visual effects, diminishing the resource's integrity of feeling. Noise walls have been deemed feasible, and adverse visual impacts would increase if noise walls were used for these alternatives. The visual impacts of Alternatives D and D1 on the district, with or without noise walls, would be lesser than the visual impacts of Alternatives G2 and H1, but greater than the visual impacts of Alternative K. If left unmitigated, 32 contributing buildings would approach or exceed FHWA's noise abatement criteria (NAC) by the year 2030 under Alternatives D and D1, compared to 24 buildings under the No Build Alternative, diminishing the resource's integrity of feeling. Noise walls have been deemed feasible, and adverse noise impacts would not occur if noise walls were used for these alternatives.
G2 and H1	One contributing building (four dwelling units) would be demolished, diminishing the district's integrity of materials, design, location, and setting. One new building would possibly be constructed, diminishing the district's integrity of materials, design, and setting. 1.05 acres (4.40% of the district's total acreage) would be acquired for right-of-way, diminishing the district's integrity of design and setting. The introduction of a modern highway and associated highway features within or immediately adjacent to the district would result in adverse visual effects, diminishing the resource's integrity of feeling. Noise walls have been deemed feasible, and adverse visual impacts would increase if noise walls were used for these alternatives. The visual impacts of Alternatives G2 and H1 on the district, with or without noise walls, would be greater than the visual impacts of Alternatives D, D1, or K. If left unmitigated, 38 contributing buildings would approach or exceed FHWA's NAC by the year 2030 under Alternatives G2 and H1, compared to 24 buildings under the No Build Alternative, diminishing the resource's integrity of feeling. Noise walls have been deemed feasible, and adverse noise impacts would not occur if noise walls were used for these alternatives.
K	Five contributing buildings (12 dwelling units) would be demolished, diminishing the district's integrity of materials, design, location, and setting. Five new buildings would possibly be constructed, diminishing the district's integrity of materials, design, and setting. 2.20 acres (9.27% of the district's total acreage) would be acquired for right-of-way, diminishing the district's integrity of design and setting. The introduction of a modern highway and associated highway features within or immediately adjacent to the district would result in adverse visual effects, diminishing the resource's integrity of feeling. Noise walls have been deemed feasible, and adverse visual impacts would increase if noise walls were used for these alternatives. The visual impacts of Alternative K on the district, with or without noise walls, would be lesser than the visual impacts of Alternatives D, D1, G2, or H1. If left unmitigated, 26 contributing buildings would approach or exceed FHWA's NAC by the year 2030 under Alternative K, compared to 24 buildings under the No Build Alternative, diminishing the resource's integrity of feeling. Noise walls have been deemed feasible, and adverse noise impacts would not occur if noise walls were used for these alternatives.

Table 5.7-2: Summary of Adverse Effects for All Build Alternatives

There are 70 buildings within Bellmawr Park that are located within the APE for the proposed project. (More detailed information about the historic district, including individual survey form attachments for properties located within the district, are included in the *Historic Architectural Resources TES*.)

Generally, the residential buildings within Bellmawr Park are simple, one- or two-story, light timber frame buildings with concrete foundations and side-gabled, hipped, or flat roofs. The buildings are currently clad in brick facing or asbestos, vinyl, or aluminum siding. Most buildings have undergone significant modifications, the most common of which are the application of siding, the installation of replacement windows and doors, the construction of small additions, the replacement and/or enclosure of porches, and the enlargement of window openings. Asphalt shingle roofing and small brick chimneys are visible on all dwellings.

The *Historic Architectural Resources TES* categorized the residential buildings within the development into five primary types, designated as Types A, B, C, D, and E. Type A is characterized by single-story, side-gabled buildings containing two side-by-side units. Type B consists of two-story, brick-faced, side-gabled or flat-roofed buildings containing four side-by-side units. Type C is characterized by single-story, brick-faced, side-gabled buildings containing two side-by-side units (similar to Type A, but clad in brick instead of asbestos, vinyl, or aluminum siding). Type D consists of single-story, side-gabled or hipped-roofed buildings containing four side-by-side units. Type E consists of single-story, hipped-roofed buildings containing two side-by-side units.

NJDOT submitted the *Historic Architectural Resources TES*, which included documentation of the APE, the results of architectural and historical investigations of the APE, and National Register evaluations to NJHPO and FHWA in June 2005. NJHPO issued an opinion of eligibility for Bellmawr Park (the Bellmawr Park Mutual Housing Historic District) in a letter dated July 6, 2005, stating that the district is eligible for listing in the National Register under Criteria A and C (see Appendix B). It was originally recommended that the Bellmawr Park School be excluded from the National Register boundaries of the district due to a current lack of association with the Bellmawr Park Mutual Housing Corporation. However, NJHPO's opinion letter states that the school should be included as a contributing element to the district because it was constructed during the period of significance and was historically associated with Bellmawr Park. NJDOT and FHWA concurred with NJHPO's opinion.

NJHPO found the district to be significant under National Register Criterion A for its association with the development of the mutual housing concept associated with World War II-era defense housing projects and under Criterion C for its embodiment of the distinctive characteristics of an architectural type (functional military worker housing of the 1940s). The district's period of significance is 1942 to 1945. Contributing elements to the district include all dwellings and communal open space dating from the period of significance, the Bellmawr Park Mutual Housing Corporation office building, and the Bellmawr Park School. The aspects of integrity that are most important to the district are location, design, setting, feeling, and association.

5.7.3 Impacts and Mitigation

5.7.3.1 Impact Evaluation Criteria

In order to determine if the proposed project would have an adverse effect on the Bellmawr Park Mutual Housing Historic District, the criteria of adverse effect (36 CFR Part 800.5(a)) was applied. In general, a proposed project is deemed to have an adverse effect if it would alter a historic property in a manner that would diminish any of the characteristics of the property that qualifies it for inclusion in the National Register. Adverse effects on historic properties include, but are not limited to:

- physical destruction, alteration or damage to all or part of the property;
- removal of the property from its historic location;
- change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
- introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features; and
- neglect of a property which causes its deterioration.

5.7.3.2 No Build Alternative

The No Build Alternative would result in no impact to historic architectural resources as no buildings would be demolished and no visual intrusions would be constructed.

5.7.3.3 Build Alternatives

In an August 16, 2006 letter, NJHPO concluded that the proposed project will have an adverse effect on the Bellmawr Park Mutual Housing Historic District under all build alternatives (see Appendix B) due to the permanent acquisition of land, demolition of contributing structures, and roadway construction within the boundaries of the historic district. It was the NJHPO's opinion that Alternative K would have the least overall adverse effect to historic resources.

Adverse effects that would result with the proposed project are summarized in **Table 5.7-2**. (Additional information regarding the assessment of adverse effect can be found in the *Historic Architectural Resources TES*.)

5.7.3.4 Mitigation

The proposed project would have an adverse effect on the Bellmawr Park Mutual Housing Historic District under all build alternatives; therefore mitigation of adverse effects is necessary. Mitigation would be implemented through a Memorandum of Agreement (MOA) that would be developed in consultation with FHWA, NJHPO, NJDOT, and the Bellmawr Park Mutual Housing Corporation. A copy of the MOA is included in Appendix I. Potential mitigation measures may include (but are not limited to) the following:

- Document buildings slated for demolition within the Bellmawr Park Mutual Housing Historic District in accordance with the Historic American Buildings Survey (HABS) Level II guidelines

prior to any alteration or demolition.

- Complete a National Register nomination form for the district.
- As part of the National Register nomination form, prepare a graphic overlay to illustrate the evolution of the district by comparing its original layout to changes that have occurred over time, including changes that would result from the proposed project.
- Assist BPMHC in the creation of a website for the BPMHC community.
- Upon completion of the National Register nomination form, prepare a historic narrative for BPMHC's use on their website.
- Assist BPMHC in the selection of graphics from the National Register nomination form to use on their website and reformat the graphics in an electronic format that BPMHC can utilize for posting on their website.
- In an effort to assist BPMHC in developing strategies to help ensure the community's cohesiveness and stability, assist BPMHC to develop a Conservation Plan for archival storage of historic documentation (blueprints, maps, plans, etc.) that they have on file.
- Provide guidance to BPMHC regarding the archival storage of materials identified in the Conservation Plan.

5.8 HAZARDOUS MATERIALS

As the proposed project would require property acquisitions and soil and groundwater management during construction, it was necessary to determine the potential for any of the properties within the study area to contain hazardous materials.

A *Hazardous Waste Screening TES* was prepared for properties located in the vicinity of each of the five proposed build alternatives. The objective of this study was to assess the potential for contamination due to past or current land use activities within the study area. The TES report was based, in part, upon an initial hazardous waste evaluation of the entire project area that was conducted in 2002 to aid in the alternative screening process. The results of the initial evaluation identified several potentially hazardous and/or contaminated sites in the project area. For more information, refer to the *Hazardous Waste Screening TES* included in Attachment 9.

5.8.1 Methodology

The study area for hazardous materials extends approximately 250 feet from the limits of construction of the build alternatives. In order to assess the potential for contamination within the study area, the analysis included study corridor reconnaissance, historical records review, review of federal and state records, and inquiries with state and local agencies. A more detailed description of this analysis is included in the *Hazardous Waste Screening TES* (see Attachment 8).

The potential for the study area to contain hazardous and/or contaminated materials was examined in accordance with all applicable policies, rules, and regulations.

5.8.2 Existing Conditions

An initial hazardous waste evaluation, including a site reconnaissance and records review, identified 52 businesses within the project area which had potential environmental concerns. After narrowing the study area to a 250-foot buffer for the five build alternatives, many of these sites were eliminated from concern. As discussed in the *Hazardous Waste Screening TES*, 17 areas of concern (AOCs) remained within the 250-foot buffer for the five build alternatives (see **Figure 5.8-1**). However, only three AOCs would be impacted by proposed construction activities under all build alternatives—Area of Ramp C at I-295, MP 27; New St. Mary's Cemetery; and Bill Seas Towing. As a result, the following analysis is limited to these three areas.

5.8.2.1 Areas of Concern

AOCs include potential areas of soil or groundwater contamination. Construction of the proposed project would impact three AOCs, as described below:

- The Area of Ramp C at I-295, MP 27 (identified as AOC No. 4 in **Figure 5.8-1**) is located at the I-295/I-76 interchange ramp in Bellmawr and is of environmental concern based on information obtained from the regulatory database search and from the site reconnaissance. This area is listed on the New Jersey Spills and New Jersey Release databases due to a spill of approximately 200 gallons of diesel fuel during a motor vehicle accident. Soil contamination was confirmed and no cleanup was reported.
- During the site reconnaissance of the Area of Ramp C at I-295, MP 27, an adjacent undeveloped wooded fill area was observed between I-295 and the western end of Linwood Avenue and the southern end of Cleveland Avenue in Mount Ephraim. According to NJDEP, it appears that fill, possibly containing demolition debris, was placed within this area of former tidal wetlands. Although this fill area is within the 250-foot buffer, it is not within the right-of-way of any of the build alternatives.
- New St. Mary's Cemetery (identified as AOC No. 7 in **Figure 5.8-1**) is located on West Browning Road near the I-295/Route 42 interchange in Bellmawr and is of environmental concern based on information obtained during the site reconnaissance. An underground storage tank (UST) fill cap was observed near the cemetery's administration building and a gasoline aboveground storage tank (AST) was observed in the maintenance area. In addition, maintenance equipment and storage space were observed. Since maintenance areas often contain chemicals and petroleum products, there is a concern that these items may be or may have been present. As the administration building will be demolished under the proposed project, this area is of environmental concern.
- Bill Seas Towing (identified as AOC No. 9 in **Figure 5.8-1**) is located on Essex Avenue in Bellmawr and is of environmental concern based on information obtained during the site reconnaissance. Motor vehicles and equipment are stored on the site. Use of the site for maintenance and storage of motor vehicles and equipment raises concerns regarding the presence of chemicals and petroleum products. As buildings on the property would be demolished under the proposed project, this area is of environmental concern.

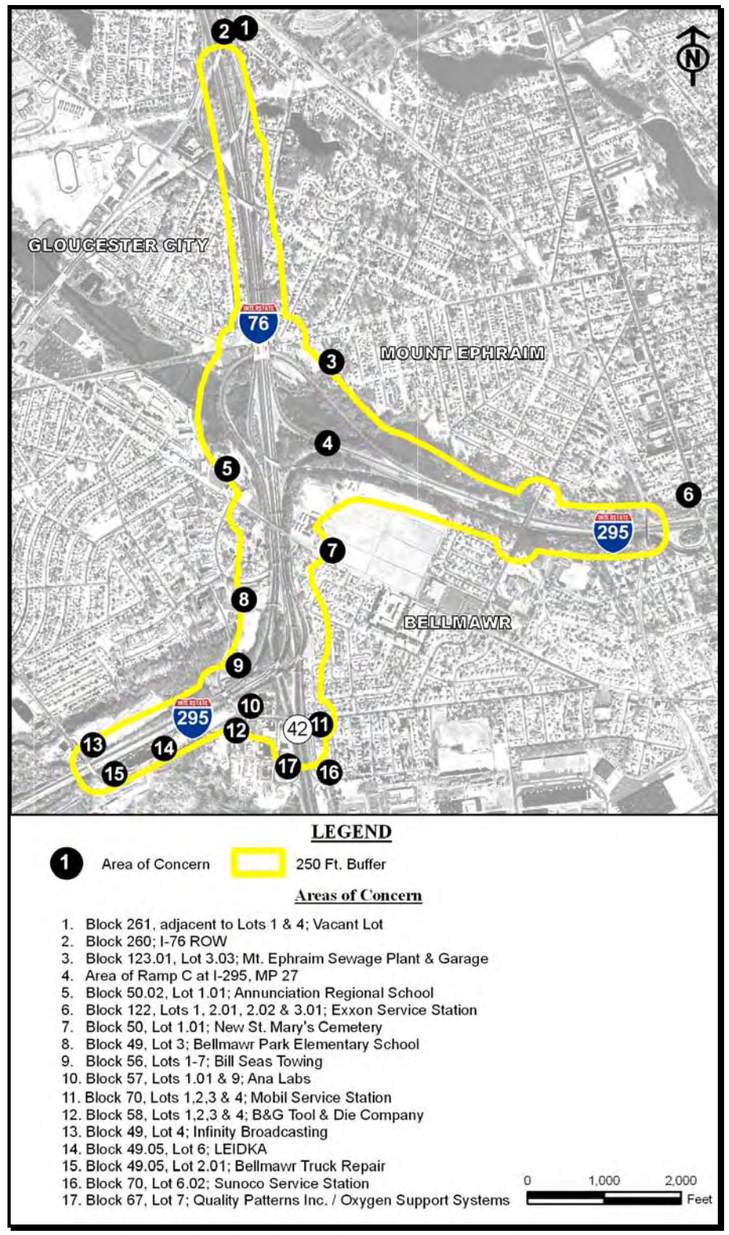


Figure 5.8-1: Areas of Environmental Concern

5.8.2.2 Potential Asbestos-Containing Building Materials/Lead-Based Paint Sites

The proposed project will require the demolition of several older buildings that may contain asbestos-containing building materials (ACBM) and/or lead-based paint (LBP). ACBM can be found within piping insulation, ceiling and floor tiles, wallboard, roofing and siding materials, and mastic. LBP can be found on painted surfaces, such as walls, ceilings, doors, and windows.

Based on a review of aerial photographs, buildings located on the property of New St. Mary's Cemetery were constructed prior to 1940 and buildings at Bill Seas Towing were constructed on the property prior to 1964. The administration building at New Saint Mary's Cemetery would be demolished under all alternatives. In addition, under Alternatives D, D1 and K, buildings would be acquired and demolished during construction at Bill Seas Towing. Residential buildings located within the Bellmawr Park Mutual Housing Corporation community were constructed between 1942 and 1945. Buildings located within the Bellmawr Park Mutual Housing Corporation would be acquired and demolished during construction under each build alternative.

Based on the dates of construction for these buildings, there may be the likelihood of encountering ACBM and LBP during demolition. The potential for ACBM and LBP also exists on roadway bridges that would be replaced as part of the proposed project.

As a result, further studies are recommended. A survey for ACBM and LBP must be conducted prior to demolition in order to verify the presence and quantities of ACBM and LBP that may be encountered. These investigations will be conducted during final design in accordance with NJDEP regulations.

5.8.3 Potential Impacts and Mitigation

5.8.3.1 Impact Evaluation Criteria

In total, 17 AOCs were identified within a 250-foot buffer surrounding the five build alternatives. After further study, it was determined that only three AOCs would potentially pose a concern with respect to the build alternatives.

5.8.3.2 No Build Alternative

As no construction activity would occur under the No Build Alternative, there would be no impact from any known or potential contaminated sites. However, although there would be no impact from contaminated sites, the No Build Alternative would allow known contamination at the Area of Ramp C at I-295, MP 27 to remain. As a result, contaminated materials would not be remediated and could result in environmental impacts if left unattended.

5.8.3.3 Build Alternatives

The following AOCs would potentially be impacted by proposed construction activities associated with Alternatives D, D1 and K:

- Area of Ramp C at I-295, MP 27, Bellmawr;
- New St. Mary's Cemetery, Browning Road, Bellmawr; and
- Bill Seas Towing, Essex Avenue.

The following AOCs would potentially be impacted by proposed construction activities associated with Alternatives G2 and H1:

- Area of Ramp C at I-295, MP 27, Bellmawr; and
- New St. Mary's Cemetery, Browning Road, Bellmawr.

The potential for soil and groundwater contamination exists within the NJDOT right-of-way in the vicinity of Ramp C at I-295, MP 27, from the past diesel fuel spill. Due to the presence of an UST, AST, maintenance equipment, and outdoor maintenance and storage space located on New St. Mary's Cemetery and, based on the nature of operations at Bill Seas Towing, there is the potential for soil and groundwater contamination at these locations. Since maintenance areas often contain chemicals and petroleum products, there is a concern that these items may be or may have been present at these sites. However, alignments of the build alternatives have been designed to minimize acquisition and to avoid the maintenance areas.

A soil sampling plan would be developed during final design in accordance with NJDEP's Technical Requirements for Site Remediation (NJAC 7:26E). This plan would outline the depths of excavation and the potential need to collect soil and groundwater samples, as appropriate, to determine the presence, type, and level of contamination in the proposed construction areas at these sites.

Should soil contamination exist, potential management options may consist of the reuse of such material beneath the roadway pavement and embankments within the project limits. Potential mitigation for contaminated groundwater encountered during construction may consist of redeposition in a trench or basin without treatment. If applicable, the redeposition would be handled through either a Permit-by-Rule or On-Scene Coordinator authorization issued by the NJDEP. Health and safety precautions would be instituted for the protection of the public and construction personnel. The mitigation approach for contaminated soil and groundwater would developed based upon investigations conducted during final design in accordance with the Technical Requirements for Site Remediation (NJAC 7:26E). The NJDOT will follow appropriate case assignment protocol and remedial actions will be selected in consultation with the NJDEP's case manager based on sampling data collected during final design.

The cemetery administration building and buildings located within the Bellmawr Park Mutual Housing Corporation community would be acquired and demolished during construction under all build alternatives. Buildings located at Bill Seas Towing would be acquired and demolished during construction under Alternatives D, D1 and K. Based on the dates of construction of these buildings, there is a high potential that ACBM and LBP would be encountered during demolition. The potential for ACBM and LBP also exists on roadway bridges that would replaced. As a result, a survey for ACBM and LBP must be conducted prior to any demolition activities. If ACBM and LBP are found, an appropriate workplan would be developed to address the management, transportation, and disposal of contaminated materials.

CHAPTER 6:
OTHER PROJECTS IN THE STUDY AREA

In addition to the I-295/I-76/Route 42 Direct Connection Project, there are other major infrastructure improvement projects in the study area that are in various stages of planning and construction that may affect secondary and cumulative impacts. These projects are summarized below.

6.1 MISSING MOVES

The project known as NJDOT's Missing Moves has been proposed to connect Route 42 and I-295 by providing ramps for a connection between I-295 northbound and Route 42 southbound and between Route 42 northbound and I-295 southbound.

Northbound motorists on Route 42 destined for Route 295 south must use local roadways or pass through the interchange, exit onto Route 168 or onto Market Street (Route 634), perform a U-turn and then pass back though the interchange to be able to proceed south on Route 295. Motorists on Route 295 heading north and wishing to proceed to Route 42 south, must perform similar movements, i.e., use local roadways or navigate through the interchange, perform a U-turn and pass back through the interchange to Route 42 south. The additional trips through the interchange, along with the various weaving patterns that accompany them, add to the congestion and potentially the occurrence of accidents within the interchange. Construction of the Missing Moves ramps will allow traffic to flow between Route 42 and I-295 in both directions without overtaxing the already congested local roadway system.

Currently, the Missing Moves project is on hold as discussions continue with local officials. The design may be modified in response to recent changes in local development plans. Present funding includes re-evaluation of the purpose and need for the project. Since future traffic conditions would differ if the Missing Moves project were not constructed, additional traffic and air quality analyses were conducted to evaluate the I-295/I-76/Route 42 Direct Connection alternatives with and without construction of the Missing Moves project.

The traffic analyses results, whether Missing Moves is constructed or not, indicate that overall traffic flow conditions under any of the five build alternatives will be relatively similar to one another. The Missing Moves traffic is drawn primarily from roads to the south along NJ-42 and to the southwest along I-295, rather than from the interchange. One situation where traffic flow conditions are distinctly different without the construction of Missing Moves involves Route 42 northbound during the AM peak hour. The peak direction during the AM commute is primarily headed towards Philadelphia and, to a relatively lesser degree, to other points north along I-295. The consequence of not having the Missing Moves ramps is for a moderate number of vehicles to circulate through the interchange area to get to their destinations. For Route 42, that means accommodating slightly more traffic volumes on a facility that, during the AM peak hour, will be more congested without the Missing Moves ramps than with the Missing Moves ramps. Higher northbound volumes are also predicted on I-295 without Missing Moves, since removing the Missing Moves users from I-295 is sufficient to invite other motorists to travel northbound on I-295.

The air quality study assumed that the Missing Moves project will be constructed by the year 2030. CO levels were also predicted without construction of the Missing Moves project which resulted in similar CO concentrations (less than 5% difference).

6.2 ROUTE 168 INTERCHANGE

In the Draft Interstate Access Request submitted to FHWA, traffic for the five build alternatives would flow well through the interchange when compared to the No Build Alternative. However, I-295 southbound traffic will slow (especially in the AM) as it reaches the Route 168 interchange. Likewise, I-295 northbound traffic (especially in the PM) is affected by the existing geometrics at the Route 168 interchange and the heavy volumes on I-295 and Route 168. NJDOT has identified the need to improve operations at the Route 168 interchange and has initiated a feasibility assessment to investigate alternatives. These possible future improvements will not be precluded by the proposed project. In addition, the timing of construction will be such that the two projects will not adversely affect one another.

6.3 WALT WHITMAN BRIDGE

The Delaware River Port Authority (DRPA) plans to replace the center span deck of the Walt Whitman Bridge. This construction is scheduled to take place over a period of 3 years, beginning in 2009, extending through late 2011 and, possibly, into early 2012. During the course of construction it will be necessary to place warning signs and traffic control devices in advance of the work zone to guide motorists. On the New Jersey approach, these traffic control measures will extend beyond the limits of the Walt Whitman Bridge onto Route 42. Construction of the I-295/I-76/Route 42 Direct Connection project is not anticipated to commence before 2012, thus there should be minimal overlap in the construction of these projects. Construction staging will be coordinated accordingly between the DRPA and NJDOT to minimize traffic impacts.

6.4 BELLMAWR WATERFRONT DEVELOPMENT

There is a proposed development (Bellmawr Waterfront Development) in Bellmawr that is currently in the conceptual design stage. It will be located in the abandoned landfill area between I-295 and Route 42, along Big Timber Creek south of the interchange. The type and size of the development is still being studied. As the Bellmawr Waterfront Development project progresses, its potential impacts on the transportation system will need to be analyzed. The proposed project will not preclude the possibility of this development. However, the scale and size of the development is dependent upon improvements to the regional transportation networks.

6.5 PATCO RAIL EXTENSION

The Delaware River Port Authority (DRPA) is a regional transportation and economic development agency serving the people of southeastern Pennsylvania and southern New Jersey. Through a subsidiary—the Port Authority Transit Corporation (PATCO)—the DRPA runs the PATCO High Speed Line Service between New Jersey and Philadelphia. PATCO has expressed interest in extending rail service to southern New Jersey, including Camden County. DRPA/PATCO has participated in partnering sessions, PICs, and stakeholder meetings for the I-295/I-76/Route 42 Direct Connection project. These sessions and meetings are more thoroughly discussed in Chapter 11.

In October 2005, the DRPA sponsored a *Southern New Jersey to Philadelphia Transit Study*. This was a feasibility study conducted to assess transit needs and to develop potential transit improvements in four portions of the study area: Southern New Jersey, Camden Waterfront, Market West (Center City Philadelphia), and Philadelphia Waterfront. A total of 34 alternatives were developed for these four areas that satisfied the transit needs. Through discussions between DRPA, PATCO and stakeholder input, five Southern New Jersey alternatives have been advanced for further study and are summarized below and shown in **Figure 6-1:**

- Alternative NJ-1 would originate as new PATCO-style service from Williamstown to Center City Philadelphia via the Atlantic City Expressway and Route 42 medians, and along the south side of Route 42, I-76 and I-676. In Camden the new service would merge with the existing PATCO service into Center City Philadelphia.

- Alternative NJ-2 would originate as a PATCO type rapid transit service from Glassboro to Center City Philadelphia via the Route 55 and Route 42 medians, and along the south side of Route 42, I-76 and I-676. In Camden the new service would merge with the existing PATCO service into Center City Philadelphia. A possible Phase II extension would be a separate, commuter-oriented service from Millville to Glassboro in the Conrail right-of-way, initially operated with a diesel vehicle.

- Alternative NJ-2a would originate as a PATCO type rapid transit service from Glassboro to Center City Philadelphia via the existing Conrail right-of-way, Route 55 and Route 42 medians, and along the south side of Route 42, I-76 and I-676. In Camden the new service would merge with the existing PATCO service into Camden and Center City Philadelphia. A possible Phase II extension would be the same as described in Alternative NJ-2.

- Alternative NJ-3 would originate as a PATCO type rapid transit service utilizing an existing Conrail right-of-way from Glassboro to Camden, where it would merge with the existing PATCO service to Center City Philadelphia.

- Alternative NJ-4 follows the same alignment as Alternative NJ-3 utilizing a diesel light rail service to Camden, where passengers would transfer to the existing PATCO service to Center City Philadelphia. A possible Phase II extension would be the same as described in Alternative NJ-2.

While the choice of alignment for PATCO transit expansion has not yet been finalized, three of the five PATCO alternatives presently under consideration (Alternatives NJ-1, NJ-2, and NJ-2a) run along the I-76/Route 42 corridor and include a potential station at or near the southern edge of the I-295/I-76/Route 42 Direct Connection project area in Bellmawr at Leaf Avenue and Route 42. These alternatives have the potential to impact many of the same resources as the I-295/I-76/Route 42 Direct Connection project. The other two PATCO alternatives are located west of Bellmawr outside the I-295/I-76/Route 42 Direct Connection project area (Alternatives NJ-3 and NJ-4).

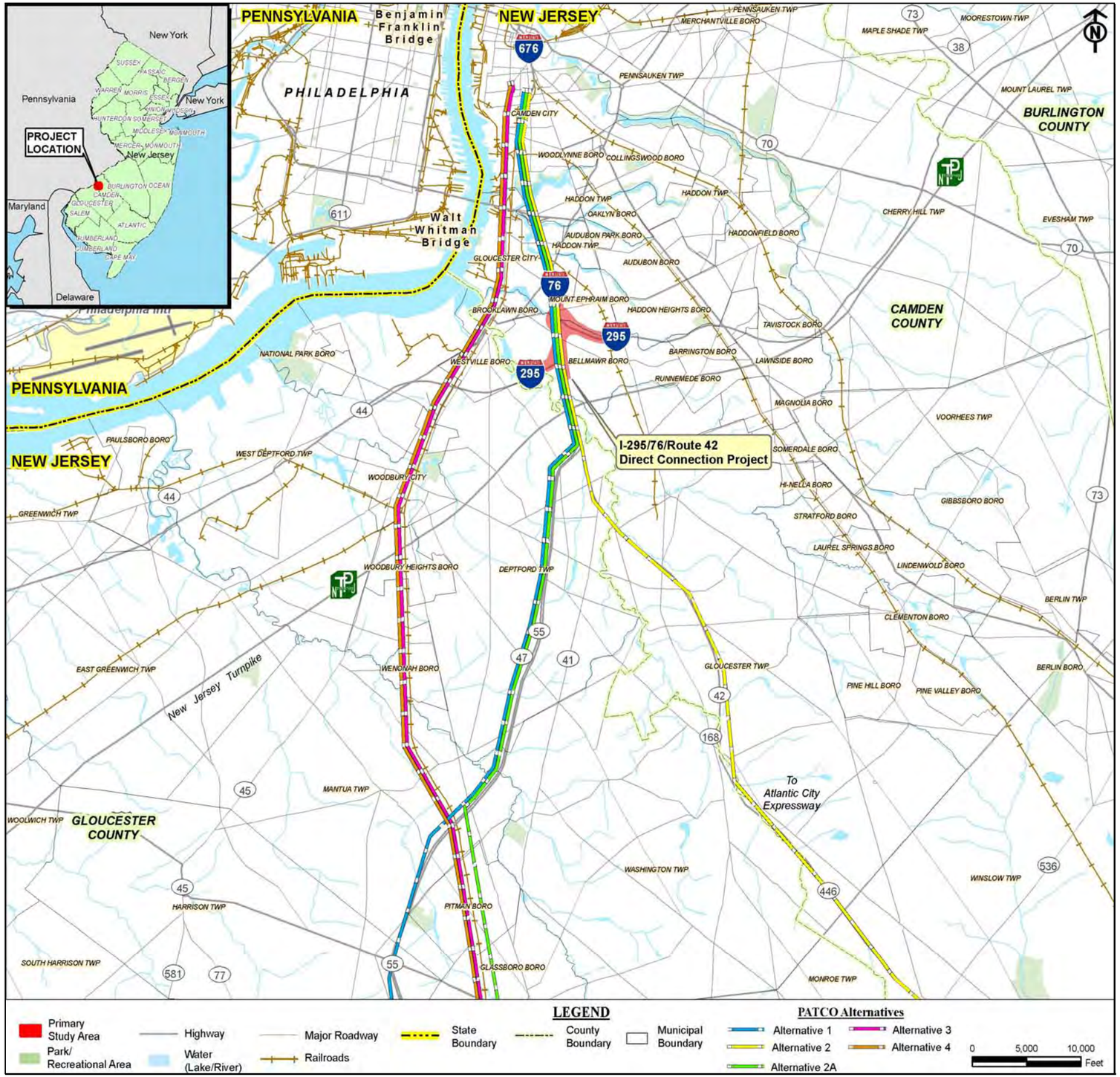
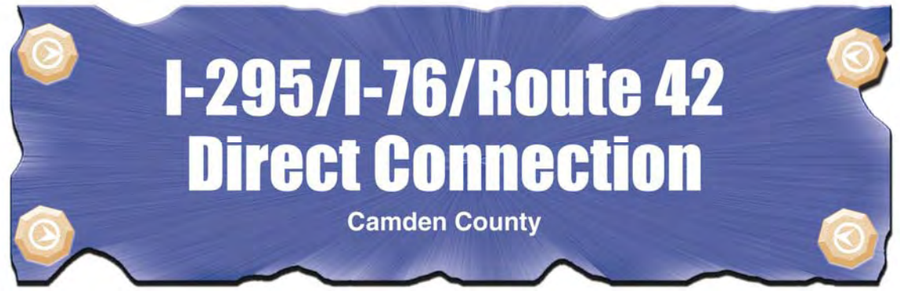


Figure 6-1: PATCO Southern NJ Expansion Alternatives



CHAPTER 7:
SECONDARY AND CUMULATIVE IMPACTS

This chapter assesses the secondary and cumulative impacts that may result from the proposed project as well as other proposed projects in the study area.

7.1 SECONDARY IMPACTS

Guidelines prepared by the CEQ for carrying out NEPA broadly define secondary impacts as those that are "caused by an action and are later in time or further removed, but are still foreseeable" (40 CFR 1508.8). Secondary impacts are those normally associated with development that may result from the construction of a facility, such as a transportation improvement project, and differ from those impacts directly associated with the construction and operation of the facility itself. Secondary impacts are commonly referred to as induced development. Generally, these impacts are made possible or feasible by the initial action and comprise a variety of secondary effects, such as changes in land use, development patterns, economic activity, utility service capacity, and population density. Secondary impacts may result in increased development pressures on open space, farmlands, and other natural resources.

The potential for secondary impacts or increased development to occur in any area is determined partly by the individual municipal planning objectives of the local area. Factors that generally induce secondary development are improved transportation access, utility capacity, existing development plans, suitable terrain, and economic incentives.

Based on these criteria, and according to information gathered from meetings held with local officials and DVRPC (August 12, 2005, September 19, 2005, and November 3, 2005), along with the analysis conducted for the *Socioeconomic, Land Use and Environmental Justice TES*, no secondary impacts are anticipated for this project. The proposed project would not alter development patterns in Bellmawr, Mount Ephraim or Gloucester City, either separately or in conjunction with any other project. Based on the developed nature of Bellmawr and Mount Ephraim, the limited amount of improvements within Gloucester City, and the intended purpose of this project (safety and travel time savings), secondary impacts are not anticipated. Bellmawr is fully developed with the exception of the post office/industrial park and abandoned landfill area which is not expected to be affected by the proposed project because the purpose of this project is to reduce traffic congestion and improve safety through the interchange. Mount Ephraim is also fully developed and no significant additional development is planned. In Gloucester City, development has been proposed along the waterfront outside of the primary study area but within the secondary study area. According to the *Socioeconomic, Land Use and Environmental Justice TES*, Gloucester City representatives indicated that none of the build alternatives would affect development along the waterfront.

7.2 CUMULATIVE IMPACTS

The objective of the cumulative impacts evaluation is to determine the impact of the project when combined with other major infrastructure improvement projects that are either planned or have been recently completed in the study area and region. This may affect future land uses and environmental and/or socioeconomic resources.

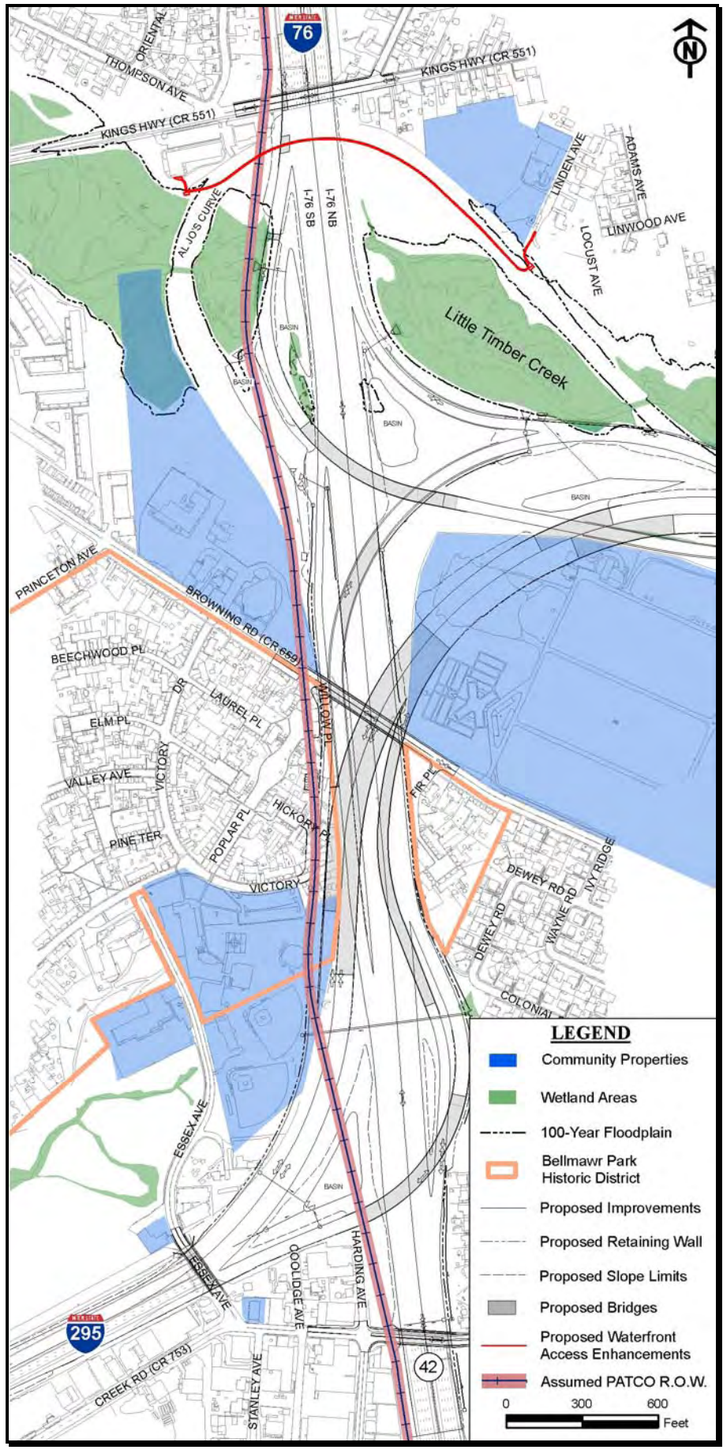


Figure 7-1: Alternative D and the PATCO Rail Alternatives NJ-1/ NJ-2/NJ-2A

The CEQ's regulations (40 CFR 1500-1508) implementing the procedural provision of NEPA, define cumulative effects 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 regardless of what agency (federal or non-federal) or person undertakes other actions (49 CFR 1508.7)

The I-295/I-76/Route 42 Direct Connection Project and the PATCO transit expansion projects are complementary in their overall transportation improvements in this region. While the Direct Connection Project addresses safety, congestion and mobility issues, the transit expansion project provides a modal option and potentially increases the commuting capacity for the area. The cumulative benefits to the transportation system of both projects are greater than either project taken individually.

In order to consider the cumulative impacts of the I-295/I-76/Route 42 Direct Connection project and a potential PATCO rail extension, the preferred alignment of the PATCO rail extension must be identified. Three of the conceptual PATCO horizontal alignments (Alternatives NJ-1, NJ-2, and NJ-2a), generally parallel southbound I-76/Route 42 through the I-295/I-76/Route 42 Direct Connection project area. PATCO concepts for NJ-1, NJ-2, and NJ-2a were evaluated based on discussions with DRPA and a prior 1975 PATCO study. As per DRPA, the conceptual rail corridor is assumed to be 40 feet wide and requires a vertical clearance of 20 feet. The assumed 40 foot right-of-way for one of these PATCO alignments adjacent to the I-295/I-76/Route 42 Direct Connection alignment for Alternative D is depicted in **Figure 7-1**.

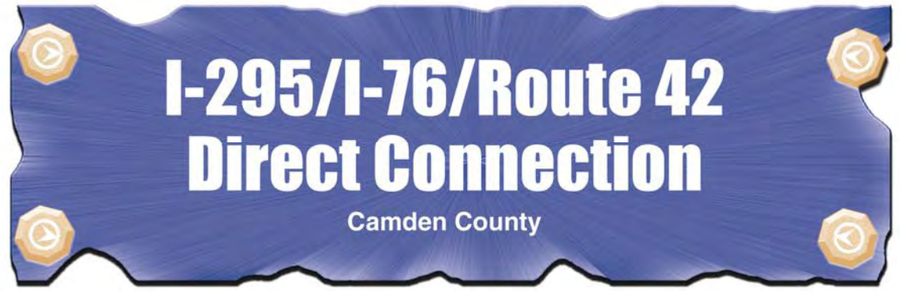
The community and natural environment would be impacted by the construction of rail line Alternatives NJ-1, NJ-2, or NJ-2a. These additional impacts would lie to the west of the I-295/I-76/Route 42 Direct Connection project from Kings Highway to the south of Browning Road and would include, at a minimum, the following resources:

- wetlands and floodplains in the vicinity of Al Jo's curve;
- parking at Annunciation BVM Church;
- residences within BPMHC/historic district;
- Bellmawr Park School ballfield; and
- Bellmawr Baseball fields.

Alternatives NJ-3 and NJ-4 would not result in additional impacts within the I-295/I-76/Route 42 Direct Connection project area.

The EIS for the I-295/I-76/Route 42 Direct Connection project is available to DRPA for the development of the environmental documentation for the potential PATCO rail extension. Once the design of the potential PATCO rail extension advances, the cumulative impacts of these projects may be more thoroughly addressed in the environmental documentation for the PATCO project. Coordination between the design teams for the I-295/I-76/Route 42 Direct Connection project and the potential PATCO rail extension will continue.

The construction of the I-295/I-76/Route 42 Direct Connection project would not preclude the future construction of the PATCO rail extension through the I-295/I-76/Route 42 interchange.



CHAPTER 8:
TEMPORARY CONSTRUCTION IMPACTS

8.1 TEMPORARY NOISE IMPACTS AND MITIGATION

Regardless of the alternative selected, the area within the proposed project limits would experience an increase in noise levels during the construction phase. Overall, construction activities throughout the study area may have a short-term noise impact on sensitive receptors in the immediate vicinity of the construction site. Specifications for all contracts would require contractors to comply with all applicable laws, regulations, and orders to reduce any impacts.

Equipment such as bulldozers, scrapers, backhoes, graders, loaders, cranes, and trucks would be used in the construction but are subject to construction noise specifications. Construction noise levels for residences and commercial/industrial establishments can reach 90 to 95 dBA L_{eq} during some phases of construction. On-site construction noise mitigation options such as mufflers, vibration dampers, and portable noise walls, can be specified to minimize construction noise impacts. Whenever possible, it is recommended that the proposed noise walls be constructed as early as feasible within the construction schedule of the project to mitigate noise impacts during construction.

8.2 TEMPORARY AIR QUALITY IMPACTS AND MITIGATION

Air quality impacts that arise during construction consist of construction equipment exhausts and dust generated by the movement of equipment over exposed earth. However, construction of the proposed project is expected over an extended period of time and temporary increases in MSAT emissions may result. There are several strategies to mitigate construction-related MSATs including a new USEPA cooperative program that is intended to work toward reducing particulate matter and NO_x. Methods to avoid community exposure may include reducing engine activity or shift times. Others include retrofitting specific construction equipment with devices that provide exhaust emission reduction as well as utilizing an ultra-low sulfur diesel. Additional measures to minimize these temporary impacts will be investigated during final design and specifications will be prepared to identify how air quality impacts will be mitigated. Mitigation measures that can be implemented during construction to ensure dust generation is kept to a minimum include the application of water or dust retardants to heavily traveled portions of the construction area.

As a result of the anticipated contractor mitigation measures described above, adverse impacts of construction activities to residents proximate to the primary study area would be minimized.

8.3 CONSTRUCTION-RELATED ECONOMIC IMPACTS

For all of the alternatives, right-of-way takings, and temporary and permanent easements are required. A summary list of required right-of-way takings and easements can be found in the *Socioeconomic, Land Use and Environmental Justice TES.*

The total construction cost of the proposed improvements would range from a low of approximately $608 million for Alternative D to a high of approximately $893 million for Alternative H1. These expenditures would result in some additional employment opportunities during construction in the secondary impact area through the employment of construction workers. Additionally, with the influx of workers in the area, local retail services (i.e., restaurants, grocery stores, etc.) may see an increase in business.

8.4 TEMPORARY ECOLOGY IMPACTS AND MITIGATION

Short-term water quality impacts can occur from construction-related soil erosion. These can increase turbidity and suspended solids, lower dissolved oxygen, and alter pH values. Water quality impacts due to soil erosion and sedimentation during construction would be minimized through implementation of a soil erosion and sediment control plan in accordance with NJDOT standards. Dewatering effluent is expected to be discharged to surface water and a NJPDES General Permit would be required. Construction techniques, such as prefabrication of various structural elements, also can reduce erosion and sedimentation potential. As construction activities would require large areas of regrading and soil disturbance, phased construction as well as the isolation of work areas could be implemented in order to limit potential impacts. A short-term water use permit-by-rule would be applicable since the dewatering is related to construction activity and cofferdams would be utilized.

Bank stabilization would be achieved through slope protection measures, as well as retaining wall installation in association with the roadway embankment. Erosion and sediment transport would be prevented using silt fencing, seeding, and/or topsoil stabilization matting of exposed soil slope surfaces. Roadway fill materials would be stabilized by asphalt paving of the road surfaces. Turbidity of the water column would be prevented by the use of temporary floating turbidity barriers. Excess soils would be properly disposed at an approved disposal site in accordance with all applicable regulatory requirements. Cofferdams/sheet piling would be installed prior to excavation of the soils and placement of the riprap to prevent entrainment of the excavated soils in the water column.

8.5 TEMPORARY TRAFFIC IMPACTS AND MITIGATION

Construction of the proposed project is not expected to significantly impact traffic conditions in the project area, since the same number of traveled lanes as existing will be maintained during peak hours.

Traffic control for the proposed project would require the reduction of lane widths, the elimination or narrowing of shoulders (see **Photograph 8.5-1**), and numerous shifts in traffic in order to construct the proposed improvements for all alternatives. In many instances, a live lane would be adjacent to a median barrier. The existing number of lanes would be maintained during peak periods. Lane closings would be allowed only at night and on weekends. Ramps would remain operational at all times with all lanes being open during peak periods. In some instances, traffic would need to be split around a construction zone. Temporary widenings would be required in many areas in order to maintain the existing number of lanes. Temporary connections would be required between new and existing pavement on both the ramps and the mainline. Each alternative would require numerous construction stages, therefore requiring numerous changes in traffic patterns.

Northbound Route 42/I-76 will remove the median island separating the local and express lanes early in construction. A median construction barrier would separate local and express traffic. The separation of the northbound local and express roadways will be eliminated under all alternatives. A temporary bridge would be required to carry the I-295 northbound to I-76 local ramp in the Route 42 median area. The I-76 northbound express lane merge from three to two lanes would take place farther to the south.

Photograph 8.5-1: Typical Shoulder Closure during Construction

It is expected that traffic would slow through the construction zone for each of the alternatives. However, any delays are not expected to divert a significant amount of traffic off the freeway onto the local roads (less than 25 vehicles per hour). Diversions to the local arterial system will be located and timed in such a manner as to minimize the chance of overwhelming any specific location.

The only exception is a temporary weaving condition on I-76 southbound (a.k.a. Route 42 southbound) that would exist after the closure of existing Ramp G and prior to the closure of existing Ramp C. Alternative K would not contain this weave condition. The weave condition would take place for Alternatives D, D1, G2, and H1 for the durations listed below:

- Alternative D—8 months;
- Alternative D1—18 months;
- Alternative G2—30 months; and
- Alternative H1—12 months.

It may be possible to shorten these durations with the addition of temporary pavement and use of a temporary bridge. Southbound through-traffic on I-295 and traffic from southbound I-295 to southbound Route 42 will share a three-lane, 900-foot section of roadway with traffic from southbound I-76 to southbound I-295. The travel demand model estimates some diversions of I-76 eastbound mainline traffic to southbound Route 130. An illustration of such diversions (for Alternative D) is shown in **Figure 5.1-5** for the year 2010. More traffic is expected to divert during the AM peak because I-295 southbound through-traffic is projected to be high. As southbound Route 130 is not congested in the morning, it is expected that this roadway should be able to absorb the added load.

PM peak period diversions in 2010 due to the temporary southbound weaving section are much more dispersed. Most roadways, with the exception of I-295 southbound, will generally not be impacted by this temporary weave condition. Average lengths of back-ups on I-295 southbound will be approximately seven miles long with the weave condition compared to four miles long without it. This longer back-up will add about 17 more minutes of travel time through the interchange.

On the local roads (Browning Road, Bell Road, and Creek Road) Bellmawr has requested that each roadway remain operational with one lane of traffic in each direction (see **Photograph 8.5-2**) with one sidewalk for pedestrians. At Browning Road, a temporary bridge is proposed to be constructed to the north of the existing structure. The temporary diversion road would run though a vacant portion of New St. Mary's Cemetery on the east and through the parking lot of the Annunciation B.V.M. Church and School to the west. The removal of the existing Browning Road Bridge must be done before substantial construction can begin for any of the alternatives along I-76/Route 42. The replacement Browning Road Bridge can only be completed in one of the later stages of construction for each of the alternatives. For these reasons, the temporary bridge would be in place for approximately three years.

Photograph 8.5-2: Operational Single Lane in Each Direction

The temporary diversion of Browning Road would impact 30 parking spaces of the Annunciation B.V.M. Church. A total of 36 temporary parking spaces would be constructed adjacent to the rear of the lot to offset the impacted spaces during construction. Circulation within the church parking lot would also be affected since the driveway closest to I-76 would be closed during the period when the temporary diversion road is in place. This would affect circulation of cars for church services as well as school drop-off and pick-up. The remaining entrance and exits would remain and ensure continued access; therefore, it is not anticipated that the closing of the one driveway would result in a significant impact.

Bell Road would be constructed in two stages. First, traffic would be shifted to the east and the westerly half of the existing bridge would be removed. The westerly portion of the new bridge would be constructed slightly wider to accommodate two lanes of traffic in the next stage and at a higher elevation to provide the necessary underclearance in the final condition. Traffic would then be shifted onto the newly constructed bridge to allow the remainder of the existing bridge to be removed, and the completion of the new bridge. The two-stage construction would take approximately 14 months, and would have minimal impact on local motorists and residents under all alternatives.

Creek Road would be replaced in a similar manner to Bell Road. Some impacts to motorists traveling westbound on Creek Road can be expected. Presently, there is a heavy left turn movement from westbound Creek Road onto Harding Avenue. Depending on the size and location of the left turning vehicle, vehicles wishing to go straight onto Creek Road can often squeeze by on the right. During construction, with narrower lane widths and bridge construction restraints, vehicles may not be able to squeeze by depending on how many cars are queued to make a left turn. A short left turn slot would be provided in both stages to help mitigate this "blocking" of vehicles wishing to go straight. Other mitigating measures to aid traffic flow, such as a temporary signal, would be considered during final design. Access to and from some driveways on the north side may be slightly more difficult during this second stage of construction as traffic is shifted closer to the driveways.

The construction durations of the alternatives would be as follows:

- Alternative D and D1—5 years;
- Alternative G2 and H1—6 years; and
- Alternative K—7 years.

Methods of accelerating construction would be investigated during the final design phase of the preferred alternative. In addition, measures would be taken to assist the motorist with traveling through the construction zone. Accelerated construction and motorist assistant measures that would be considered include:

- Proactive community outreach program that educates motorists about changed travel patterns through the use of the NJDOT website, highway advisory radios, variable message signs and public meetings.

- Proactive community outreach program that promotes a reduction of vehicles through the interchange through car pooling, park and ride locations, and staggered work hours.

- Temporary signing that clearly identifies lane shifts and merge/diverge locations.

- The use of pre-cast concrete elements and high-strength materials to expedite construction.

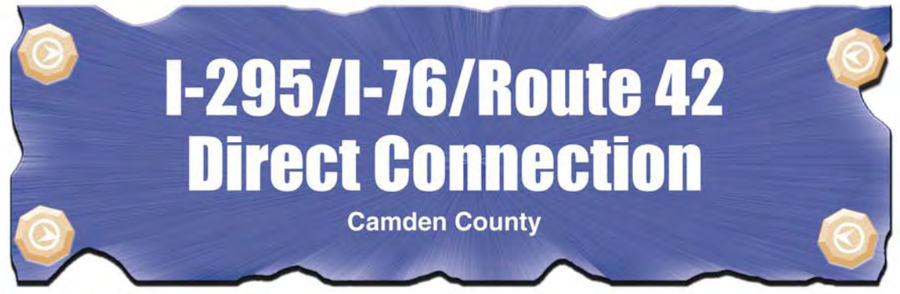
- Incentive/disincentive clauses for the contractor.

- Significant lane occupancy charges to the contractor to ensure all travel lanes are open in advance of the morning rush hour.

- Multiple work crews and shifts.

- Advance purchase/fabrication of structural components.

Detailed plans for maintenance and protection of traffic would be developed as part of the final design that would detail the construction phasing and temporary traffic controls for detours and closures. Public outreach programs would be developed to notify the public of proposed construction activities and associated traffic patterns and delays. The staging of construction activities would be coordinated with the local utilities to ensure that continuous services are provided during the relocation of utilities as required for the construction of the project. Health and safety plans would also be developed to ensure safe working conditions for construction workers, as well as the general public, and would detail procedures to be followed in the event that hazardous conditions or emergency situations occur at the construction site.



CHAPTER 9: ALTERNATIVES ANALYSIS

As discussed in earlier chapters, the proposed project will result in numerous impacts and benefits to the built, natural, and social environment in and around the interchange area both during, and following construction. In order to meet the proposed project's purpose and need, a comprehensive analysis of alternatives was conducted. As the development of alternatives is discussed in Chapter 4, this chapter summarizes the extensive planning that led to the recommendation of the Preferred Alternative.

9.1 SUMMARY OF FINDINGS, IMPACTS, AND BENEFITS

This section summarizes the findings, impacts, and benefits of the proposed project with respect to each alternative. The engineering and environmental summaries can be found in **Tables 9.1-1** and **9.1-2,** respectively.

9.1.1 No Build Alternative

Other than maintenance work within the existing right-of-way, this alternative proposes no changes to the existing interchange. For a depiction of the No Build Alternative, see **Figure 9.1-1**. Impacts to the project area have been evaluated in the same way as the build alternatives, with the assessment of current conditions projected to the design year (2030) serving as the impact assessment for the No Build Alternative. The No Build Alternative serves as the benchmark to measure the costs and benefits of each build alternative evaluated. Since there are no changes to the interchange under this alternative, there are very few impacts, other than those that are a result of the perpetuation of existing conditions.

The No Build Alternative does not meet the purpose and need of the proposed project and is therefore not a viable alternative. Accident rates and congestion would continue to increase without action. Local noise and dust impacts resulting from the routine maintenance operations and bridge deck replacements to the existing interchange may cause an inconvenience for less than a few months. Since any temporary construction impacts would be within the existing right-of-way, no encroachment onto adjacent properties would be required and no visible changes to the interchange would occur. The No Build Alternative assumes resurfacing operations would be performed at night and would involve lane closures and traffic diversions, as needed, over relatively short durations. Since no tunnel or significant viaduct would be constructed under the No Build Alternative, breaches to the security of the interchange would result in minor damage to existing facilities with a short recovery time for repair. No geometric improvements to the numerous substandard design elements, or the 35 mph posted speed, would be implemented through the year 2030. Mainline I-295 would not be accommodated with a direct connection and the northbound weave with Route 42 and the use of Al Jo's Curve for I-295 southbound would remain. Since the amount of structure would not increase, maintenance would be routine and no operation of stormwater pump stations or tunnel sections would be required.

Noise impacts to a total of 287 receptors would occur with the No Build Alternative, without any additional mitigation measures (e.g., noise walls) over what are presently in place. Of the 269 residential impacts, 250 would be unperceivable (< 3 dB), four are perceivable (3-7 dB), none are noticeable (> 7 dB), and 15 are anticipated impacts to approved, yet-to-be-constructed, residences.

CRITERIA	NO BUILD ALTERNATIVE	BUILD ALTERNATIVES				
		D	D1	G2	H1	K
Meets Purpose and Need	No	Yes	Yes	Yes	Yes	Yes
Temporary Construction Impacts						
Noise	Low	Medium	Medium	High	High	Medium
Dust	Low	Medium	Medium	Medium	Medium	Medium
Vibration	Low	Medium	Medium	Medium	Medium	Medium
Encroachment	None	High	High	Medium	Medium	High
Visual	None	Medium	Medium	High	High	Low
Overall Rating	Low	Medium	Medium	High	High	Medium
Maintenance and Protection of Traffic						
I-76 Southbound Diversion	0	8 Months	18 Months	30 Months	12 Months	0
Construction Duration	As Needed	64 Months	63 Months	70 Months	73 Months	88 Months
Overall Rating	Low	Medium	High	High	High	High
Security						
Mainline Tunnel	No	No	No	No	No	Yes
Significant Viaduct	No	No	No	Yes	Yes	No
Potential Impact to Multiple Facilities	Yes	Yes	Yes	Yes	Yes	Yes
Overall Rating	Low	Medium	Medium	High	High	High
Design Criteria (Substandard Elements)						
Substandard Design Elements	High	Low	Low	Low	Low	Low
Mainline Posted Speed	35 mph	55 mph	55 mph	55 mph	55 mph	55 mph
Ramp Posted Speed	35 mph	40 mph	40 mph	40 mph	40 mph	40 mph
Overall Rating	High	Low	Low	Low	Low	Low
Cost To Build	N/A	$608 million	$642 million	$833 million	$893 million	$822 million
Construction Duration	As Needed	64 Months	63 Months	70 Months	73 Months	88 Months
Maintenance and Operations						
Need to Operate and Maintain Stormwater Pump Stations	No	Yes	Yes	Yes	Yes	Yes
Amount of Structure To Maintain	Low	Medium	Medium	High	High	High
Tunnel Operations and Maintenance	No	No	No	No	No	Yes
Overall Rating	Low	Medium	Medium	High	High	High

Table 9.1-1: Summary of Engineering Impacts and Benefits

CRITERIA	NO BUILD ALTERNATIVE	BUILD ALTERNATIVES				
		D	D1	G2	H1	K
Noise						
Category B Residences	269	340	342	378	380	327
Category B Recreation	2	3	5	3	5	3
Category B Cemeteries	1	2	2	2	2	2
Category E Schools (interior)	2	3	3	3	3	3
Category E Churches (interior)	2	2	2	2	2	2
Category C Commercial/Industrial	11	11	11	15	15	10
Total Number of Impacts Without Mitigation	287	361	365	403	407	347
Walls to be Removed	0	4	4	4	4	4
Noise Wall Costs	0	$11.2 million	$11.5 million	$12.7 million	$13 million	$8 million
Mitigation for School Impacts (Air Conditioning)	0	2	2	3	3	2
Noise Impact Reduction	0	109	109	91	91	113

Table 9.1-2 (1 of 3): Summary of Environmental Findings, Impacts, and Benefits

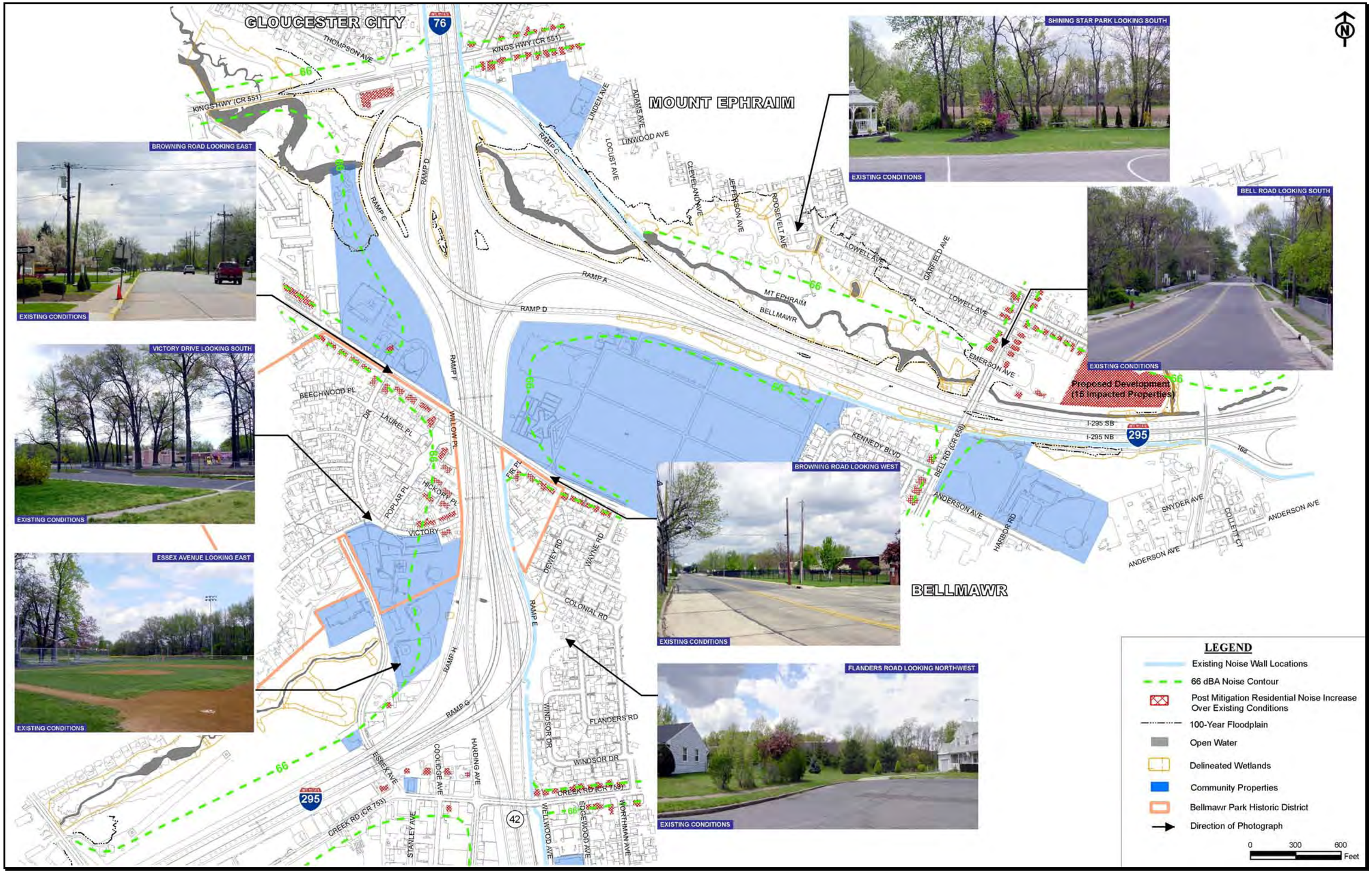


Figure 9.1-1: Alternatives Analysis – Environmental Impact Plans (No Build Alternative)

While the number of noise impacts to the Bellmawr Park Mutual Housing Historic District are higher than any of the build alternatives, these impacts would be unperceivable (< 3 dB). Due to the substandard stormwater drainage system, any ongoing impacts to surface water quality from the existing roadway and drainage system would continue. There would be no opportunities for public access to Little Timber Creek under the No Build Alternative.

9.1.2 Alternative D

For this alternative, the mainline I-295 would be accommodated with a direct connection and a 55 mph posted speed. For a depiction of Alternative D, see **Figure 9.1-2.** Interchange ramps would have a 40 mph posted speed. Some substandard elements would remain following construction, but would be limited to existing bridges and/or facilities at the limits of the project. The cost to build Alternative D would be $608 million. The amount of structure would increase over existing conditions requiring an increased need for maintenance and there would be a need to operate and maintain stormwater pump stations.

Temporary construction impacts, including easements, increased noise, dust, and vibrations, would inconvenience neighboring properties and cause visual impacts for several years. Existing noise walls may be removed for short durations during construction but will be replaced. During the 64-month construction duration, I-76 may have to be diverted for up to eight months. While a potential breach in security could cause significant facility damage and require an extended duration for repair, there would be no tunnel and no significant viaduct added to the interchange.

The purpose and need of the proposed project would be met by Alternative D. Following construction, without mitigation, Alternative D would cause noise impacts to 361 receptors. The noise walls proposed to mitigate these impacts would cost $11.2 million. Following mitigation, 155 residential impacts would remain. Of these post mitigation impacts, 135 are unperceivable, 15 are perceivable, none are noticeable, and five are anticipated impacts to approved, yet-to-be-constructed, residences. The viewshed would be changed by a single level being added above the existing interchange. However, the view would still be recognizable despite the additional, 49-foot-tall infrastructure. Right-of-way and permanent easement acquisitions would total 11.97 acres. This alternative would cause impacts to the floodplain and wetlands/open waters at 2.28 and 1.97, respectively. It would create a total impervious coverage of 61 acres. In addition, wild rice habitat could be increased, waterfront access would be available, and the opportunity for on-site mitigation would be 100% with the removal of Al Jo's Curve. For a depiction of the altered viewshed, refer to **Photograph 9.1-1**.

The demolition/relocation of five residential buildings (12 dwelling units) in the Bellmawr Park Mutual Housing Historic District would result in an adverse effect to this resource. Following mitigation, no residences in the historic district would experience perceivable noise increases over existing conditions.

CRITERIA	NO BUILD ALTERNATIVE	BUILD ALTERNATIVES				
		D	D1	G2	H1	K
Post Mitigation Residential Noise Increase over Existing Conditions						
Less than 3 dBA (Not Perceivable)	250	135	125	150	140	133
Greater than 3 dBA but less than 7 dBA (Perceivable)	4	15	26	35	46	7
Greater than 7 dBA (Noticeable)	0	0	0	12	12	0
Approved Additional Residential Units (not present under existing conditions)	15	5	5	18	18	5
Total Number of Remaining Noise Impacts	269	155	156	215	216	145
Air Quality	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Socioeconomics						
Visual Impacts						
Number of additional levels in interchange	0	1	1	2	2	1
Height of structure including noise walls	0	49 feet	49 feet	78 feet	78 feet	55 feet
Economic Benefits						
Regional Accessibility						
Travel Time Savings-Car (dollars saved)	0	$26 million	$26 million	$26 million	$26 million	$26 million
Travel Time Savings-Truck (dollars saved)	0	$13 million	$13 million	$13 million	$13 million	$13 million
Total Travel Time Savings through the Interchange (dollars saved)	0	$39 million	$39 million	$39 million	$39 million	$39 million
Cost Benefit from Reduction in Accidents (annual dollars saved)	0	$11 million	$11 million	$11 million	$11 million	$11 million
Community Impacts						
Minority Population	No Change	No Impact	No Impact	No Impact	No Impact	No Impact
Senior Citizen	No Change	No Impact	No Impact	No Impact	No Impact	No Impact
Disabled	No Change	No Significant Impact	No Significant Impact	No Significant Impact	No Significant Impact	No Significant Impact
Linguistically Isolated Population	No Change	No Impact	No Impact	No Impact	No Impact	No Impact
Female Head of Household	No Change	No Impact	No Impact	No Impact	No Impact	No Impact
Transit Dependent	Negative Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Low Income	No Change	No Significant Impact	No Significant Impact	No Significant Impact	No Significant Impact	No Significant Impact
Land Use and Zoning	No Change	No Impact	No Impact	No Impact	No Impact	No Impact
Total Acquisition Including Right-of-Way and Permanent Easements	None	11.97 acres	14.40 acres	12.88 acres	9.46 acres	11.91 acres
Bellmawr						
Proposed Right-of-Way Acquisitions	0	10.50 acres	12.99 acres	11.41 acres	8.02 acres	10.54 acres
Permanent Easements	0	1.18 acres	1.11 acres	1.18 acres	1.14 acres	1.07 acres
Temporary Easements	None	2.18 acres	2.12 acres	2.11 acres	1.93 acres	1.95 acres
Residences Acquired	0	13	13	5	5	13
Businesses Relocated	0	1	1	0	0	1
Community Facilities Impacted - number of sites	0	5	5	5	5	5
Community Facilities Impacted- (Acquisition and Permanent Easement)	None	8.61 acres	11.03 acres	7.67 acres	10.10 acres	8.62 acres
Bellmawr Baseball League	None	0.86 acres	0.86 acres	0.30 acres	0.30 acres	0.88 acres
Bellmawr Park Elementary School (4(f))	None	0.70 acres	0.70 acres	0.32 acres	0.32 acres	0.70 acres
New St. Mary's Cemetery	None	6.26 acres	6.26 acres	6.26 acres	6.26 acres	6.26 acres
Annunciation B.V.M. Church and Regional School	None	0.72 acres	3.15 acres	0.72 acres	3.15 acres	0.72 acres
Resurrection of Christ Cemetery	None	0.07 acres	0.07 acres	0.07 acres	0.07 acres	0.07 acres
Community Facilities - Impact on services provided	No Impact	No impact	No impact	No impact	No impact	No impact
Public Access to Little Timber Creek	No	Yes	No	Yes	No	Yes
Mount Ephraim						
Proposed Right-of-Way Acquisitions (in acres)	0	0.03 acres	0.03 acres	0.03 acres	0.03 acres	0.03 acres
Permanent Easements (in acres)	0	0.22 acres	0.22 acres	0.22 acres	0.22 acres	0.22 acres
Temporary Easements (in acres)	0	0.11 acres	0.11 acres	0.11 acres	0.1 acres 1	0.11 acres

Table 9.1-2 (2 of 3): Summary of Environmental Findings, Impacts, and Benefits

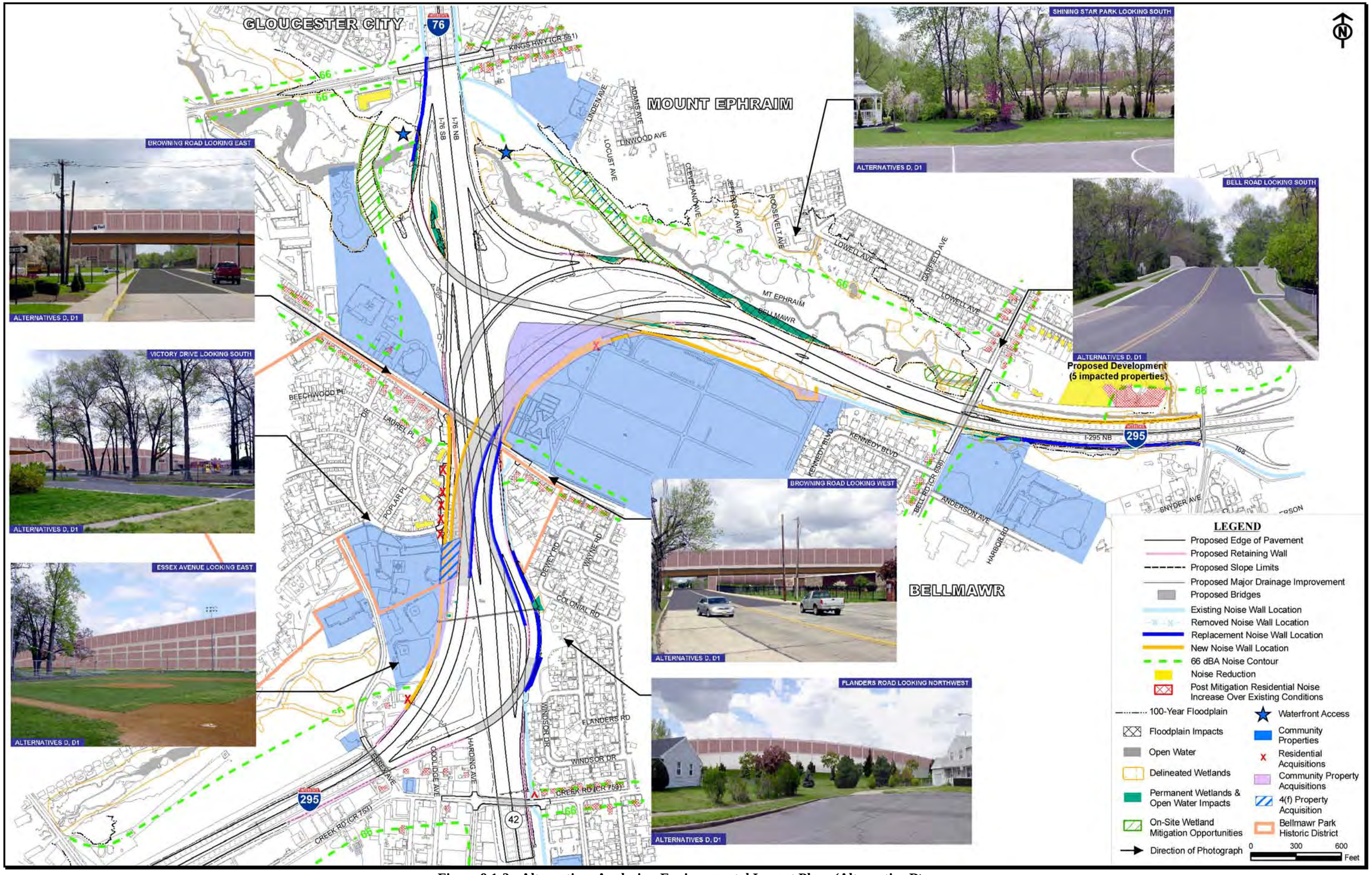


Figure 9.1-2: Alternatives Analysis – Environmental Impact Plans (Alternative D)

Photograph 9.1-1: Essex Avenue Looking East, Alternatives D and D1

It is not anticipated that the proposed project would result in any impacts to air quality, archaeological resources, or hazardous materials.

9.1.3 Alternative D1

If this alternative were recommended to be built, mainline I-295 would be accommodated with a direct connection and a 55 mph posted speed. For a depiction of Alternative D1, see **Figure 9.1-3**

Interchange ramps would have a 40 mph posted speed. Some substandard elements would remain following construction, but would be limited to existing bridges and/or facilities at the limits of the project. The cost to build Alternative D1 would be $642 million. The amount of structure would increase over existing conditions requiring an increased need for maintenance and there would be a need to operate and maintain stormwater pump stations.

Alternative D1 meets the purpose and need of the proposed project. Temporary construction impacts, including easements, increased noise, dust, and vibrations, would inconvenience neighboring properties and cause visual impacts for several years. Existing noise walls may be removed for short durations during construction but will be replaced. During the 63-month construction duration, I-76 may have to be diverted for up to 18 months. While a potential breach in security could cause significant facility damage and require an extended duration for repair, there would be no tunnel and no significant viaduct added to the interchange.

The viewshed would be changed by a single level being added above the existing interchange. However, the view would still be recognizable despite the additional, 49-foot-tall infrastructure. (see **Photograph 9.1-2**). Total acquisitions including right-of-way and permanent easements would be 14.40 acres with this alternative.

CRITERIA	NO BUILD ALTERNATIVE	BUILD ALTERNATIVES				
		D	D1	G2	H1	K
Gloucester City						
Proposed Right-of-Way Acquisitions (in acres)	0	0	0	0	0	0
Permanent Easements (in acres)	0	0.05 acres	0.05 acres	0.05 acres	0.05 acres	0.05 acres
Temporary Easements (in acres)	0	0	0	0	0	0
Natural Ecosystems						
Total Wetland & SOW Permanent Impacts	None	1.97 acres	3.73 acres	0.95 acres	3.15 acres	2.90 acres
State Open Water	None	0.06 acres	0.10 acres	0.06 acres	0.22 acres	0.06 acres
Tidal Wetlands	None	0.64 acres	2.14 acres	0.04 acres	1.53 acres	1.44 acres
Non-Tidal Wetlands	None	1.28 acres	1.49 acres	0.86 acres	1.40 acres	1.40 acres
Stream Ecology Impacts	No Impact	Minimal Impact	Minimal Impact	Minimal Impact	Minimal Impact	Minimal Impact
Stormwater Management (acres of total impervious coverage)	42 acres **	61 acres	65 acres	64 acres	67 acres *	67 acres
Requires Relocation of Little Timber Creek Channel	No	No	No	No	Yes	No
Floodplain	No Impact	2.28 Ac	4.45 Ac	0.90 Ac	4.26 Ac	3.04 Ac
Freshwater Wetland Buffer Impacts	None	3.59 Ac	4.20 Ac	2.48 Ac	4.67 Ac	3.35 Ac
On-Site Wetland Mitigation Opportunities	0	100%	10%	100%	12%	93%
Opportunity to Increase Wild Rice (Wildlife Food Source) Habitat	No	Yes	No	Yes	No	Yes
Surface Water Quality	Negative Impact	Improved Storm Water Quality	Improved Storm Water Quality	Improved Storm Water Quality	Improved Storm Water Quality	Improved Storm Water Quality
Waterfront Access	No	Yes	No	Yes	No	Yes
Upland Vegetation Impacts	None	19.04 Ac	20.92 Ac	20.57 Ac	21.95 Ac	21.43 Ac
Geology Impacts	None	Minimal Impact	Minimal Impact	Minimal Impact	Minimal Impact	Minimal Impact
Soils Impacts	None	Minimal Impact	Minimal Impact	Minimal Impact	Minimal Impact	Minimal Impact
Groundwater Flow / Quality Impacts	None	Minimal Impact	Minimal Impact	Minimal Impact	Minimal Impact	Minimal Impact
Archaeological Resources	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Historic Architectural Resources						
Physical Destruction of Resource in Acres (% of total acreage)	No Impact	2.11 Ac (8.87%)	2.11 Ac (8.87%)	1.05 Ac (4.4%)	1.05 Ac (4.4%)	2.20 Ac (9.27%)
Demolition/Relocation of Contributing Resources	5 buildings; 12 dwelling units	5 buildings; 12 dwelling units	1 building; 4 dwelling units	1 building; 4 dwelling units	5 buildings;12 dwelling units	No Impact
Noise Impact Reduction to Historic District	14	14	14	14	18	0
Post Mitigation Residential Noise Increase over Existing Conditions						
Less than 3 dBA (Not Perceivable)	16	16	18	18	12	23
Greater than 3 dBA but less than 7 dBA (Perceivable)	0	0	1	1	0	0
Greater than 7 dBA (Noticeable)	0	0	0	0	0	0
Total Number of Remaining Noise Impacts to Historic District	16	16	19	19	12	23
Impact to Viewshed	Moderate	Moderate	High	High	Low	No Impact
Hazardous Waste						
Areas of Concern Impacted	3	3	2	2	3	1
Area of Ramp C at I-295, MP 27	Yes	Yes	Yes	Yes	Yes	No
New St. Mary's Cemetery	Yes	Yes	Yes	Yes	Yes	No
Bill Sea's Towing	Yes	Yes	No	No	Yes	No
Number of Buildings on AOCs to be Demolished (LBP/ACM issues)	4	4	2	2	4	0
Number of Residential Buildings to be Demolished (LBP/ACM issues)	6	6	2	2	6	0
Acreage of Potentially Contaminated Soil Impacted (Maintenance Areas)	0.35 Ac.	0.35 Ac.	0.30 Ac.	0.30 Ac.	0.35 Ac.	0.00
Roadway Spill Area Impacted	Yes	Yes	Yes	Yes	Yes	Yes
Aboveground Storage Tanks to be Removed	1	1	1	1	1	0
Underground Storage Tanks to be Removed	1	1	1	1	1	0

NOTES: *Italicized* impacts are distinguishing characteristics.
* Includes channel realignment/relocation.
** Does not provide for stormwater treatment.

Table 9.1-2 (3 of 3): Summary of Environmental Findings, Impacts, and Benefits

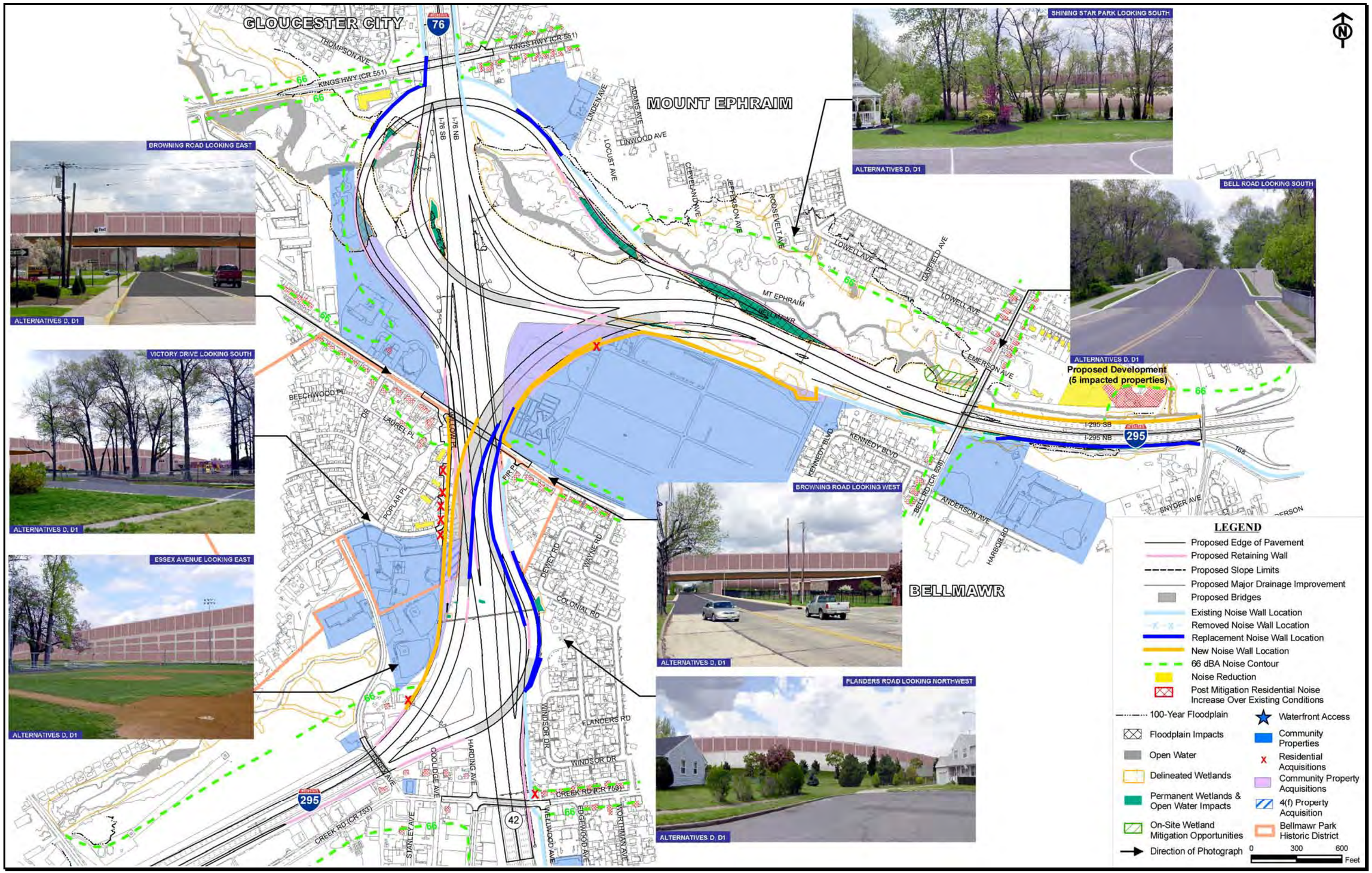


Figure 9.1-3: Alternatives Analysis – Environmental Impact Plans (Alternative D1)

Photograph 9.1-2: Browning Road Looking West, Alternative D1

Alternative D1 would cause impacts to the floodplain and wetlands/open waters at 4.45 and 3.73 acres, respectively. A total of 4.20 acres of freshwater wetland buffer and 20.92 acres of upland vegetation would be impacted. Since this alternative calls for the reuse of Al Jo's Curve, it does not provide waterfront access to the public or opportunities to increase wild rice habitat. In addition, it would provide the smallest opportunity for on-site wetlands mitigation at only 10% of the total required. The total impervious coverage resulting from Alternative D1 would be 65 acres.

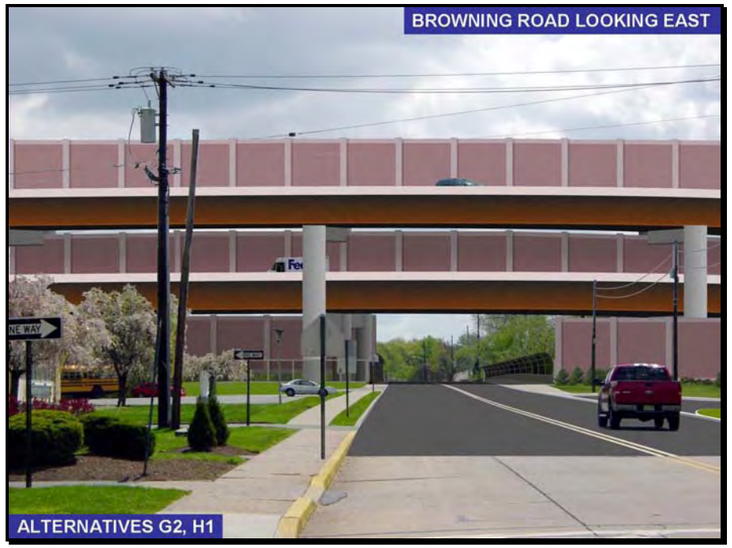
As part of the acquisitions, five residential buildings (12 dwellings) in the Bellmawr Park Mutual Housing Historic District would require demolition/relocation and would result in an adverse effect to this resource. Following mitigation, no residences in the historic district would experience perceivable noise increases over existing conditions.

It is not anticipated that the proposed project would result in any impacts to air quality, archaeological resources, or hazardous materials.

9.1.4 Alternative G2

If this alternative were recommended to be built, mainline I-295 would be accommodated with a direct connection and a 55 mph posted speed. For a depiction of Alternative G2, see **Figure 9.1-4.** Interchange ramps would have a 40 mph posted speed. Some substandard elements would remain following construction, but would be limited to existing bridges and/or facilities at the limits of the project. The cost to build Alternative G2 would be $833 million. This alternative's viaduct would result in the amount of structure increasing significantly over existing conditions requiring an equally increased need for maintenance. In addition, there would be a need to operate and maintain stormwater pump stations.

Alternative G2 meets the purpose and need of the proposed project. During construction, there would be considerable noise and visual impacts to surrounding properties for several years. Easements, dust, and vibrations, would also inconvenience neighboring properties for several years. Existing noise walls may be removed for short durations during construction but will be replaced. During the 70-month construction duration, I-76 may have to be diverted for up to 30 months. Due to the addition of a significant viaduct to the interchange, a potential breach in security could cause multiple



Photograph 9.1-3: Browning Road Looking East, Alternative G2

extreme failures of facilities with an extended duration needed for repair. No mainline tunnel would be constructed under Alternative G2.

Following construction, without mitigation, 403 receptors would incur noise impacts. The noise walls proposed to mitigate these impacts would cost $12.7 million. For a depiction of proposed noise walls, refer to **Photograph 9.1-3.** Following mitigation, 215 residential impacts would remain. Of these post mitigation impacts, 150 are unperceivable, 35 perceivable, 12 noticeable, and 18 are anticipated impacts to approved, yet-to-be-constructed, residences. The field of view of the local community would be dominated by two new, massive (78-foot high), intrusive highway overpass structures and 9.46 acres of right-of-way and permanent easement acquisitions would be required.

Alternative G2 would cause floodplain and wetlands/waters impacts of 0.90 and 0.95 acres, respectively. This alternative would also provide waterfront access to the public, opportunities to increase wild rice habitat, and 100% on-site wetland mitigation with the removal of Al Jo's Curve. In addition, 2.48 acres of freshwater wetland buffer and 20.57 acres of upland vegetation would be impacted. The total impervious coverage resulting from Alternative G2 would be 64 acres.

One residential building (four dwelling units) in the Bellmawr Park Mutual Housing Historic District would require demolition/relocation and would result in an adverse effect to this resource. Following mitigation, one residence in the historic district would experience perceivable noise increases over existing conditions. In addition, the historic district's field of view would be intruded upon by the two new highway overpass structures.

It is not anticipated that the proposed project would result in any impacts to air quality, archaeological resources, or hazardous materials.

9.1.5 Alternative H1

If this alternative were recommended to be built, mainline I-295 would be accommodated with a direct connection and a 55 mph posted speed. For a depiction of Alternative H1, see **Figure 9.1-5.** Interchange ramps would have a 40 mph posted speed. Some substandard elements would remain following construction, but would be limited to existing bridges and/or facilities at the limits of the project. The cost to build Alternative H1 would be $893 million. This alternative's viaduct would result in the amount of structure increasing significantly over existing conditions requiring an increased need for maintenance and operation of stormwater pump stations.

Photograph 9.1-4: Victory Drive Looking South, Alternative H1

Alternative H1 meets the purpose and need of the proposed project. During construction, there would be considerable noise and visual impacts to surrounding properties for several years. Easements, dust, and vibrations would also inconvenience neighboring properties for several years. Existing noise walls may be removed for short durations during construction, but will be replaced. During the 73-month construction duration, I-76 may have to be diverted for up to 12 months. Due to the addition of a significant viaduct to the interchange, a potential breach in security could cause multiple extreme failures of facilities with an extended duration needed for repair. No mainline tunnel would be constructed under Alternative H1. With respect to noise impacts following construction, 407 receptors would be impacted by Alternative H1 if no noise mitigation measures were implemented. The cost to build the proposed noise walls is $13.0 million. For a depiction of proposed noise walls, refer to **Photograph 9.1-4**. Following mitigation, 216 residential impacts would remain. The post mitigation residential noise increase over existing conditions is. Of these impacts, 140 are unperceivable, 46 are perceivable, 12 are noticeable, and 18 are anticipated impacts to approved, yet-to-be-constructed, residences.

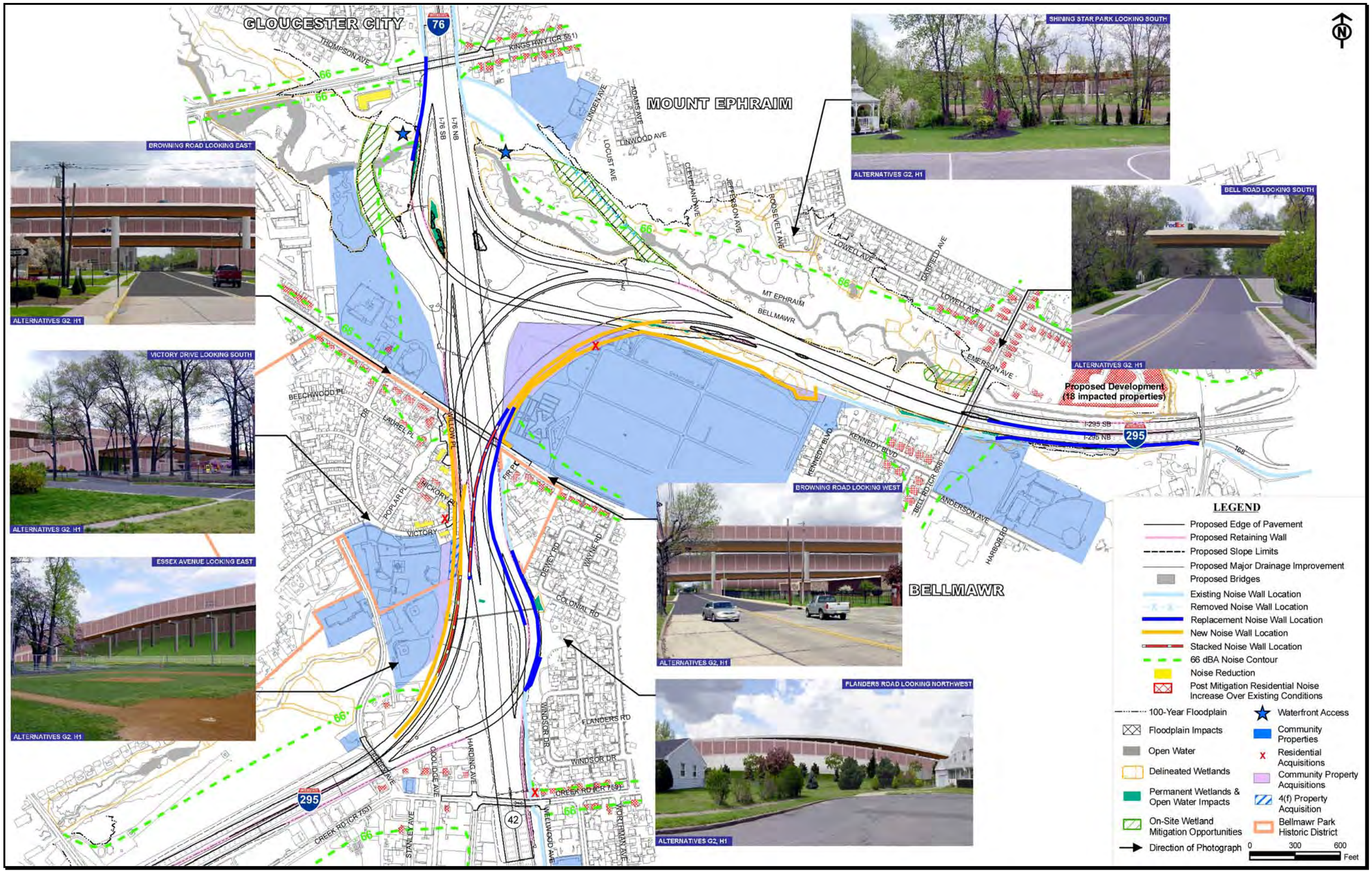


Figure 9.1-4: Alternatives Analysis – Environmental Impact Plans (Alternative G2)

The field of view of the local community would be dominated by two new, massive (78-foot high), intrusive highway overpass structures and 11.91 acres of right-of-way and permanent easement acquisitions would be required. This alternative would cause impacts to the floodplain and wetlands/open waters of 4.26 and 3.15 acres, respectively. This is due in large part to approximately 250 feet of the Little Timber Creek channel being relocated. Alternative H1 is the only alternative that requires channel relocation. In addition, there would be no opportunity for waterfront access, no opportunity to increase wild rice habitat, and only 12% of the required wetland mitigation would be possible on-site. The impact to freshwater wetland buffers is 4.67 acres and 21.95 acres of upland vegetation would be impacted by Alternative H1. This alternative would result in a total impervious coverage of 67 acres.

One residential building (four dwelling units) in the Bellmawr Park Mutual Housing Historic District would require demolition/relocation and would result in an adverse effect to this resource. Following mitigation, one residence in the historic district would experience perceivable noise increases over existing conditions. In addition, the historic district's field of view would be intruded upon by the two new highway overpass structures.

It is not anticipated that the proposed project would result in any impacts to air quality, archaeological resources, or hazardous materials.

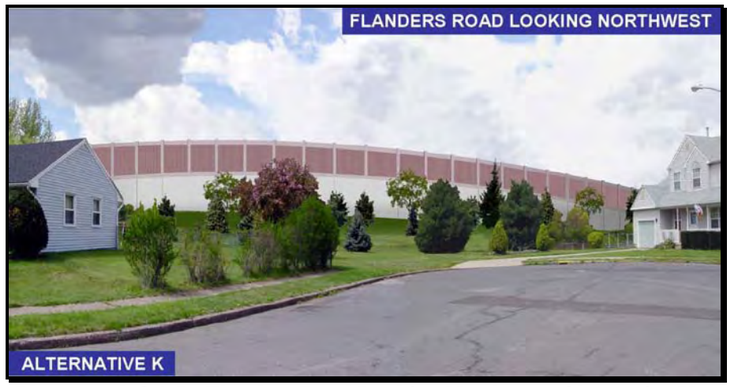
9.1.6 Alternative K

If this alternative were recommended to be built, mainline I-295 would be accommodated with a direct connection and a 55 mph posted speed. For a depiction of Alternative K, see **Figure 9.1-6.** Interchange ramps would have a 40 mph posted speed. Some substandard elements would remain following construction, but would be limited to existing bridges and/or facilities at the limits of the project. The cost to build Alternative K would be $822 million. This alternative's mainline tunnel would result in the amount of structure increasing significantly over existing conditions requiring an increased need for maintenance and operation of stormwater pump stations.

Alternative K meets the purpose and need of the proposed project. During construction, there would be considerable encroachment upon surrounding properties for several years. Impacts from noise, dust, and vibrations would inconvenience neighboring properties for several years. Visual impacts under this alternative would last less than a few months. Existing noise walls may be removed for short durations during construction, but will be replaced. During the 88-month construction duration, an I-76 southbound diversion would not be required. Due to the addition of a mainline tunnel to the interchange, a potential breach in security could cause multiple extreme failures of facilities with an extended duration needed for repair. No significant viaduct would be constructed under Alternative K.

This alternative would cause noise impacts to 347 receptors without mitigation through the use of a mainline tunnel. The cost to build the noise walls is $8.0 million. Following mitigation, 145 residential impacts would remain. Of these post mitigation impacts, 133 are unperceivable, seven are perceivable, none are noticeable, and five are anticipated impacts to approved, yet-to-be-constructed, residences. For a depiction of proposed noise walls, refer to **Photograph 9.1-5**.

The viewshed would be changed by a single level being added above the existing interchange. However, this additional 55-foot tall infrastructure improvement would result in a limited visual intrusion. Right-of-way and permanent easement acquisitions would total 12.88 acres. The impacts to the floodplain and wetlands/open waters for this alternative would be 3.04 and 2.90 acres, respectively. While Alternative K does provide for waterfront access and opportunities to increase wild rice habitat, only 93% of the wetland mitigation is possible on-site. A total of 3.35 acres of freshwater wetland buffer and 21.43 acres of upland vegetation would be impacted. The total impervious coverage resulting from Alternative K would be 67 acres.



Photograph 9.1-5: Flanders Road Looking Northwest, Alternative K

The demolition/relocation of five residential buildings (12 dwelling units) in the Bellmawr Park Mutual Housing Historic District would result in an adverse effect to this resource. Following mitigation, no residences in the historic district would experience perceivable noise increases over existing conditions.

It is not anticipated that the proposed project would result in any impacts to air quality, archaeological resources, or hazardous materials.

9.2 ALTERNATIVES ANALYSIS PROCESS

Whereas the Alternatives Screenings Process discussed in Chapter 4 identified the five build alternatives to be advanced for further study, the Alternatives Analysis process examined the ability of each alternative to meet the purpose and need of the proposed project while still taking practicable measures to avoid, minimize, and mitigate potential impacts to the built, natural, and social environment. This process involved the development and evaluation of specific impact criteria that were essential to the decision-making process. The following sections discuss this evaluation and the overall Alternatives Analysis process which ultimately led to the identification of the Preferred Alternative.

9.2.1 Development of Impact Criteria

The Alternatives Analysis process focused on those impact criteria that exhibited distinguishing characteristics between alternatives (e.g., where alternatives differ in regard to types and degrees of effects). Careful consideration of these distinguishing characteristics defined the choices and tradeoffs between alternatives. **Tables 9.2-1** and **9.2-2** summarize the impact criteria and metrics used to evaluate each alternative, while the technical background for the impact criteria is described below.

In order to evaluate the environmental criteria in a spatial context, graphic representations of potential impacts by alternative were developed (see **Figures 9.1-1** through **9.1-6**). Each graphic illustrates future conditions for the specified alternative. The impacts and benefits can be seen in a holistic manner so that tradeoffs are easily identified.

Since the impact criteria provide the basis for rating the alternatives and ultimately for decision making, it was important to reach agreement on the criteria and measurements before ratings were finalized. A series of workshops and stakeholder meetings were conducted in June 2006 with the objective of defining the engineering and environmental criteria. An information packet was distributed to stakeholders two weeks prior to these meetings to prepare them for discussion and to solicit their input. This information included the engineering and environmental criteria. The impact criteria definitions and associated metrics were refined to reflect input from the NJDOT Core Group, LOB, CAC, and ACM.

For example, during the CAC meeting, it was noted that besides noise impacts, there would also be noise reductions due to different road alignments and the construction of new noise walls, something not captured in the original criteria. After some discussion, a new criterion for noise reduction was agreed upon and added for consideration. Similarly, the Project Cost as reflected in the original Findings Summary was revised to "Cost to Build" in order to include design, inspection and right-of-way costs for a more comprehensive cost comparison based on ACM participants' comments. In addition, stormwater concerns were addressed by adding a criterion for impervious coverage.

9.2.1.1 Engineering Impact Criteria

Meets Purpose and Need

The purpose of this project is to improve traffic safety, reduce traffic congestion and meet driver expectations by improving the direct connection of the I-295 mainline and the interchange of I-295/I-76/Route 42. All of the build alternatives meet the purpose and need, while the No Build Alternative does not.

Temporary Construction Impacts

Temporary construction impacts include increased noise, dust, vibrations, encroachment and inconvenience to residents during construction. Local residents and community facilities will be impacted due to construction activities taking place that will increase noise levels, create dust, cause

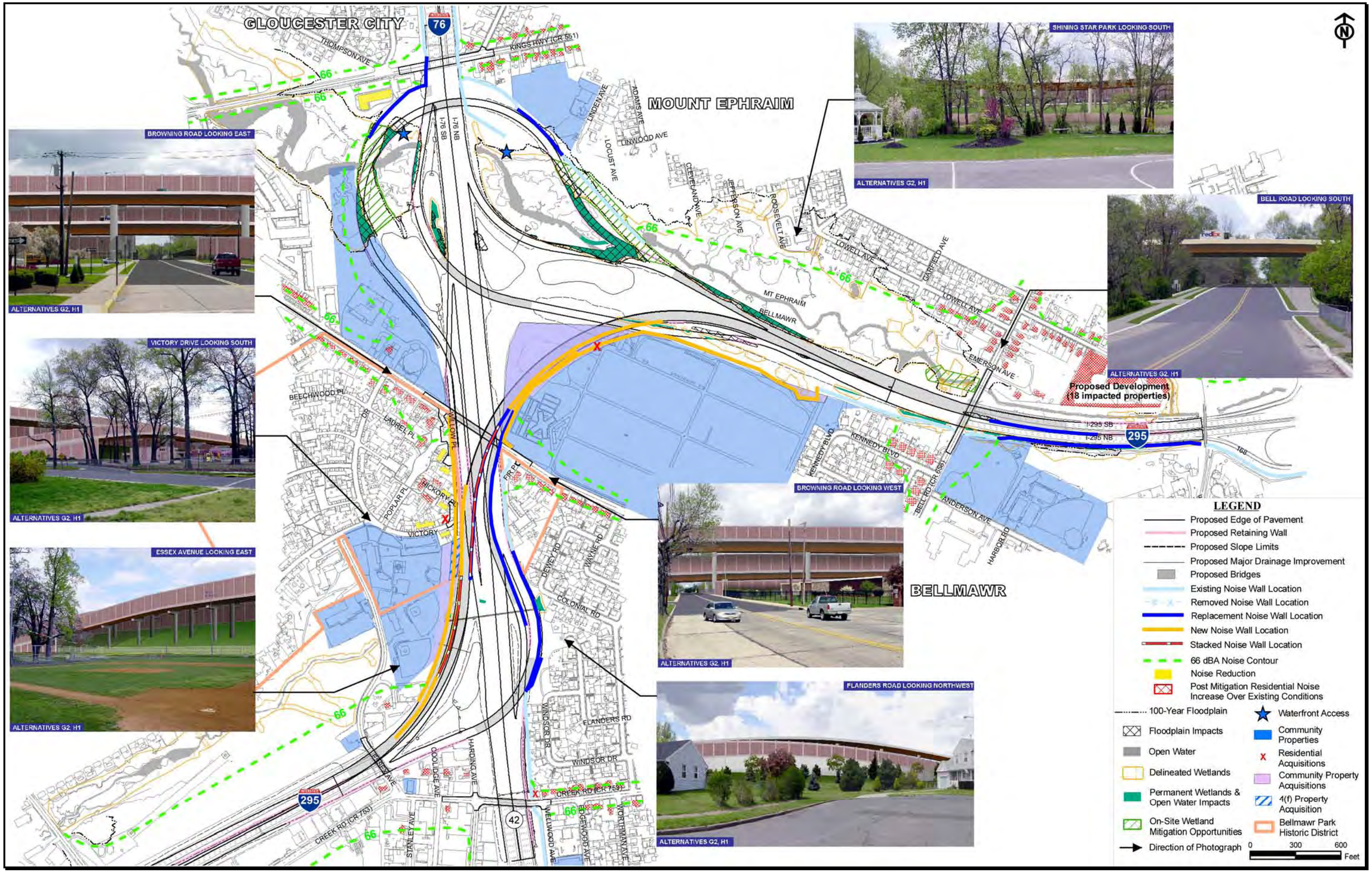


Figure 9.1-5: Alternatives Analysis – Environmental Impact Plans (Alternative H1)

vibration, encroach upon their properties through temporary easements and cause visual impacts. Existing noise walls may have to be removed for short durations while new ones are constructed. Revised access into some homes (Willow Place and/or Hickory Place) homes will be required. Construction activities are required on lands and community facilities (New St. Mary's Cemetery, the Annunciation B.V.M. Church, Bellmawr Elementary School and the Bellmawr Baseball fields). The No Build Alternative assumes all maintenance work will be performed within the existing right-of-way, require no new excavation or structures, and be of significantly shorter duration than any of the build alternatives.

Maintenance and Protection of Traffic

A preliminary maintenance and protection of traffic (MPT) scheme has been developed for each alternative. Each alternative will require reduction of lane widths, the elimination or narrowing of shoulders, numerous traffic shifts, a temporary bypass roadway on Browning Road which impacts parking at the Annunciation B.V.M. Church, and staging of the other local road bridges. It can be expected that traffic will slow through the construction zone for each alternative; however, the delays will not divert a significant amount of traffic off the freeway onto local roads (less than 50 VPH). However, when the existing I-76 southbound to I-295 southbound ramp is closed, a weave condition will exist on the new Ramp F which will also be carrying I-295 southbound and I-295 southbound to Route 42 southbound traffic. The overall construction schedule is also a governing factor. The No Build Alternative assumes resurfacing operations will be performed at night, over relatively short durations, with multiple lane closures and only minimal disruption to traffic. In addition, it assumes at least one lane of traffic will be maintained on the two lane ramps during bridge deck reconstruction which will cause traffic diversions onto local roads for short durations.

Security

With homeland security issues being much more significant over the last five years, the security of each of the alternatives has been evaluated. Incidents which can impact multiple facilities are of greatest concern. There is also concern for alternatives that are elevated and are in close proximity to residential properties and/or community facilities. Types of preventative measures (such as hardening) will be considered for each of the build alternatives. The No Build Alternative assumes no preventive measures will take place on existing facilities.

Design Criteria (Substandard Elements)

Each alternative has been designed for compliance with applicable design standards (NJDOT-Design Manual and AASHTO 2001 – A Policy on Geometric Design of Highways and Streets). The number of substandard design elements have been identified, as well as items in the design that may not be standard (i.e., shoulder transition, shoulder width greater than 12 feet, no superelevation on local roads, acceleration lane length per AASHTO), but do not require design exceptions. The No Build Alternative assumes there will be no geometric improvements to the interchange through the Year 2030.

Cost to Build

Costs to build were developed for each alternative based upon a review of 2005 bid prices for projects in New Jersey, bid prices of recent large transportation projects in New Jersey, and input from contractors and suppliers, along with other recognized sources, to develop unit prices for non-standard items. Prices were then adjusted to reflect construction staging, difficulty of construction, night-time work, etc. Tunnel and depressed road section costs were compared to actual costs from the Boston Artery Tunnel project, and adjusted accordingly. Costs to build include contingencies of 15% to 20%, depending upon the construction operations. Costs to build were then escalated to the anticipated construction midpoint, but were capped at 20% maximum. These costs assume there will be no natural disasters or other unexpected events which will drastically alter material and/or labor costs. An allowance for construction change orders was calculated. Design and Construction Engineering costs have both been assumed to be 10% of the cost to build. Cost to Build also includes costs for design, construction inspection and right-of-way acquisitions.

Construction Duration

Construction durations were developed for each alternative based on preliminary MPT schemes. Durations of large complex items (bridges, walls, tunnel, stormwater pump stations, etc.) were estimated to develop a critical path schedule. Opportunities for acceleration and the split into various construction contracts will be investigated once an alternative is selected. The No Build Alternative would have no construction duration.

Maintenance and Operations

This includes routine maintenance (i.e., bridge/structural inspections, replacing damaged guide rails, replacing luminaries and cleaning drainage facilities) to more significant maintenance work, such as replacement of bridge decks and resurfacing. Operation costs include electrical costs for lighting, Intelligence Transport System (ITS) facilities, stormwater pump stations, special police and fire training by the local municipality, etc. Evaluation factors include the following over the life-cycle of the project:

- Need to operate and maintain stormwater pump stations.
- Amount of major rehabilitation work (i.e., redecking) on bridges.
- Amount of structure (bridges and walls) to be maintained.
- Maintenance and operation associated with the tunnel interior, drainage system, electrical system, ventilation system, lighting system, and control system.

The No Build Alternative assumes the replacement of all bridge decks, the cleaning and painting of structural steel and the resurfacing of all roadways and ramps every 10 years, as well as the routine maintenance and operations associated with the existing roadway facility.

9.2.1.2 Environmental Impact Criteria

Noise

Noise impacts were predicted for the Year 2000 existing conditions, as well as future 2030 No Build and build conditions (all alternatives). New and replacement noise walls were designed to mitigate Category B (exterior)

CRITERIA	METRICS
Meets Purpose and Need	The metric is yes or no.
Temporary Construction Impacts	**Low:** Impacts caused by routine maintenance and potential upgrades which will result in local noise, dust and inconvenience of short duration (less than a few months).
	Medium: Noise, dust, vibration and/or visual impacts and inconvenience to neighboring properties for several years.
	High: Considerable noise, dust, vibrations, visible impacts, inconvenience to neighboring properties for several years.
Maintenance and Protection of Traffic	**Low:** Minimal traffic is diverted off the mainline due to construction.
	Medium: Traffic diversions off the mainline due to the southbound weave are 12 months or less and/or overall construction duration is less than 6 years.
	High: Traffic diversion off the mainline due to the southbound weave is greater than 12 months and/or overall construction duration is 6 years or more.
Security	**Low:** Potential breach of security results in minor facility damage with a short recovery time for repair.
	Medium: Potential breach of security results in significant facility damage with an extended duration for repair.
	High: Potential breach in security results in multiple extreme failures of facilities with an extended duration for repair.
Design Criteria (Substandard Elements)	**Low:** Mainline I-295 is accommodated with a direct connection with 55 mph posted speed, and interchange ramps are designed for a 40 mph posted speed. The substandard design elements are primarily limited to existing bridges and/or facilities at the limits of the project (i.e., Market Street, railroad bridge).
	Medium: Some geometric improvements are made to the interchange with some increase in posted speeds; however, there are still a number of substandard design exceptions or other substandard conditions throughout the project limits.
	High: Mainline I-295 is not accommodated with a direct connection and the northbound weave with Route 42 and the use of Al Jo's Curve for I-295 southbound still exist. There are no changes in posted speed. Numerous substandard design elements and conditions are present for the roadway, ramps, and bridges within the interchange, as well as for bridges or facilities at the limits of the project.
Cost to Build	The metric is the estimated Cost to Build.
Construction Duration	The metric for construction duration is the estimated duration of the project.
Maintenance and Operations	**Low:** Amount of structure has not increased and structure maintenance is routine. Operations of stormwater pump stations and tunnel sections are not required.
	Medium: Amount of structure has increased or structure maintenance is significant. Operations of stormwater pump stations are required. Operations of tunnel sections are not required.
	High: Amount of structure has increased significantly or structure maintenance is significant. Operations of stormwater pump stations and tunnel sections are required.

Table 9.2-1: Engineering Impact Criteria

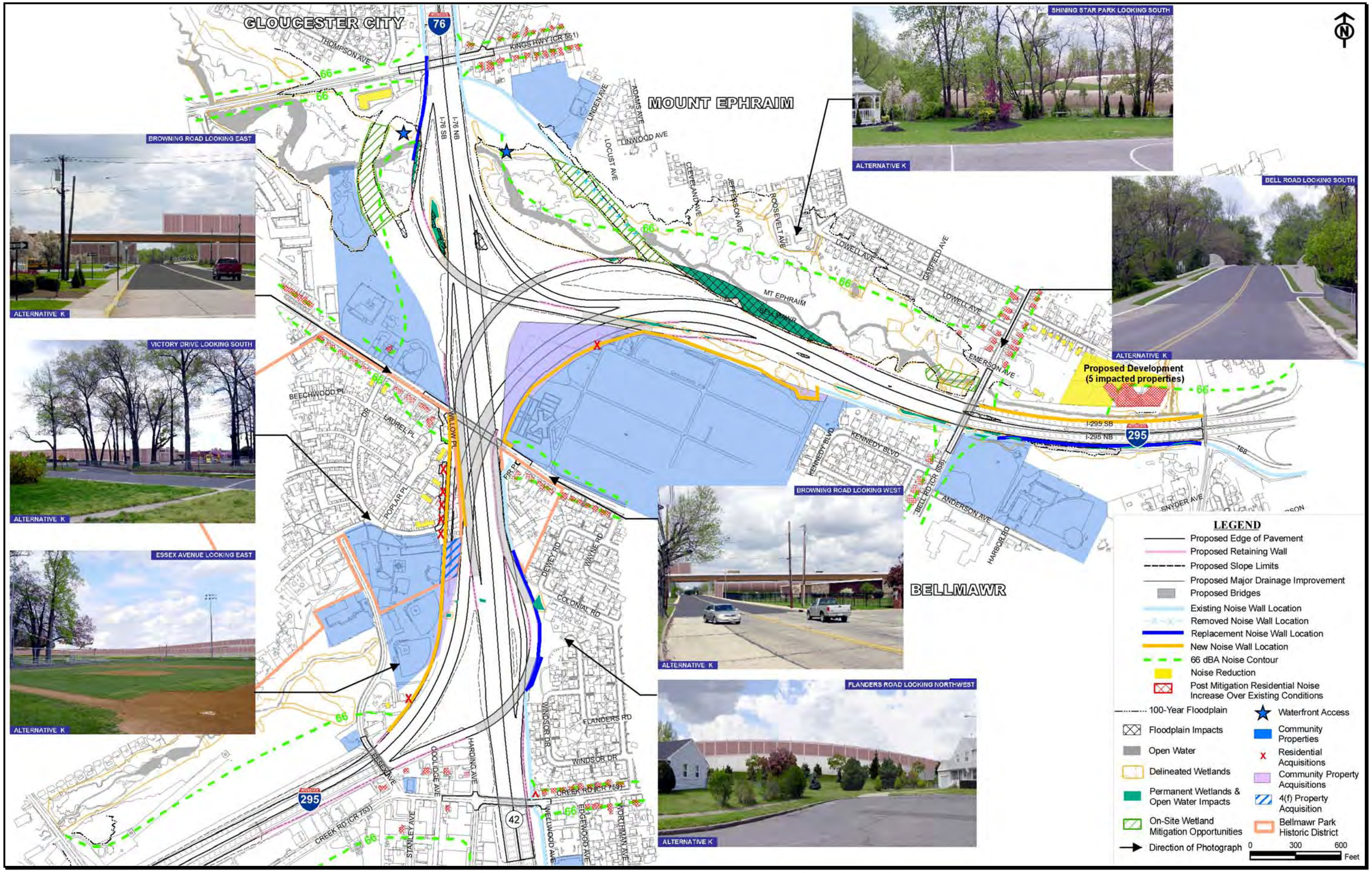


Figure 9.1-6: Alternatives Analysis – Environmental Impact Plans (Alternative K)

NAC noise impacts, which includes recreational areas, cemeteries and residences. Since recreational areas and cemeteries were mitigated through noise wall designs (except for the Annunciation School playground), alternatives will be evaluated based on the Category B NAC residential impacts. While new noise walls were designed to eliminate noise impacts, replacement noise walls were designed to approach in-kind effectiveness of existing noise walls, thus yielding noise levels similar to the No Build condition.

Residential Noise Impact Reduction: The construction of new and replacement noise walls will reduce the number of residential units that experience noise levels in excess of the Category B NAC (66 dBA) compared to the No Build Alternative.

Post Mitigation Residential Noise Increase over Existing Conditions: Noise levels resulting from this project have been projected, assuming that all proposed noise walls and replacement noise wall segments will be constructed. (Although new and replacement noise walls proposed under each design alternative eliminate a significant number of impacts, several residential noise impacts remain. The degree of each remaining impact is determined by the noise level increase over existing conditions.) Under normal circumstances, a change in noise levels less than three decibels is not perceivable to the human ear. A change greater than three decibels is considered to be a perceivable increase in noise. An increase of seven decibels or more is noticeable.

Air Quality

The *Air Quality TES* documents carbon monoxide concentrations for each alternative. No carbon monoxide impact was documented under the 2030 No Build or any of the build alternatives. Air quality is improved under all build alternatives to the same relative degree across the project area. The difference between the No Build and any of the build alternatives at the area-wide level was not significant enough to constitute a distinguishing characteristic.

Socioeconomics

The *Socioeconomic, Land Use and Environmental Justice TES* identified that all build alternatives would have impacts due to right-of-way acquisitions and easements. Visual impacts due to construction affect all build alternatives. There will also be positive economic benefits associated with the build alternatives. The criteria for Socioeconomics follow:

Visual Impacts: Under this criterion, an evaluation will be made of whether an alternative introduces a visual intrusion that does not fit into the context of the project area. A balloon study, in which weather balloons were floated at the heights of the proposed structures, was used to evaluate the range of viewshed impacts. Photo simulations created from photographs of the balloons taken from various locations during the balloon study were used to illustrate the change. The visual quality of the area would be changed by all of the build alternatives. All build alternatives would require the construction of a new structure throughout the interchange, while some would require the construction of new double-decker structures. New noise walls would be constructed on top of these structures to mitigate the noise impacts. None of the visual intrusions fit the current context of the area surrounding the project.

CRITERIA	METRICS
Noise	The metric for noise reduction is measured as the number of receptors presently above the Category B NAC that will be reduced below the Category B NAC as a result of the project.
	The metric for remaining noise impacts are measured as the number of receptors experiencing an increase over existing conditions in each of the following three ranges: **Less than 3 dBA (Not Perceivable):** Number of receptors with a noise level increase that is not perceptible to the average person. **Greater than 3 dBA but less than 7 dBA (Perceivable):** Number of receptors with a perceivable increase over existing conditions. **Greater than 7 dBA (Noticeable):** Number of receptors with a noticeable increase over existing conditions.
Air Quality	Not a distinguishing characteristic.
Socioeconomics	The metric for residential acquisitions is the actual number of residential acquisitions.
	None: No impact to community facility. **Low:** No loss of use of community facility. **Medium:** Temporary loss of use of community facility. **High:** Permanent loss of use of community facility.
	The metric for 4(f) property acquisition is the actual acreage acquired from the 4(f) property.
	None: There will be no change to viewshed. **Low:** View is open with limited intrusion of concrete infrastructure. Landscape is dominated by vegetation and existing buildings of a consistent nature. **Medium:** View has changed to include some road infrastructure, but infrastructure is balanced with the rest of the landscape. Although the view has changed, the view is recognizable. **High:** Field of view is dominated by massive intrusive infrastructure, and the resulting view is barely recognizable from existing conditions.
	The metric for regional accessibility is the annual vehicle dollars saved.
	The metric for cost benefits from reduction in accidents is measured in dollars saved on an annual basis.
Natural Ecosystems	The metric for floodplain is the actual acreage of floodplain lost due to construction and fill.
	The metric for wetland impacts is the actual acreage of permanent wetland and SOW impacts.
	The metric for on-site mitigation is the percentage of acreage available.
	The metric for stormwater management is the total acres of impervious coverage.
	The metric for waterfront access is yes or no.
Archaeological Resources	Not a distinguishing characteristic.
Historic Architectural Resources	The overall metric is the actual acres impacted and the number of structures impacted.
	The metric for noise reduction is measured by the number of residential units in the historic district presently above the Category B NAC that will be reduced below the Category B NAC as a result of the project.
	The metric for remaining noise impacts on the historic district is measured as the number of contributing buildings within the historic district that would have an increase in noise levels over current conditions in each of the following three ranges: **Less than 3 dBA (Not Perceivable):** Number of receptors with a noise level increase that is not perceivable to the average person. **Greater than 3 dBA but less than 7 dBA (Perceivable):** Number of receptors with a perceivable increase over existing conditions. **Greater than 7 dBA (Noticeable):** Number of receptors with a noticeable increase over existing conditions.
	None: There will be no change to viewshed. **Low:** The viewshed would remain relatively unchanged and open with limited intrusion of physical infrastructure. **Medium:** The viewshed would be changed to include some new infrastructure at a relatively close distance to the historic district. **High:** The viewshed would be dominated by intrusive infrastructure at a relatively close distance to the historic district.
Hazardous Waste	Not a distinguishing characteristic.

Table 9.2-2: Environmental Impact Criteria

Residential Acquisitions: Impacts to residents were evaluated for each of the alternatives by counting the number of discrete residential structures that would require taking. For multi-family structures, each individual residential unit was counted separately.

Community Property Acquisitions: Impacts to community properties were evaluated for each alternative. Each build alternative would affect four community facilities (not including the 4(f) property discussed below). Although impacted, all facilities would function normally after project completion. Some unavoidable impacts to support facilities result from permanent easements/acquisitions.

4(f) Property Acquisition: Impacts to 4(f) resources were evaluated for each alternative. Each build alternative will affect one facility that is protected by 4(f) regulations. Although impacted, the functionality of this facility will not be impaired after project completion.

Regional Accessibility: This pertains to the ease with which travelers may get to a specific destination. The build alternatives would generally result in improved accessibility within the secondary study area (Bellmawr, Mount Ephraim, and Gloucester City) by reducing congestion on most segments of the principal access roads used for regional destinations. The value of travel time savings and of the reduced variability of travel time can be thought of in terms of dollars saved. Annual dollar cost savings were calculated for trucks and automobiles. The sum of these is annual vehicle dollars saved.

Cost Benefit from Reduction in Accidents: This parameter captures the annual benefit realized by increased safety features and improved road design. The dollar amount reflects the financial benefits of accident avoidance.

Natural Ecosystems

The *Natural Ecosystems TES* identified impacts to floodplains, wetlands, stream ecology and stormwater quality. The opportunity for waterfront access was a beneficial attribute identified in the *Natural Ecosystems TES*. Results of the *Natural Ecosystems TES* are captured in the four rating criteria discussed below.

Floodplain: Floodplains within the project area were mapped. Permanent impacts to floodplains were measured in acres for each build alternative. The No Build Alternative results in no impact to floodplain acreage.

Total Wetland and State Open Waters (SOW) Permanent Impacts: Wetlands were delineated within the project area. Impacts to SOW, tidal wetlands and non-tidal wetlands were quantified for the five build alternatives. All impacts to wetlands must be mitigated in accordance with USACE and NJDEP regulations and directives for all build alternatives.

On-Site Wetland Mitigation Opportunities: Required acres for mitigation were estimated within the TES. The actual acreage available for on-site mitigation is dependent upon final design. Not all alternatives could accommodate on-site mitigation. On-site mitigation is preferred because the mitigation would be in close proximity to the areas of impact and thus, the benefits of mitigation will enhance the natural resources within the project area. On-site mitigation will enhance and restore wetland functional characteristics, including water absorptive capacity, increased water quality and enhanced conditions for wildlife habitat, including the potential expansion of wild rice, an important food source for migratory species. The No Build Alternative results in no impact.

Stormwater Management: Total impervious coverage provides a good working comparative analysis of the effects on stormwater quantity, quality and recharge within this area of a sole source aquifer. Stormwater management will not be provided in the No Build Alternative.

Waterfront Access: Access to stream corridors for passive recreational opportunities is an enhancement for the community. Some alternatives provide the opportunity for waterfront access as a design characteristic, while others do not.

Archaeological Resources

The *Phase I/II Archaeological Investigation TES* involved research and review of existing information obtained from several state and local repositories. Phase II archaeological investigations were conducted at four sensitive sites; however, none of the sites were found to have the potential to yield new information important in prehistory or history. As a result, no adverse effect to archaeological resources will occur from the project and therefore it is not a distinguishing characteristic.

Historic Architectural Resources

One historic resource is located within the project area—the Bellmawr Park Mutual Housing Historic District. For the purpose of evaluating the impacts to the Bellmawr Park Mutual Housing Historic District, physical, visual, and audible impacts were evaluated.

Physical Impacts to Historic District: This is defined by two different criteria which include: 1) the area within the historic district that is impacted by right-of-way takings; and, 2) the number of residential buildings and units requiring demolition and/or relocation within the historic district. For these two criteria, a reduction in integrity of the design, setting, and materials are represented. The No Build scenario for this overall criterion is defined as No Impact since there would be no physical destruction or taking of area of the historic district, no contributing resources (residential buildings) would be demolished, and no open spaces within the district would be removed/reduced if this project were not constructed. The Bellmawr Park Mutual Housing Historic District comprises 82.24 acres and includes 176 multi-unit residential and support buildings.

Noise Impact Reduction to Historic District: The construction of proposed and replacement noise walls will benefit some area residents by reducing the number of residential units that will experience noise levels in excess of the NAC.

Post Mitigation Residential Noise Increase over Existing Conditions: Noise levels resulting from this project have been projected assuming that all proposed noise walls and replacement noise wall segments will be constructed.

Impact to Viewshed: This criterion incorporates the relative comparative amount of visual intrusions as viewed from the contributing buildings within the Historic District. The visual intrusions are due to the size of the highway structure and noise walls that will be constructed for each alternative. The measurements of low, moderate, and high are not based on quantitative information obtained from studies, but are qualitative in nature and derived solely from visual comparison of the alternatives. The determinations were greatly assisted by the photosimulations of each alternative as viewed from Victory Drive. The reduction in integrity of the design, setting, materials, and feeling is represented by this criterion.

Hazardous Waste

Seventeen Areas of Concern (AOCs) within the study area were identified based on the potential impacts to properties from proposed construction activities. After further study, three of these AOCs were found to have a possibility of affecting the five build alternatives. However, the effect on each alternative was similar such that hazardous waste was found not to be a distinguishing characteristic among the alternatives.

9.2.2 Alternatives Comparison Matrix

The Alternatives Comparison Matrix (see **Table 9.2-3**) provided the basis for the comparative analysis of the alternatives. Each column of the matrix table represents a holistic view of each alternative's distinguishing criteria, developed through a collaborative process. By compiling the impacts and contrasting the alternatives in a matrix, tradeoffs of impacts could be discriminated.

Once consensus was reached on the criteria definitions and their measurements, the alternatives could be rated and the Alternatives Comparison Matrix could be populated using the ratings for each alternative.

Stakeholder meetings were held again in October 2006 to discuss loading the Alternatives Comparison Matrix. Information packets containing the refined criteria and metrics used to rate each of the alternatives and the populated Alternatives Comparison Matrix were provided for stakeholder review. Input was again solicited in this round of meetings (NJDOT Core Group, LOB, CAC, and ACM). During these meetings, the populated Alternatives Comparison Matrix was discussed as well as the recommended Preferred Alternative.

9.3 SUMMARY OF ANALYSIS

Once the alternatives were rated based on the distinguishing criteria developed, the comparison of alternatives could begin. The summary of this comparison is provided below.

The purpose and need of this project involves improving traffic safety, reducing traffic congestion and meeting driver expectations for the users of the highway and the surrounding communities. The existing I-295/I-76/Route 42 interchange is insufficient to accommodate current traffic volumes and travel speeds safely, resulting in an accident rate that is more than seven times the statewide average. The existing traffic congestion and associated impacts will continue to worsen if the No Build Alternative is chosen. The No Build Alternative does not meet the purpose and need and therefore is not a reasonable alternative.

The two stacked alternatives (G2 and H1) are the most visually intrusive of the build alternatives. The visual impacts were assessed by the photo simulations derived from a balloon study conducted as part of the TES process. This impact is significant, permanent and irreversible to the surrounding residential community. Since the community will be directly affected by the short and long-term impacts of the build alternatives it is important to consider if the project is in harmony with that community, and that it preserves the aesthetic, historic and natural resource value of the area.

Alternatives G2 and H1 call for five residential acquisitions as opposed to 13 with Alternatives D, D1, and K. However the eight residences spared demolition would be the ones most affected by the high visual impact of the stacked alternatives, as they are in close proximity to the roadway.

Property acquisitions in the vicinity of Browning Road are shown on **Figure 9.3-1**. The Bellmawr Park Mutual Housing Historic District would lose one residential building with Alternatives G2 and H1, and lose five with Alternatives D, D1, and K. All of these residents would be relocated, potentially within Bellmawr Park, regardless of the build alternative. Although there are less residential acquisitions associated with Alternatives G2 and H1, the viewshed of the Bellmawr Park Mutual Housing Historic District would be dominated by the intrusive nature of the stacked structures, as shown on **Figures 9.1-4** and **9.1-5**. This is not in harmony with the existing historic and aesthetic value of the neighborhood.

The stacked infrastructure of Alternatives G2 and H1 would also present significant security and maintenance concerns. Cost to build and construction duration are also increased due to the length of the southbound viaduct and the stacking of roadways in comparison to the other build alternatives. Noise walls are not as effective with a stacked design, and an increase in post mitigation noise levels would occur.

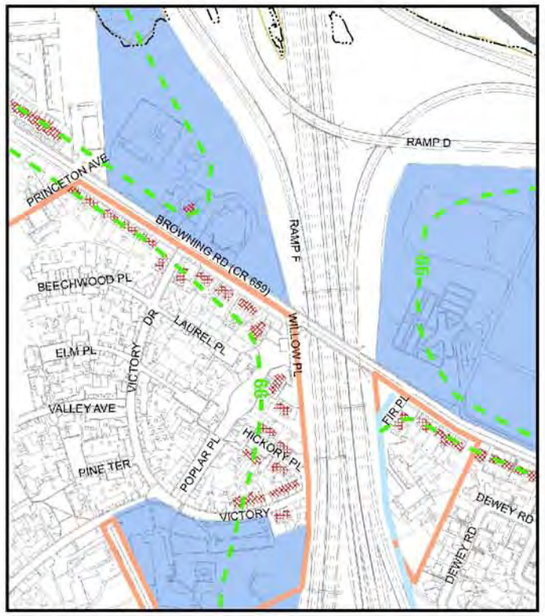
Although G2 had the lowest impact to floodplains and wetlands/open waters, when the community impacts above are considered, Alternatives D, D1, and K present better options. For the reasons stated above, the stacked alternatives G2 and H1 are not preferred.

The main design difference between Alternatives D and D1 is that Alternative D1 proposes Ramp C in the vicinity of Al Jo's Curve. In the screening process this was thought to be beneficial from both a cost and

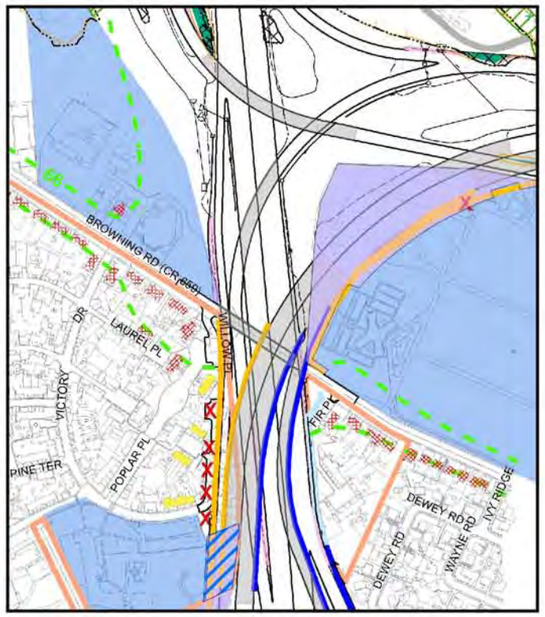
CRITERIA	NO BUILD ALTERNATIVE	BUILD ALTERNATIVES				
		D	D1	G2	H1	K
ENGINEERING CRITERIA						
Meets Purpose and Need	No	Yes	Yes	Yes	Yes	Yes
Temporary Construction Impacts	Low	Medium	Medium	High	High	Medium
Maintenance and Protection of Traffic	Low	Medium	High	High	High	High
Security	Low	Medium	Medium	High	High	High
Design Criteria (Substandard Elements)	High	Low	Low	Low	Low	Low
Cost to Build	N/A	$608 million	$642 million	$833 million	$893 million	$822 million
Construction Duration	As Needed	64 months	63 months	70 months	73 months	88 months
Maintenance and Operations	Low	Medium	Medium	High	High	High
ENVIRONMENTAL CRITERIA						
Noise						
Residential Noise Impact Reduction	0	109	109	91	91	113
Post Mitigation Residential Noise Increase over Existing Conditions						
Less than 3 dBA (Not Perceivable)	250	135	125	150	140	133
Greater than 3 dBA but less than 7 dBA (Perceivable)	4	15	26	35	46	7
Greater than 7 dBA (Noticeable)	0	0	0	12	12	0
Approved Additional Residential Units (not present under existing conditions)	15	5	5	18	18	5
Socioeconomics						
Visual Impacts	None	Medium	Medium	High	High	Low
Residential Acquisitions	0	13	13	5	5	13
Community Property Acquisitions	None	Medium	Medium	Low	Low	Medium
4(f) Property Acquisition	0	0.70 acres	0.70 acres	0.32 acres	0.32 acres	0.70 acres
Regional Accessibility (Annual)	0	$39 million	$39 million	$39 million	$39 million	$39 million
Cost Benefit from Reduction in Accidents (Annual)	0	$11 million	$11 million	$11 million	$11million	$11 million
Natural Ecosystems						
Floodplain	0	2.28 acres	4.45 acres	0.90 acre	4.26 acres	3.04 acres
Total Wetland and SOW Permanent Impacts	0	1.97 acres	3.73 acres	0.95 acre	3.15 acres	2.90 acres
On-Site Wetland Mitigation Opportunities	N/A	100%	10%	100%	12%	93%
Stormwater Management (acres of total impervious coverage)	42 acres**	61 acres	65 acres	64 acres	67 acres*	67 acres
Waterfront Access	No	Yes	No	Yes	No	Yes
Historic Architectural Resources						
Physical Impacts to Historic District	0 acres/ 0 buildings	2.11 acres/ 5 buildings	2.11 acres/ 5 buildings	1.05 acres/ 1 building	1.05 acres/ 1 building	2.20 acres/ 5 buildings
Noise Impact Reduction to Historic District	0	14	14	14	14	18
Post Mitigation Residential Noise Increase over Existing Conditions						
Less than 3 dBA (Not Perceivable)	23	16	16	18	18	12
Greater than 3 dBA but less than 7 dBA (Perceivable)	0	0	0	1	1	0
Greater than 7 dBA (Noticeable)	0	0	0	0	0	0
Impact to Viewshed	None	Medium	Medium	High	High	Low

NOTES: Air Quality, Hazardous Waste and Archaeology are not distinguishing criteria.
* Includes channel realignment/relocation.
** Does not provide for stormwater treatment.

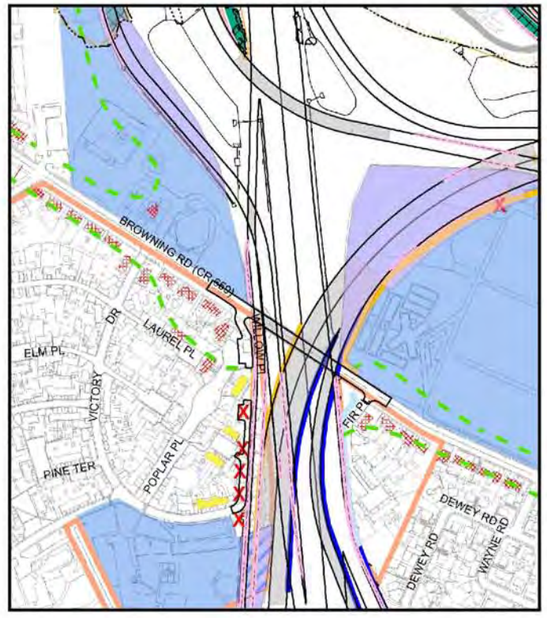
Table 9.2-3: Alternatives Comparison Matrix



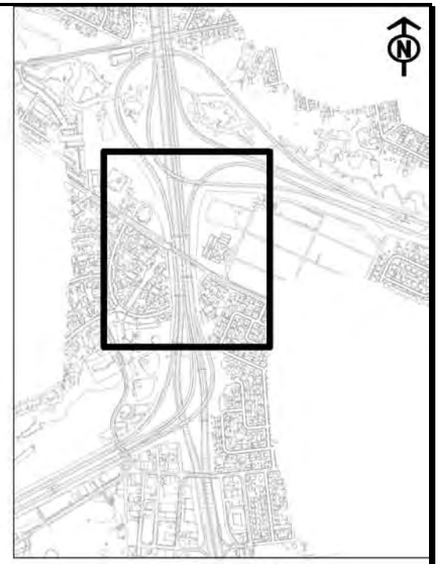
No Build

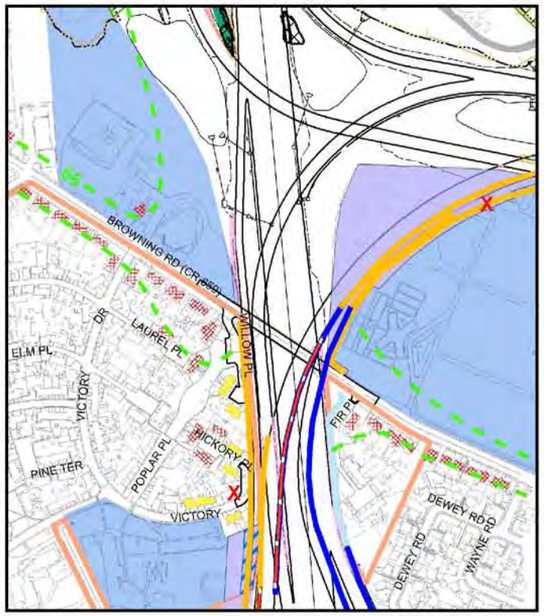


Alternative D

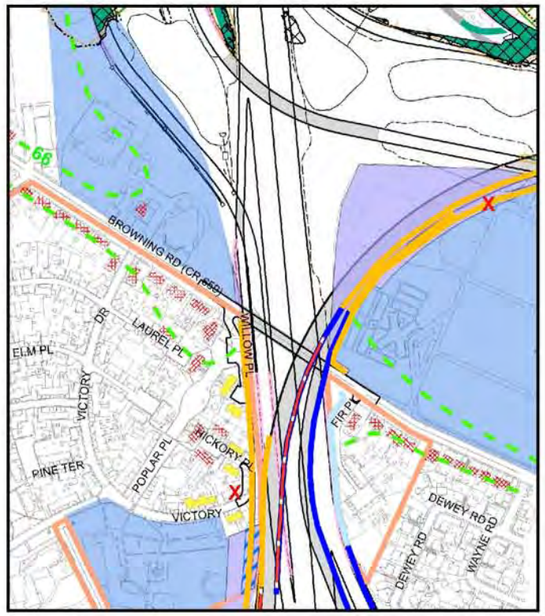


Alternative D1

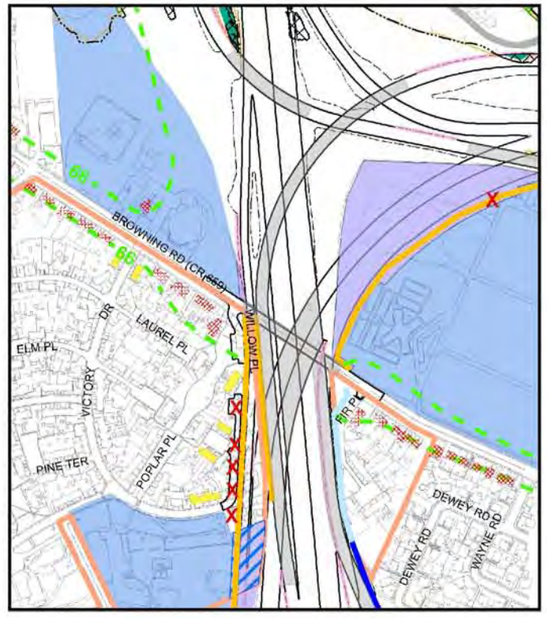




Alternative G2



Alternative H1



Alternative K

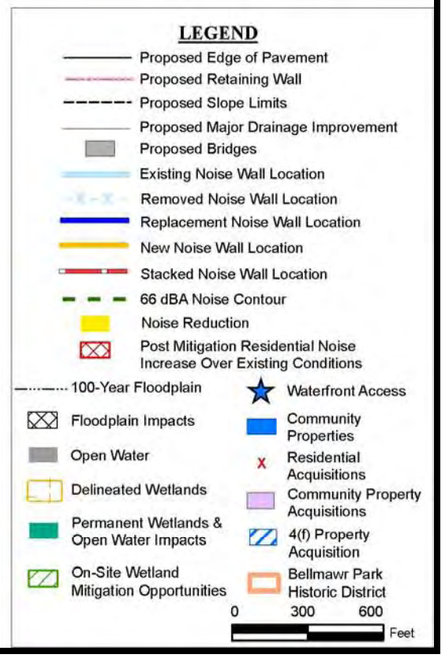


Figure 9.3-1: Alternatives Analysis – Environmental Impact Plans (Browning Road)

ecological standpoint, as it would follow the alignment of the existing ramp. Further engineering studies show that due to current design standards, it would actually increase the cost to build and would incur right-of-way impacts to the Annunciation B.V.M. Church property, because the current alignment of Al Jo's Curve could not be fully utilized

The elimination of Al Jo's Curve has substantial ecological benefits. Floodplain and wetlands/open waters impacts are reduced by 50% with Alternative D, as compared to Alternative D1. In addition, 100% of the wetland mitigation can be accomplished on-site compared to only 10% for Alternative D1. Alternative D also has the potential to provide public access to Little Timber Creek, while Alternative D1 would not. The potential for bicycle/pedestrian pathways would be explored as part of the access plan. A clearer spatial appreciation of the benefits to the natural ecosystem provided in Alternative D by removing Al Jo's Curve are shown on **Figure 9.3-2.**

When comparing Alternative D and Alternative K, there are long-term security and maintenance issues with Alternative K, and concerns from the standpoint of emergency response logistics. These complications are not as prevalent with Alternative D as it does not involve a mainline tunnel. Alternative K requires that local emergency response personnel be trained for tunnel emergencies. This training commitment places a long-term burden on local emergency personnel.

The mainline tunnel element of Alternative K does present less of a visual impact and results in slightly better noise conditions after construction. However, when considering the efficient and effective use of resources (time, budget, community impacts), Alternative D is the better alternative. The cost to build Alternative D is approximately $200 million less than Alternative K and would have a construction duration two years shorter than Alternative K. This is a substantial amount of time for the community and the traveling public to be spared the disruption of the construction impacts that Alternative K would cause.

Based on this Alternatives Analysis, Alternative D has been selected as the Preferred Alternative amongst the five build alternatives studied.

9.4 PREFERRED ALTERNATIVE

The purpose and need of the project established nine goals and objectives (see Chapter 3). All of the build alternatives would improve safety, incorporate design speeds consistent with the approach roadways, improve local traffic mobility, enhance regional economic development, and decrease the number of vehicle accidents. Although no specific opportunities for intermodal use within the project area are provided, none of the build alternatives would preclude the possibility of future intermodal enhancement projects. Alternatives D, G2, and K all enhance opportunities for other modes of transportation within the project area by providing waterfront access in place of Al Jo's Curve. While all of the build alternatives would require the relocation and acquisition of private and public property, Alternatives D and K best preserve the quality of life of the local communities with respect to visual and noise impacts. As described in this chapter, the avoidance, minimization, and mitigation of environmental impacts is best accomplished by Alternative D.

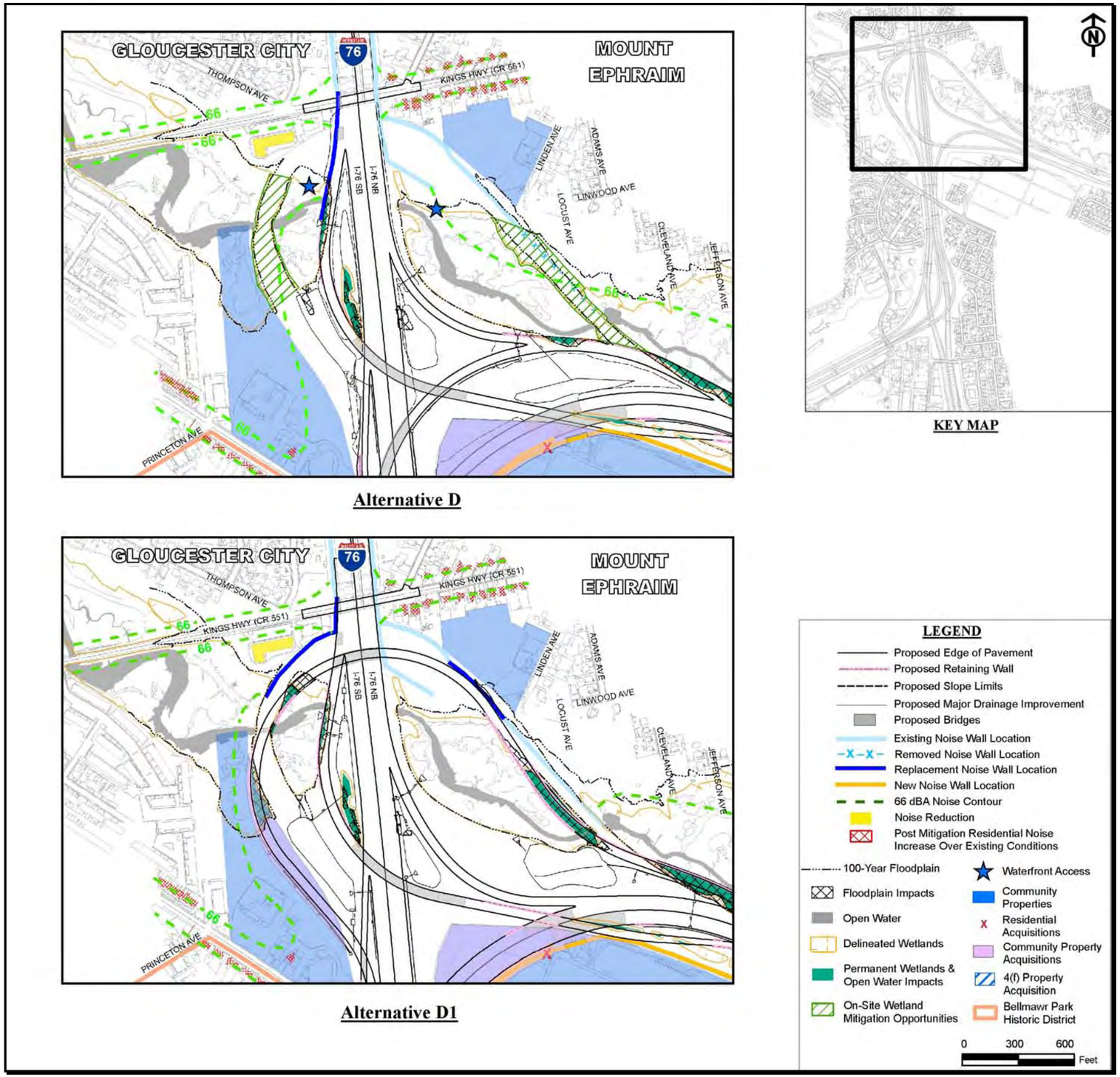


Figure 9.3-2: Alternative Analysis Environmental Impact Plans (Al Jo's Curve)

As with all of the other proposed alternatives, Alternative D would cause inconveniences to neighboring properties in the form of noise, dust, and/or visual impacts. Some traffic would be diverted off the mainline for Alternative D and construction duration is expected to last 64 months. However, compared to Alternative K, the tunnel alternative, construction time and costs are decreased and potential breaches in security are not considered to be as significant. The maintenance needs for this alternative are the lowest for all build alternatives. Since Alternative D does not use a stacked infrastructure design, permanent visual intrusion on the community will be less of an issue as well. The cost to build Alternative D is approximately $608 million. This alternative would cause the second lowest impacts to the floodplain and wetlands/open waters at 2.28 and 1.97, respectively. The opportunity for on-site wetlands mitigation is 100% with the removal of Al Jo's Curve. This alternative would result in the lowest acreage of total impervious coverage at 61 acres compared to the other build alternatives.

In the process of identifying a Preferred Alternative, qualities and characteristics which integrate highway development with environmental and community considerations were rigorously analyzed. The environmental and engineering impact criteria became the basis for the decision making process. Through analysis of the populated Alternatives Comparison Matrix, the detailed graphics, and photo simulations, it was determined that Alternative D should be recommended as the Preferred Alternative. Participants in subsequent meetings of the NJDOT Core Group, LOB, CAC, and ACM #10, concurred with this recommendation. A PIC meeting was held on February 15, 2007 and most participants supported the recommendation of Alternative D as the Preferred Alternative for this project.

During the DEIS comment period, written and oral input was received from public agencies and other stakeholders. During the public comment period there was a lot of public support for Alternative D. The comments and responses to those comments are discussed in Chapter 11. In the DEIS, Alternative D was recommended as the Preferred Alternative based on the analysis of engineering and environmental requirements and impacts. The final design details will give more precise measures of the impacts and appropriate mitigation, but it will not change the distinguishing characteristics or the selection criteria. For this reason Alternative D is the Preferred Alternative for this project.

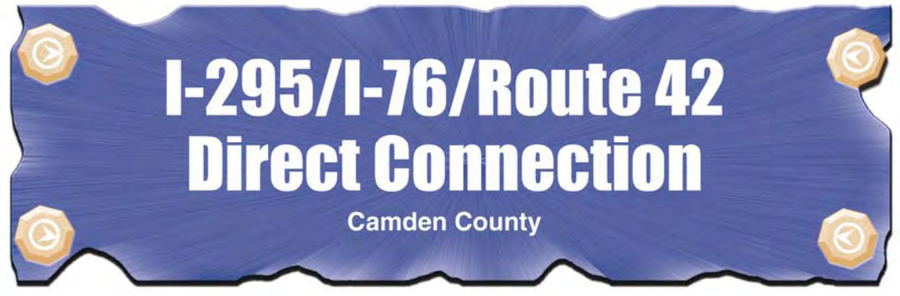
9.4.1 Remaining Issues

Outstanding issues identified during the circulation of the DEIS which will be resolved during the final design for the project are described below.

Monitoring Plan for Wetlands Mitigation – The final details of the monitoring plan for wetlands mitigation will be provided as part of the mitigation plan in the Individual Freshwater Wetlands Permit Application to be submitted during final design. The details of such a plan will include a wetlands proposal with monitoring frequency and planting design pursuant to USEPA and NJDEP regulations.

The removal of Al Jo's curve and mitigation of wetland impacts in this area may provide the potential for bicycle/pedestrian pathways. The final design for the mitigation plans will be developed with the permit application.

Mitigation for Construction MSAT Emissions – Construction activity may generate a temporary increase in MSAT emissions. Given the construction time frame for Alternative D is projected at 64 months, construction emission mitigation strategies would minimize community exposures. Potential mitigation strategies include reducing engine activity at shift times, retrofitting construction equipment with devices that provide exhaust emission reduction and utilizing ultra low sulfur diesel fuel. The EPA has identified a number of approved diesel retrofit technologies, which will be reviewed as potential mitigation options for this project. In addition, opportunities such as utilizing non-road diesel engines that conform to EPA's stringent Tier 3 or Tier 4 emission standards (as applicable), enacting an idling minimization policy, and either electrification of the project site or staging of diesel generators to avoid adverse impacts may be considered. As construction specifications are developed, NJDOT will prescribe the most appropriate voluntary reduction efforts. Due to evolving technologies, policies and regulations, NJDOT will evaluate these measures and incorporate the most appropriate strategies during the final design phase.



CHAPTER 10: SECTION 4(F) EVALUATION

10.1 INTRODUCTION

This Section 4(f) Evaluation has been prepared as a chapter of the EIS for the I-295/I-76/Route 42 Direct Connection project. This analysis has been prepared pursuant to Section 4(f) of the U.S. Department of Transportation Act of 1966. Section 4(f) states that land from a publicly owned park, recreation area, wildlife or waterfowl refuge, or land of a historic site can be used for a transportation project only if:

- there is no feasible and prudent alternative to the use of these resources; and
- all possible planning has been taken to minimize harm to the resource.

This Section 4(f) Evaluation has been prepared pursuant to the finding that the proposed project will have an adverse effect on the Bellmawr Park Mutual Housing Historic District, which has been determined eligible for listing in the National Register of Historic Places.

10.2 PROJECT DESCRIPTION

As described in greater detail in Chapter 2, the I-295/I-76/Route 42 Direct Connection project involves the reconstruction of I-295, I-76, and Route 42 and affected roadway segments traversing the Boroughs of Bellmawr and Mount Ephraim, and Gloucester City, Camden County. The study area is shown on **Figure 2.2-1**.

The existing interchange has numerous geometric design elements and, due to this poor configuration, is unable to accommodate current traffic volumes and travel speeds safely, resulting in an accident rate that is more than seven times the statewide average. Additionally, failing levels of service on the interchange ramps, combined with the congestion of local streets, adversely affects the quality of life in the surrounding communities.

10.3 PROJECT PURPOSE AND NEED

10.3.1 Project Purpose

The purpose of this project is to improve traffic safety, reduce traffic congestion, and meet driver expectations by improving the direct connection of the I-295 mainline and the interchange of I-295/I-76/Route 42.

10.3.2 Project Need

There is a significant accident history at the interchange. The interchange's existing roadways include a number of geometric deficiencies that can be considered contributing factors to the high number of accidents. The deficiencies were identified from NJDOT record construction drawings and Structural Inventory and Appraisal Sheets. As explained in Chapter 3, the project need includes the following:

- improve safety;
- improve geometric and structural deficiencies;
- meet driver expectations; and
- improve operational deficiencies.

10.4 DESCRIPTION OF SECTION 4(F) RESOURCE

The Bellmawr Park Mutual Housing Historic District is located immediately adjacent to the I-295/I-76/NJ Route 42 interchange. When the I-295/I-76/Route 42 interchange was constructed between 1958 and 1961, the community was divided into two sections (see **Figure 5.7-2**). In addition to the 175 residential buildings within Bellmawr Park, a housing office is located at the intersection of Peach Road and Essex Avenue. Communal open space and one school are also located within the historic district.

The New Jersey Historic Preservation Office (NJHPO) found the district to be significant under National Register Criterion A for its association with the development of the mutual housing concept associated with World War II-era defense housing projects and under Criterion C for its embodiment of the distinctive characteristics of an architectural type (functional military worker housing of the 1940s). The district's period of significance is 1942 to 1945. Contributing elements to the district include all dwellings and communal open space dating from within the period of significance, the Bellmawr Park Mutual Housing Corporation office building, and the Bellmawr Park School. The aspects of integrity that are most important to the district are location, design, setting, feeling, and association.

10.5 IMPACT TO SECTION 4(F) RESOURCE

The proposed project will impact the Bellmawr Park Mutual Housing Historic District. The proposed project will require land acquisition and will impact the visual context of the historic district by introducing numerous elevated roadway structures and noise walls. In addition, the Preferred Alternative would require the demolition of five residential buildings that are considered contributing resources to the historic district. The proposed project would have an adverse effect on the Bellmawr Park Mutual Housing Historic District under all build alternatives due to the permanent acquisition of land, demolition of contributing structures, and roadway construction within the boundaries of the historic district. (See Chapter 5 for additional information regarding potential impacts to the historic district.) Although the proposed project will result in an adverse effect to the historic district, the community will continue to function as before.

10.6 ALTERNATIVES

10.6.1 No Build

In this alternative, only routine maintenance and repairs would be performed as needed. Also, no work would be done to improve the safety of the roadway. Under this alternative, no construction would take place, no property within the Bellmawr Park Mutual Housing Historic District would be acquired, and no buildings would be demolished. The No Build Alternative avoids Section 4(f) resources; however, it does not meet any of the project needs identified in Chapter 3. As a result, the No Build Alternative is not a prudent alternative.

10.6.2 Avoidance Alternatives

As part of the process to develop the conceptual alternatives, it was determined that there was no feasible and prudent alternative that could meet the project purpose and need without using a Section 4(f) property. As explained in Chapter 4, the project scoping process identified 26 conceptual alternatives for consideration. As part of this process, attention was given to the development of alternatives that could avoid or minimize impacts to Section 4(f) properties. All 26 alternatives would have used land from a Section 4(f) resource—the Bellmawr Park Mutual Housing Historic District (see **Table 10.6.1**).

All 26 conceptual alternatives are feasible concepts that met the purpose and need of the project; however, not all 26 were deemed prudent. After extensive community involvement and input from regulatory agencies, five build alternatives (D, D1, G2, H1 and K) and a No Build Alternative were chosen to advance for further study as part of the EIS process. (See Chapter 4 for a detailed description of these alternatives.) The 21 conceptual alternatives that were dismissed were generally found to result in high costs and higher environmental impacts, including high constructability, residential, wetlands, noise, and visual/contextual impacts.

Based upon comments received during the alternatives screening process, these five alternatives were refined and minor alignment adjustments were incorporated into their conceptual design in order to minimize environmental impacts and to improve traffic operations. The five build alternatives were generally found to be the most prudent (least impacts) of the 26 conceptual alternatives developed. As part of the detailed Alternatives Analysis process, Alternative D was ultimately selected as the Preferred Alternative. (See the Alternatives Analysis included in Chapter 9 for more detailed information regarding the selection of the Preferred Alternative.)

Following FHWA's *Section 4(f) Policy Paper*, as all build alternatives use Section 4(f) resources, such that there are no feasible and prudent alternatives that avoid Section 4(f) resources, the impacts to both Section 4(f) and non Section 4(f) resources were evaluated in order to select the prudent and least overall harm alternative. Although Alternative D has slightly higher Section 4(f) impacts than Alternative K, there are additional important environmental impacts associated with Alternative K that Alternative D does not have.

When comparing Alternative D and Alternative K, there are long-term security and maintenance issues with Alternative K, and concerns from the standpoint of emergency response logistics. These complications are not as prevalent with Alternative D, as it does not involve a mainline tunnel. Alternative K requires that local emergency response personnel be trained for tunnel emergencies. This training commitment places a long-term burden on local emergency personnel.

The mainline tunnel element of Alternative K does present less of a visual impact and results in slightly better noise conditions after construction. For these reasons, it was NJHPO's opinion that Alternative K would have the least overall adverse effect to the historic district. However, when considering the efficient and effective use of resources (time, cost, community impacts), Alternative D is the better alternative. The cost to build Alternative D is approximately $200 million less than Alternative K and would have a construction duration two years shorter than Alternative K. This is a substantial amount of time for the community and the traveling public to be spared the disruption of the construction impacts that Alternative K would cause.

Based on this alternative selection process, Alternative D was recommended as the Preferred Alternative amongst the five build alternatives studied. Therefore, it is more prudent to choose Alternative D.

ALTERNATIVE	FEASIBLE?	PRUDENT?	USES 4(F) LAND?	RELATIVE NET HARM TO SECTION 4(F) LAND AFTER MITIGATION
Alternative A	Yes	No	Yes	N/A
Alternative A1	Yes	No	Yes	N/A
Alternative A2	Yes	No	Yes	N/A
Alternative B	Yes	No	Yes	N/A
Alternative B1	Yes	No	Yes	N/A
Alternative B2	Yes	No	Yes	N/A
Alternative C	Yes	No	Yes	N/A
Alternative C1	Yes	No	Yes	N/A
Alternative C2	Yes	No	Yes	N/A
Alternative D	Yes	Yes	Yes	0.70 acres impacted
Alternative D1	Yes	Yes	Yes	0.70 acres impacted
Alternative E	Yes	No	Yes	N/A
Alternative E2	Yes	No	Yes	N/A
Alternative F	Yes	No	Yes	N/A
Alternative F1	Yes	No	Yes	N/A
Alternative F2	Yes	No	Yes	N/A
Alternative G	Yes	No	Yes	N/A
Alternative G1	Yes	No	Yes	N/A
Alternative G2	Yes	Yes	Yes	0.32 acres impacted
Alternative H	Yes	No	Yes	N/A
Alternative H1	Yes	Yes	Yes	0.32 acres impacted
Alternative I	Yes	No	Yes	N/A
Alternative I1	Yes	No	Yes	N/A
Alternative J	Yes	No	Yes	N/A
Alternative K	Yes	Yes	Yes	0.70 acres impacted
Alternative L	Yes	No	Yes	N/A

Table 10.6-1: Comparison of Alternatives

10.7 MEASURES TO MINIMIZE HARM

As explained above, the five build alternatives were designed and further modified to minimize harm to Section 4(f) resources and to reduce overall environmental impacts. Alternative D was selected as the Preferred Alternative as it was found to result in less overall environmental impacts when compared to the other build alternatives. As the proposed project will require the use of the Bellmawr Park Mutual Housing Historic District and impacts to this resource will be unavoidable, mitigation measures (described below) will be developed to minimize harm to this property.

The proposed project would have an adverse effect on the Bellmawr Park Mutual Housing Historic District; therefore, mitigation of adverse effects is necessary. Mitigation measures have been developed through consultation between FHWA, NJHPO, NJDOT, as well as the Bellmawr Park Mutual Housing Corporation, and will be outlined in a Memorandum of Agreement (MOA). A copy of the MOA is included in Appendix J.

Potential mitigation measures are summarized in Chapter 5, and may include (but are not limited to) the following:

- Document buildings slated for demolition within the Bellmawr Park Mutual Housing Historic District in accordance with the Historic American Buildings Survey (HABS) Level II guidelines prior to any alteration or demolition.
- Complete a National Register nomination form for the district.
- As part of the National Register nomination form, prepare a graphic overlay to illustrate the evolution of the district by comparing its original layout to changes that have occurred over time, including changes that would result from the proposed project.
- Assist BPMHC in the creation of a website for the BPMHC community.
- Upon completion of the National Register nomination form, prepare a historic narrative for BPMHC's use on their website.
- Assist BPMHC in the selection of graphics from the National Register nomination form to use on their website and reformat the graphics in an electronic format that BPMHC can utilize for posting on their website.
- In an effort to assist BPMHC in developing strategies to help ensure the community's cohesiveness and stability, assist BPMHC to develop a Conservation Plan for archival storage of historic documentation (blueprints, maps, plans, etc.) that they have on file.
- Provide guidance to BPMHC regarding the archival storage of materials identified in the Conservation Plan.

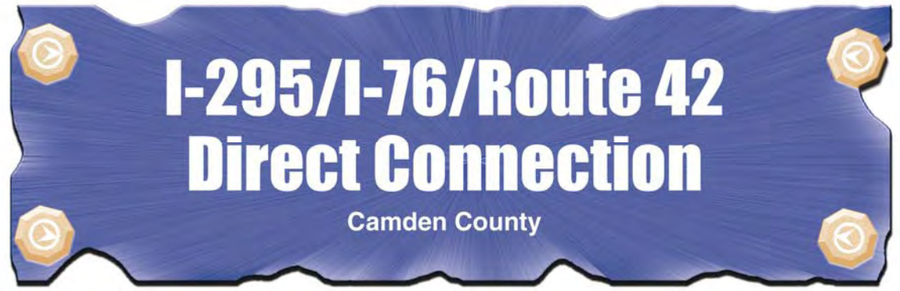
As the proposed project will require the use of a limited number of buildings located within the historic district, it is anticipated that the historic district will continue to serve its same function as a residential community after project construction and after mitigation measures are implemented.

10.8 COORDINATION

As summarized in Chapters 2 and 11, the alternative selection process leading to the preparation of this EIS/Section 4(f) Evaluation has had extensive agency coordination. Representatives from FHWA and NJHPO have actively participated in the environmental review process and impacts to historic resources and parkland have been discussed at agency and public meetings. Consultation with NJHPO has been ongoing regarding potential impacts to cultural resources and NJHPO will continue to be involved in the development of mitigation measures, including the preparation of an MOA.

The proposed project also involved significant local government and public participation in order to build consensus among the stakeholders in the project area. Public involvement has been an integral part of this project and NJDOT has sought and responded to the input of the community since the beginning of project planning. Public meetings have been held to inform local residents, officials, and members of the business community of the current status of the project. The Project Flow Chart (see **Figure 2.5-1**) illustrates the public involvement opportunities during the project scoping process.

The Draft Section 4(f) Evaluation was circulated as part of the DEIS to appropriate agencies and interested parties for review and comment. Comments received are summarized in Appendix X and have been incorporated into this FEIS/Final Section 4(f) Evaluation.



CHAPTER 11:
CONSULTATION AND COORDINATION

This chapter summarizes the extensive consultation and coordination that took place as part of the proposed project. The proposed project involved significant local, state, and federal government coordination, in collaboration with public participation, in order to build consensus among stakeholders in the project area. The Project Flow Chart (see **Figure 2.5-1**) illustrates the public involvement opportunities during the project scoping, development, and conceptual design process. The Project Flow Chart is based on the Public Involvement Action Plan (PIAP), developed as a roadmap for public and inter-agency involvement in the project (See Appendix C).

The PIAP was developed for conducting early and continuing outreach that was timely in providing public notices, broadly disseminated and responsive to stakeholder needs. Implementation of this plan was a crucial ingredient in gaining support from all key stakeholders. This plan was structured and executed through a phased approach consistent with the project phases and was designed to meet pertinent needs and circumstances as they developed. Achievement of the PIAP fulfills the following goals:

- Provide effective education of the general public about the funding, permitting, design, and construction process, and their role within the project.
- Establish credibility and trust with the communities and highway users.
- Anticipate potential public reaction to real and perceived issues thereby mitigating the need to develop remedial action.
- Obtain public input in the Alternatives Screening Process to arrive at five alternatives and the development of a Preferred Alternative to promote public understanding of the reasons that a Preferred Alternative was selected. Provide clear, concise information in a manner encouraging feedback. Provide a convenient, effective mechanism for the general public to offer feedback and recommendations to the project team so as to allow for mitigation and resolution of any problems related to project goals and alternatives.
- Meet required federal and state requirements for public comment.

11.1 STAKEHOLDERS

An extensive mailing list was developed to maintain ongoing contact with the community, transfer information, and invite people to public meetings. The database contained the names and addresses of project area representatives, media organizations, and representatives from the business community, as well as other stakeholders. The list was continuously updated.

Project stakeholders include the following:

- Annunciation B.V.M. Church
- Bellmawr Baseball League
- Bellmawr Park Board of Education
- Bellmawr Park Mutual Housing Corporation
- Borough of Bellmawr
- Borough of Mount Ephraim
- Business community
- Business-development organizations
- Camden County
- City of Gloucester
- Crescent Park V.F.W.
- Delaware River Basin Commission
- Delaware River Port Authority
- Delaware Valley Regional Planning Commission
- Environmental groups
- Federal Highway Administration
- General public
- Gloucester County
- Local elected officials
- Media organizations
- Minority groups
- Mount Ephraim Girls Softball
- Mount Ephraim Senior Housing
- National Marine Fisheries Service
- New Jersey Department of Environmental Protection
- New Jersey Department of Transportation
- New St. Mary's Cemetery
- Other towns: Runnemede, Barrington, Haddon Heights, Lawnside, Westville, Deptford, Washington Township, and Woodbury
- Project area residents
- Religious and civic groups
- Resurrection of Christ Cemetery
- School districts
- Senior-citizens associations
- United States Army Corps of Engineers
- United States Environmental Protection Agency
- United States Fish and Wildlife Service
- Utility companies

Stakeholders were organized into committees that were part of the decision-making process. These committees met at important milestones to foster working relationships with local leaders and to conduct the necessary public outreach to keep the affected communities apprised and involved in the project progress. The stakeholder committees are described below.

11.1.1 Agency Coordination Meeting

The ACM brings together the participating public agencies to review the progress of the project at important milestones. Each step in the NEPA process builds on the previous step. By meeting regularly and reaching consensus at each step, the participating agencies help move the process forward smoothly. Participating agencies include the USEPA, USFWS, USACE, FHWA, NMFS, NJDOT, NJDEP, DVRPC, and DRBC. The ACM involves those agencies whose regulatory jurisdiction would affect the progress and final design of the project.

11.1.2 Project Partnering Session

The Project Partnering Sessions (PPS) provide a forum for meeting with a large number of critical stakeholders at the same time. The stakeholders invited to the partnering sessions include local and county officials, business owners, and members of the public who would be affected by the project, in addition to agency representatives. The main purpose of the partnering sessions is to develop working relationships, clarify goals for the project, establish communication protocols, and provide a forum for an open exchange of ideas and information between all stakeholder groups.

11.1.3 Community Advisory Committee

The CAC consists of approximately 30 community representatives. While not a decision-making body in itself, the committee helps the NJDOT project team reconcile the community interests represented in the project area and provides NJDOT with recommendations for transportation improvements. In addition, the committee helps NJDOT set priorities and plan outreach activities. Representatives from the following groups have been, or are still, participating in CAC meetings:

- AAA South Jersey
- Bellmawr Baseball League
- Bellmawr Board of Education
- Bellmawr Park Mutual Housing Corporation
- Bellmawr Park Mutual Housing Corporation Board
- Bellmawr Public Works Department (includes Highway and Sewer Departments)
- Bellmawr Senior Citizens Association
- Borough of Bellmawr Park Town Council
- Camden County Council on Economic Opportunity
- Center for Independent Living
- Chamber of Commerce – Southern Jersey
- Delaware Valley Regional Planning Commission
- Diocese of Camden
- Forman Interstate Business Park
- Gloucester City Senior Citizens Association
- Gloucester County Engineer
- Gloucester County NAACP
- Hispanic Family Center of Southern New Jersey
- Mount Ephraim Borough Council
- Mount Ephraim Girls Softball Association
- Old Pines Farm Natural Lands Trust
- Republican Club of Bellmawr
- Residents of Bellmawr, Mount Ephraim, and Gloucester City
- Rotary International – Southern New Jersey
- Senior Citizens United Community Services of Camden County
- Southern New Jersey Development Council
- Transportation Committee, Southern New Jersey Chamber of Commerce

11.1.4 Local Officials Briefing

The LOB are conducted as a method of keeping officials apprised of and involved in the project progress. Representatives from the study area, including the Mayors of Bellmawr, Mount Ephraim, and Gloucester City, are invited to these briefings. The LOB meetings typically consist of presentations to the officials, some of whom are also participants in the PPS and CAC. In addition, New Jersey Senators and Assemblymen, US Senators, or their representatives, are invited to these meetings.

11.1.5 Public Information Center

PIC meetings are held at key milestones during the project and provide an opportunity for members of the community to ask questions and provide input directly to the project team (see **Photograph 11.1-1)**. These meetings are advertised in local newspapers and at civic group meetings. Members of the public are encouraged to attend each meeting, listen to presentations by individual team members, review the provided displays, ask questions, and provide feedback regarding their observations and concerns.

11.2 AGENCIES AND ORGANIZATIONS

Several agencies and organizations were actively involved with the development of the proposed project. The following is a list of those agencies and organizations:

- Bellmawr Park Mutual Housing Corporation
- Camden Combined Sewer Overflow
- Camden County Cultural and Heritage Commission
- Camden County Engineering Department
- Camden County Historical Society
- Camden County Municipal Utilities Authority
- Delaware Valley Regional Planning Commission
- Delaware River Basin Commission
- Federal Highway Administration
- Gloucester City Historic Preservation Commission
- Gloucester City Historical Society
- Bellmawr Borough
- Gloucester City
- Mount Ephraim
- National Marine Fisheries Service
- New Jersey Department of Environmental Protection
- New Jersey Department of Transportation
- New Jersey State Historic Preservation Office
- Port Authority Transit Corporation
- United States Army Corps of Engineers
- United States Environmental Protection Agency
- United States Fish and Wildlife Service

11.3 SUMMARY OF MEETINGS

11.3.1 Stakeholder Correspondence and Meetings

Consistent and fluid communication among agencies involved in the project was essential to achieving project goals. Formal letters were necessary to properly document official comments and concurrence statements. Copies of this correspondence can be found in Appendix B.

A chronological summary of the stakeholder meetings is provided in **Table 11.2-1**. More detailed summaries of the individual meetings follow. The summaries of these meetings have been organized according to the steps outlined in the streamlining process described in **Figure 2.4-1**. A chronological series of stakeholder meeting minutes can be found in Appendix D.

DATE	MEETING	PURPOSE OR RESULT
December 11 - 12, 2001	Project Partnering Session	Introduce the project and initiate the scoping process
January 30, 2002	Local Officials Briefing	Introduce the project
February 6, 2002	Inter-Agency Meeting	Interagency review of streamlining process
April 17, 2002	Local Officials Briefing	Give an update on progress and upcoming activities
April 24, 2002	Public Information Center	Introduce the project process and constraints, initiate the public scoping process
August 20, 2002	Community Advisory Committee	Establish goals, review protocols and procedures for the CAC, discuss purpose and need
October 9, 2002	Inter-Agency Meeting	Discuss project issues
November 12, 2002	Local Officials Briefing	Give an update on progress and get feedback
November 14, 2002	Agency Coordination Meeting	Introduce the streamlining process and discuss purpose and need
November 21, 2002	Community Advisory Committee	Present the nine initial alternatives, discuss rating criteria, and achieve consensus on the purpose and need
December 17, 2002	Agency Coordination Meeting	Further discuss the purpose and need, present environmental background data, review alternatives to date
January 7, 2003	Community Advisory Committee	Discuss impacts of initial alternatives and stakeholder status
January 28, 2003	Local Officials Briefing	Give an update on progress and upcoming activities
February 3, 2003	Agency Coordination Meeting	Begin the discussion of independent utility, review range of alternatives, introduce the screening criteria, and discuss stakeholder status
February 5, 2003	Chamber of Commerce	Introduce the project to the Transportation Committee of the Chamber of Commerce, Southern Jersey
February 6, 2003	Local Officials Briefing	Update on alternatives development
March 26, 2003	Agency Coordination Meeting	Review Independent Utility Statement
May 13, 2003	Agency Coordination Meeting	Field visit to site, design charette, achieve concurrence on purpose and need, achieve consensus on Independent Utility Statement
June 2, 2003	Agency Coordination Meeting	Review screening criteria and Alternatives Comparison Matrix
June 4, 2003	Local Officials Briefing	Give an update on Alternatives Screening and other issues
June 18, 2003	Project Partnering Session	Discuss alternatives schedule for DEIS, identify potential obstacles
June 27, 2003	Inter-Agency Meeting	Discuss wetland delineation methodologies
July 24, 2003	Public Information Center	Solicit feedback on alternatives, discuss rating criteria
October 15, 2003	Agency Coordination Meeting	Discuss Alternatives Screening: Alternatives D, D1, G2, H1, and K recommended for further study
November 5, 2003	Local Officials Briefing	Discuss Alternatives Screening Process
November 25, 2003	Community Advisory Committee	Alternatives D and K recommended for further study
January 7, 2004	Project Partnering Session	Identify Alternatives D, D1, G2, H2, and K for further study
January 28, 2004	Public Information Center	Solicit feedback from public on alternatives recommended for further study
March 23, 2004	Community Advisory Committee	Discuss public outreach efforts for publicizing the alternatives advanced for further study
April 19, 2004	Local Officials Briefing	Discuss alternatives advanced for further study
July 15, 2004	Agency Coordination Meeting – Wetlands Core Group	Discuss wetland delineation methodologies and review LOI/JD application
October 26, 2004	Local Officials Briefing	Update officials as to project status and upcoming project activities
November 10, 2004	Community Advisory Committee	Discuss environmental process and review balloon test photos
November 30, 2004	Public Information Center	Present status of the project
February 16, 2005	Local Officials Briefing	Discuss further alternatives changes
May 18, 2005	Local Officials Briefing	Explain the details of alternatives advanced for further study
June 7, 2005	Agency Coordination Meeting	Discuss status of TES report progress
June 9, 2005	Community Advisory Committee	Review alternatives advanced for further study and explain the TES report process
June 13, 2005	Public Information Center	Present status of the project
June 8, 2006	Community Advisory Committee	Review TES reports and obtain feedback on Alternatives Comparison Matrix
June 8, 2006	Local Officials Briefing	Review TES reports and obtain feedback on Alternatives Comparison Matrix
June 13, 2006	Agency Coordination Meeting	Review TES reports and obtain feedback on Alternatives Comparison Matrix status
October 19, 2006	Community Advisory Committee	Review Alternatives Comparison Matrix, Alternatives Analysis and present Preferred Alternative
October 19, 2006	Local Officials Briefing	Review Alternatives Comparison Matrix, Alternatives Analysis and present Preferred Alternative
October 24, 2006	Agency Coordination Meeting	Review Alternatives Comparison Matrix, Alternatives Analysis and present Preferred Alternative
February 15, 2007	Public Information Center	Present status of the project
November 6, 2007	Local Officials Briefing	Discuss DEIS circulation and Public Hearing
January 30, 2008	Public Hearing	Obtain public comments

Table 11.2-1: Summary of Stakeholder Group Meetings

Photograph 11.1-1: Typical Public Information Center

11.3.2 Purpose and Need Development

The purpose and need was developed through a comprehensive process that involved stakeholders at each level of project development, from technical design staff to community representatives, to members of the general public. These stakeholders were organized into committees that met regularly and at important milestones to foster working relationships with local leaders, and conduct the necessary public outreach to keep the affected communities apprised and involved in the project progress. The stakeholder committee meetings described below led to the development, evolution, and concurrence on the project's purpose and need.

11.3.2.1 Agency Coordination Meetings

November 14, 2002

The purpose of this meeting was to introduce the participants to the formal process of streamlining and NEPA documentation that will be necessary for approval of the proposed project and to discuss the project's purpose and need. Streamlining is intended as a method to reach a progressive consensus between all stakeholders in order to move ahead to the next step in the process. As part of streamlining, concurrence is sought from the participating agencies at each key milestone in the process to preclude revisiting issues later, unless significant new findings are identified. A summary of existing deficiencies in the project area and a draft purpose and need were presented by the project team for input by the participants.

December 17, 2002

The purpose of this meeting was to obtain concurrence on the purpose and need so the planning of the project could continue within the streamlining framework, to present the baseline environmental data, and to present the alternatives developed to date. Certain participants expressed reservations about signing the concurrence form, but all agreed that the purpose and need was acceptable. NJDOT presented a summary of the baseline environmental data collected to-date: land use, minority populations, noise, vegetation and wetlands, cultural resources, 4(f) and hazardous waste sites within the project area. The nine interchange alternatives developed to date were presented. A tunnel alternative was suggested; it was agreed that several alignments may have to be evaluated for this alternative.

February 3, 2003

This meeting was held to develop the Alternatives Screening Criteria. NJDOT explained that it had modified various alternatives and developed new alternatives, based on community and agency comments. NJDOT stated that it would ask for concurrence from the agencies on the alternatives recommended for further study, when developed. Some of the participants then expressed concerns regarding the separation of the I-295/I-76/Route 42 Direct Connection and the Missing Moves projects and the potential impacts the two projects might create. NJDOT stated that, from an engineering perspective, the two projects are separate. A Transportation Investment Study concluded that they should be constructed separately. NJDOT agreed to review the potential I-295/I-76/Route 42 Direct Connection project alternatives that include the area of the Missing Moves project to determine if a better alternative exists. The participants did not review the Alternatives Screening Criteria, as the discussion regarding the separation of the projects continued until the meeting ended.

March 26, 2003

The purpose of this meeting was to provide the participants with a history of the evolution of the I-295/I-76/Route 42 Direct Connection project. NJDOT provided a presentation illustrating the alternatives considered for this project since studies began in 1987. The presentation showed how the projects began as one and split into two, as they stand today. This presentation provided for discussion among the participants as to the separation of the projects and the purpose and need for the I-295/I-76/Route 42 Direct Connection project as it reads now. The participants were unable to reach a conclusion on this matter and it was agreed that a field visit might aid in this process.

May 13, 2003 and June 2, 2003

Concurrence on the purpose and need was achieved at the May 13, 2003 ACM, held in conjunction with a field visit to the project site. The major focus of the May 13, 2003 meeting was a design charette. The USACE confirmed their concurrence in a letter that was received and read at the June 2, 2003 ACM, which, like the May 13th meeting, was dedicated primarily to alternatives development and summarized in the Alternatives Development section (11.3.3).

11.3.2.2 Project Partnering Session

December 11 and 12, 2001

The purpose of this PPS was to initiate the agency scoping process, promote stakeholder coordination over the life of the project, receive input regarding the purpose and need of the project, and identify important issues among all participants. During the two-day process, participants toured the project area and exchanged ideas about project issues through in-depth group discussions and break-out groups.

11.3.2.3 Community Advisory Committee

August 20, 2002

This meeting introduced the I-295/I-76/Route 42 Direct Connection project, the project team, and explained the roles and responsibilities of the CAC. The project team stressed that CAC commitment and consistency is vital to an effective public outreach effort. The purpose and need was also discussed with the participants. Comments included:

- The process—reality of moving forward and the difference between this process and the one in the 1950s and 1960s that saw the original construction of the highways.
- The extent of the project and the relationship between the Missing Moves project and the I-295/I-76/Route 42 Direct Connection project.
- The anticipated impact on the community—management of condemnation, consideration of the cemetery, the potential for noise walls, and consideration of underground utilities.
- Alternatives—the necessity of the project and potential alternative small projects in lieu of reconstruction of the interchange, including express lanes or light rail.

November 21, 2002

This meeting addressed the nine initial project alternatives and discussed the rationale, impacts, and advantages of each. Members of the CAC reviewed the alternatives and made comments and recommendations for improvement. Participants also agreed upon the purpose and need for the project. During the question and answer session, committee members inquired about the speed of ramps versus the speed limit on the mainline, the costs of construction, noise and air pollution, wetlands impacts, right-of-way takings, and construction duration. The project team explained that the alternatives screening process and DEIS will examine many of their concerns in depth. Factors such as the cost and duration of construction, impact to residences and the cemetery, and the overall relative safety of each design, are criteria for evaluating the alternatives.

11.3.2.4 Public Information Center

April 24, 2002

This PIC initiated the public scoping process. Two presentations were given to introduce the project and engage the public in a dialogue regarding their experiences with the interchange. After the presentations, questions and comments from the public were welcomed. Comments received were incorporated into the development of the purpose and need. The topics of the comments and questions included the Missing Moves project, emergency call boxes, traffic volume, local road congestion, alternatives selection, noise, property compensation, funding, and interim roadway projects. As a scoping meeting, this PIC served to gather information that would be used to guide the further development of the project. The comments were documented in the minutes for the meeting, and shared with the ACM and Partnering Session participants so that the public's concerns were reflected in the final language of the purpose and need.

11.3.2.5 Other Meetings

February 6, 2002

This meeting was attended by NJDOT, Dewberry-Goodkind, Inc., USEPA, USACE, and FHWA. The purpose of the meeting was to review and discuss the NEPA streamlining process being employed for the DEIS. It was explained that while streamlining may not shorten the NEPA process, it assures that the points of concurrence achieved will not be revisited later in the process. Additionally, the Independent Utility Statement was reviewed and concurred with by FHWA.

October 9, 2002

This meeting was attended by NJDOT, NJDEP, USACE, Dresdner-Robin, and Dewberry-Goodkind, Inc. The purpose of this meeting was to discuss project issues, including purpose and need, Independent Utility, project schedule, wetland delineation methodology, and streamlining. It was determined that agency agreement on the Independent Utility and project limits was necessary and had not yet been achieved. There was discussion of the wetland delineation schedule and other applicable issues.

February 5, 2003

This meeting was held to introduce the project to the Transportation Committee of the Chamber of Commerce of Southern Jersey. Presentations were made by representatives of Dewberry-Goodkind, Inc., and NJDOT. It was explained that the Missing Moves project would remove some traffic from the interchange, but that the project is not focusing on congestion on I-295 near Route 130. The Committee generally approved of the local outreach being undertaken.

11.3.2.6 Inter-Agency Correspondence

The NOPA was submitted by NJDOT to various federal, state, and local agencies, along with numerous non-government agencies and individuals, in December 2001 (see Appendix A). Responses were received from NMFS, NJDEP-Office of Coastal Planning and Program Coordination (OCPPC), USFWS, Delaware River Basin Commission) (DRBC), USACE, NJTA, NJ Transit, and USEPA in December 2001 and January 2002.

A January 30, 2002 letter from the USCG requested NJDOT to notify the USCG of any changes in plans that could potentially impact navigable waters, specifically the Market Street Bridge.

NJDEP OCP sent a letter to NJDOT on December 9, 2002, stating that while they have no comments or objections to the project purpose and need at that time, they "reserve the right to request modifications to the document as the environmental review process for this project proceeds."

A letter sent by the USFWS to NJDOT on December 16, 2002, responded to Section 7 of the Endangered Species Act of 1973 and also the USFWS's response to the project purpose and need, streamlining, wetland impacts, environmental contamination, and further coordination. They also agreed to be part of the ACM.

On May 29, 2003, a letter was sent by USACE to NJDOT regarding the Independent Utility Statement and the purpose and need. The USACE concurred with FHWA's determination that the I-295/I-76/Route 42 Direct Connection project and the Missing Moves project have independent utility. They also concurred with the purpose and need of the I-295/I-76/Route 42 Direct Connection project.

11.3.3 Alternatives Development

The purpose and need for the I-295/I-76/Route 42 Direct Connection project identified critical deficiencies of the existing interchange: geometric and structural deficiencies, and operational deficiencies (level of service) that affect safety, increase congestion, and affect driver expectation when moving through the interchange. These formed the basis for the development of 26 project alternatives generated through a collaborative effort similar to the one that resulted in the development and endorsement of the purpose and need. The stakeholder committee meetings described below led to the development of the 26 conceptual alternatives.

11.3.3.1 Agency Coordination Meetings

May 13, 2003

The participants met at the Wyndham Hotel in Mount Laurel, New Jersey and took a bus tour through the I-295/I-76/Route 42 Direct Connection project area. Various environmental resources, existing substandard features and community resources were identified to the ACM participants. The bus stopped at the Browning Road overpass and Shining Star Park adjacent to Little Timber Creek so attendees could leave the bus for a more detailed view. During the tour, the project team manager described various points of concern and interest associated with the planning of the project. The group returned to the hotel where they viewed the current alternatives for the project and discussed the agency comments on the project to that point. Finally, a design charette was held where the participants were invited to participate in the design of alternatives for the project. Though no new alternatives were created, each team provided suggestions on possible refinements to the alternatives currently under consideration. Following the charette, the attendees discussed the purpose and need. There was a consensus among the attendees that the I-295/I-76/Route 42 Direct Connection project and the Missing Moves project would have Independent Utility Statements and may proceed as individual projects.

June 2, 2003

The participants confirmed the purpose and need, as well as the Independent Utility Statement of the I-295/I-76/Route 42 Direct Connection and Missing Moves projects, and discussed in detail the screening criteria and the Alternatives Comparison Matrix. Participants concurred that each alternative would be analyzed using the following criteria: construction costs, right-of-way requirements, wetlands criteria, noise impacts, socioeconomics, and historic resources. Following the discussion about the wetlands criteria, a "Wetlands Working Group" was formed to discuss the wetland delineation process.

11.3.3.2 Project Partnering Session

June 18, 2003

This meeting addressed the tentative schedule for the DEIS and then broke into groups for a brainstorming session to address possible issues facing the project. The brainstorming session involved both design and policy/procedural recommendations, as participants considered how to achieve the best results with the least impacts to the community. In some instances, such as the avoidance of impacts to the wetlands, specific design suggestions were made, although no specific new alternative was developed. In other instances, such as bolstering public support and resolving conflicts with special interest groups, policy and procedural recommendations were offered by the participants. A general discussion followed the brainstorming session, wherein participants asked a variety of questions that mirrored those asked by the CAC, including hours of construction, coordination with the Missing Moves project, impacts to the New St. Mary's Cemetery, and compensation for taking of residential structures. At this stage in the project, the agency representatives were able to answer many of the questions raised. Those that could not be answered were documented in the minutes, to be taken into consideration during subsequent project activities.

11.3.3.3 Community Advisory Committee

January 7, 2003

The project team updated the committee on the ACM progress, and presented additional alternatives that had been created since the November CAC meeting. Among the new alternatives was a revised alignment for Alternative A (a recommendation that came from the CAC at the November meeting) and a tunnel alternative. The project team also presented a right-of-way impacts chart illustrating residential, institutional, commercial, and recreational impacts. Additionally, a wetlands impact chart illustrating potential impacts to both freshwater and tidal wetlands was presented. Committee members reported that many had presented the alternatives to their respective groups. None objected to the alternatives under consideration as of the November CAC meeting. The committee and project team also discussed the planning for a PIC in the spring. The committee felt that a strong attendance was important and offered suggestions for advertising the PIC through newspaper advertisements, church bulletins, notices distributed to school children, and cable television announcements.

11.3.3.4 Public Information Center

July 24, 2003

The purpose of this PIC was to present the alternatives developed to date and solicit feedback on their design. The PIC was attended by more than 250 members of the general public and five elected officials. The day was divided into two information sessions—one at 4 pm and a second at 7 pm. Each session began with formal presentations regarding the alternatives and the screening criteria that would be used to evaluate them. Each session concluded with an informal question and answer period. During both sessions, attendees were invited to review boards and handouts and offer suggestions on potential roadway improvements. Comments from the public generally fell into the following categories:

- Traffic and congestion—the concern that the project may worsen local conditions for residents while improving conditions for commuters.
- Roadway issues—safety improvements and the potential for a signing-only alternative to construction.

- Alternatives—number, scope, and affected residents and business owners for each, the viability of tunnel or overpass, and potential for commuter or freight rail.
- Property issues—the needs of Bellmawr Park and fixed-income residents of Bellmawr Park Mutual Housing Corporation and the management of historic resources and the cemetery.
- Construction—duration, sound wall construction, and local traffic management.

Participants were encouraged to mark up the maps of the alternatives to illustrate particular design ideas that may address their quality of life concerns expressed in the question and answer session. All PIC attendees that signed in were added to the project mailing list to receive project information and meeting notices.

11.3.3.5 Other Meetings

June 27, 2003

A small meeting attended by the NJDEP-Land Use Regulation Program, USACE, and Dewberry-Goodkind, Inc., was held to discuss the wetland delineation methodologies of the USACE and NJDEP, along with the proposed schedule and necessary coordination. Coordination regarding the multiple wetland delineation methods was discussed, as well as the 1987 Manual USACE utilizes, and the 1989 Interagency Manual NJDEP utilizes. Stormwater regulations and wetland map specifics were also discussed.

11.3.3.6 Inter-Agency Correspondence

Part of the Alternatives Analysis process involved initializing communication with the agencies that would participate in the project review process. A set of letters were sent by FHWA on October 22, 2002 inviting EPA, NJDEP DPF, NJDEP OCPPC, NMFS, and USFWS to participate. The USFWS responded to the invitation in a December 27, 2002 letter thanking FHWA for the opportunity to comment and recommending a Section 7 Review. On January 31, 2003, USACE accepted the invitation to be a cooperating agency in the preparation of the I-295/I-76/Route 42 Direct Connection EIS.

The USFWS conducted an informal Section 7 Review and in a March 21, 2003 letter stated that "no federally listed or proposed threatened or endangered flora or fauna under Service jurisdiction are known to occur within the vicinity of the proposed project site."

11.3.4 Alternatives Screening

The following meeting summaries describe the continuing efforts of partner groups whose work began in the development of the purpose and need and carried through to the development of alternatives. The meetings described below were conducted during the alternatives screening process and resulted in the selection of the five build alternatives recommended for further study.

11.3.4.1 Agency Coordination Meetings

October 15, 2003

The purpose of the meeting was to review the various alternatives and the initial Alternatives Screening Matrix and to obtain consensus from the agencies regarding the alternatives to be advanced for full assessment in the DEIS. The meeting participants were divided into two groups to independently review the Alternatives Comparison Matrix and decide which alternatives to advance for further study. After deliberating, the participants agreed to recommend advancing Alternatives D, D1, G2, H1, and K. The project team and NJDOT Core Group had previously decided on the same alternatives with the exception of G2 and H1, which the project team had dropped based on visual impacts, maintenance, and constructability.

July 15, 2004

The Wetlands Working Group, a subgroup of the ACM, convened to review the LOI/JD application, and stormwater quantity and quality treatment options and requirements. It was reported that the LOI/JD application had been submitted and potential wetland mitigation areas had been inspected for the Missing Moves project. It was suggested that one of those areas might be appropriate for the project. Groundwater recharge was also discussed and it was generally decided that recharge requirements were not pertinent to a large portion of the site. Fluvial and tidal flood plains were reviewed and it was suggested that the 100-year flood be treated as a fluvial situation. Stormwater options were discussed for different alternatives. Concerns regarding the high water table, soil contamination, and water freezing in storm drain pipes were raised.

11.3.4.2 Project Partnering Session

January 7, 2004

The PPS convened to review the alternatives and the initial Alternatives Screening Matrix. The goal was to obtain consensus from the participants on the alternatives to be advanced for further study. The meeting began with a summary of the project's progress and then moved on to a discussion of the alternatives screening process. Alternatives D, G2, and K were selected by the project team. Alternatives D and K were selected by the NJDOT Core Group. Alternatives D, D1, G2, H1, and K, were selected by the agencies, and the CAC had selected Alternatives D and K. The participants then broke into three groups to review the various alternatives and make their own recommendations regarding the alternatives to be advanced for further study. The groups' consensus following the brainstorming session was that Alternatives D, D1, G2, and K should be advanced through the DEIS process for the following reasons:

- Alternative D—removes Al Jo's Curve, allows for mixed use of land, minimal impact on community and surrounding property, moderate construction costs.
- Alternative D1—provides an increased weave distance, less visual impacts than the ramp alternative (D).
- Alternative G2—high potential for environmental remediation and minimal environmental impact, minimal community and right-of-way impacts, eliminates Al Jo's Curve.
- Alternative K—moderate impacts to community and environment.

A general discussion followed the brainstorming session. Participants inquired whether the state and federal representatives would contribute the additional funding necessary to construct the tunnel alternative. Representatives from FHWA said that they would fund the higher cost if it showed appropriate benefits.

11.3.4.3 Community Advisory Committee

November 25, 2003

The CAC convened to recommend alternatives to be studied further in the DEIS process. The alternatives selection and criteria used in the screening process were reviewed. The group then provided feedback on the alternatives to dismiss and those to recommend for further study. The group agreed that overall, Alternative K offered the lowest noise and visual impacts. The group agreed that Alternatives D and K should be recommended and presented at the PPS meeting and advanced for further study for the following reasons:

- Alternative D—eliminates Al Jo's Curve; and
- Alternative K—has the least impacts of all other alternatives.

Five representatives were nominated to participate in the PPS on January 7, 2004.

March 23, 2004

The CAC convened to discuss alternatives advanced for further study and to review the roles and responsibilities of the technical professionals and project team members. The group was informed that balloon tests would be performed for the alternatives that would significantly raise the roadway over present heights. The results of these tests would be used by the team in concert with NJHPO to determine the APE. The need for network development to inform the public of activities was discussed. Suggestions were made on how best to inform the public of ongoing activities regarding the project and it was agreed that information, including the alternatives advanced for further study, should be placed on boards in public places with a contact/information sheet delineating ongoing activities. In addition, it was explained that each alternative and the status of the project entering into the TES report phase would be presented in the next newsletter. It was also suggested that residents of neighborhoods in areas to be specifically affected by noise associated with alternatives advanced for further study should be informed to that end.

November 10, 2004

The CAC convened to discuss the environmental process and potential impacts to both the natural and built environment and to explain the various disciplines (wetlands, floodplains, archaeological and historic architectural resources, noise, and visual) that will be investigated. Other highway projects in the area were reviewed, as well as the next steps in the I-295/I-76/Route 42 Direct Connection project. A computerized traffic simulation was presented comparing existing and projected traffic patterns. Balloon test photographs were also presented to the CAC. It was explained that the environmental impacts would be presented to the group when all the disciplines were prepared. It was suggested that immediate traffic signage be posted to alleviate an existing high accident area.

11.3.4.4 Public Information Center

January 28, 2004

This PIC presented a forum where citizens could provide input into the Alternatives Screening Process. The list of alternatives to be advanced for further study in the DEIS process was finalized upon receipt of comments from the PIC participants. Formal presentations included a discussion of project milestones, definition of the purpose and need, and a review of the screening process resulting in alternatives recommended for further study and those dismissed from further study by all groups that participated in the process. Comments and questions were solicited from the audience. The topics of the comments received generally fell into the following categories:

- personal disruption, specifically how many and which homes will be lost;
- property value issues, particularly any increase or decrease in resale value and the reimbursement process;
- community disruption (traffic) during construction;
- impacts on businesses and residences; and
- questions about CAC members and how to contact them.

November 30, 2004

The purpose of this PIC was to give the public an opportunity to view the different aspects of the ongoing study in an open house situation. Areas were set up to illustrate the project with stations manned by project team members for presenting the five alternatives recommended for further study. Areas were also set up for computer traffic simulations, balloon test information, wetlands/floodplains, and the archaeological study. Additionally, boards displaying projects other than the I-295/I-76/Route 42 Direct Connection project were displayed.

11.3.4.5 Inter-Agency Correspondence

On January 27, 2004, a letter was sent from NJDOT to the PPS participants thanking them for their participation in the January 7, 2004 Partnering Session. Another letter was sent by the NJDOT on March 12, 2004 to the participants of the ACM thanking them for their participation in the alternatives screening process and requesting concurrence with the five alternatives recommended for advancement.

A letter was sent by the DRPA on May 3, 2004 reminding NJDOT of the discussed issue of PATCO right-of-way allowance.

A letter was sent by FHWA on June 30, 2005 requesting guidance from the EPA regarding the preparation of a water quality assessment.

11.3.5 TES Development

As the TES reports were developed, partner groups were kept up-to-date on TES report progress through the meetings described below.

11.3.5.1 Agency Coordination Meetings

June 7, 2005

The purpose of this meeting was to discuss the status of the TES reports and their analysis of the five alternatives advanced for further study. It was noted that the alignments had been refined to reduce impacts to the Bellmawr Park Mutual Housing Corporation and the Bellmawr Baseball League Fields and to reduce wetland impacts along Little Timber Creek. The attendees were informed of the meetings previously held with the impacted property owners (including representatives of New St. Mary's Cemetery, Annunciation B.V.M. Church, Bellmawr Park Mutual Housing Corporation, Bellmawr Park Board of Education and Bellmawr Baseball League) during which the right-of-way advance acquisition process was discussed. It was stated by one of the attendees that advance acquisition would require the use of state funds. Noise and air impacts, as well as wetland mitigation options, were also discussed. A thorough review of the TES reports was presented. A question arose regarding conflicts with potential PATCO plans for a rail line and it was reported that none of the alternatives advanced for further study would preclude anything that PATCO may want to do in the future, and also that the proposed project is years ahead of any PATCO plans for this area.

11.3.5.2 Community Advisory Committee

June 9, 2005

The purpose of this CAC meeting was to present a detailed review of the five alternatives advanced for further study and to provide the group with an explanatory narrative for each TES report discipline (*Noise; Air Quality; Socioeconomic, Land Use, and Environmental Justice; Natural Ecosystems; Phase I/II Archaeological Investigation; Historic Architectural Resources;* and *Hazardous Waste Screening*). A timeline was reviewed for remaining meetings and activities through the FEIS. Details regarding the five alternatives were then discussed, including Al Jo's Curve, noise walls, and the fact that all five alternatives will be maintained through the end of the review when the Preferred Alternative will be chosen.

11.3.5.3 Public Information Center

June 13, 2005

The purpose of this PIC was to give the public an opportunity to view the different aspects of the ongoing study in an open house situation. Areas were set up to illustrate the project with stations manned by project team members for presenting the five alternatives advanced for further study. Areas were also set up to show wetland impacts, impacts to Browning Road, Creek Road, and Bell Road, right-of-way impacts, photo simulations, cultural resources, and noise impacts.

11.3.5.4 Inter-Agency Correspondence

In support of the *Natural Ecosystems TES*, letters were received concerning threatened and endangered species. The NMFS (May 27, 2005, revised July 15, 2005), USFWS (October 9, 2003), and NJDEP (September 11, 2003) all indicated that there were no threatened and endangered species listed as being present in the project area with the exception of an occasional transient bald eagle. NJDEP responded to the LOI request agreeing with the wetland delineations on February 9, 2005. Attachments to the USACE letter sent on February 15, 2005 depicted the extent of federal jurisdiction in the project area (Jurisdictional Determination).

In support of the *Historic Architectural Resources TES*, letters were received from NJHPO regarding the review and balloon test. In a letter dated July 6, 2005, NJHPO issued an opinion of eligibility for the Bellmawr Park Mutual Housing Historic District. NJHPO commented that the potential effects "to the historic district will be reviewed once a Preferred Alternative is selected."

11.3.6 Alternatives Analysis

The following meeting summaries describe the final stages of the Alternatives Analysis process and the recommendation of a Preferred Alternative.

11.3.6.1 Community Advisory Committee

June 8, 2006

The purpose of this meeting was to review the completed TES reports and explain the Alternatives Analysis process leading to the DEIS. Details were given regarding the Summary of TES Findings, Impacts, and Benefits Table and the Alternatives Comparison Matrix. Comments regarding the Alternatives Comparison Matrix criteria were reviewed by the group. Concerns voiced included splitting the contract for bidding, noise walls, and the potential for the presence of a red-headed woodpecker, a threatened and endangered species.

October 19, 2006

The purpose of this meeting was to present the CAC with the Preferred Alternative recommended by NJDOT. The Alternatives Analysis process was explained along with the Impact Criteria, Engineering Summary, Summary of TES Findings, Impacts, and Benefits Table, and the Alternatives Comparison Matrix. Alternative D was presented as the Preferred Alternative. Several comments were made inquiring about specifics, such as traffic during construction, noise, and visual impacts. The next steps of funding for the DEIS and its preparation, preparing the Conceptual Section 404 USACE Permit, and Section 4(f) documentation were then explained. The general consensus of the CAC members was that they were satisfied with the screening out of Alternatives G2, H1, and D1. The CAC indicated that they needed additional information on traffic, visual, and noise impacts prior to supporting either Alternative D or K. Subsequent to the meeting, additional information was provided and feedback indicated that the CAC is in support of Alternative D. A letter was sent by NJDOT on December 13, 2006 to the CAC participants thanking them for their participation in the alternatives analysis process and requesting their concurrence or comments in writing regarding recommending Alternative D as the Preferred Alternative.

11.3.6.2 Agency Coordination Meetings

June 13, 2006

The purpose of this meeting was to review the project status, discuss the Alternatives Analysis process and evaluate the criteria to be developed and the metrics to be used on the Alternatives Comparison Matrix to be sure that all relevant criteria have been included. Topics reviewed in the progress of the project since the last meeting included the completion of the TES reports that had been reviewed by NJDOT. Five of the seven studies were under review by FHWA. The DEIS will summarize the results of each TES report, leading to the recommendation of a Preferred Alternative. Two tables were presented and reviewed summarizing the TES findings and a draft Alternatives Comparison Matrix. The criteria for the Alternatives

Comparison Matrix were discussed and it was noted that if the impacts were similar for each of the alternatives including the No Build Alternative, they were not included in the Alternatives Comparison Matrix, as they did not distinguish one alternative from another. Another meeting was scheduled in the fall of 2006 to discuss the ratings proposed by the project team for all criteria used in the Alternatives Comparison Matrix and to discuss the recommendation of a Preferred Alternative. A detailed review of the TES results for the seven environmental disciplines studied was presented. The ACM members agreed that there is no "formula" for the Alternatives Comparison Matrix; the Preferred Alternative will be selected following a similar qualitative, informed decision-making process as was used in the initial Alternatives Screening phase. The team's goal was to have a Preferred Alternative by the end of 2006.

October 24, 2006

The purpose of this meeting was to discuss the Alternatives Analysis process and achieve a consensus on a Preferred Alternative. The Alternatives Comparison Matrix, Impact Criteria, and Summary of Engineering Criteria tables were reviewed. The Summary of TES Findings, Impacts, and Benefits Table was reviewed and concerns voiced included stormwater and wetland shading issues. The Environmental Impact Plans were then reviewed and there was one concern regarding critical wildlife impacts. The Alternatives Comparison Matrix was reviewed in detail and it was emphasized that the numbers came directly from the TES report. It was explained that G2 and H1 had significant visual and noise impacts along with high cost and a high ecological impact. D1 did not score as well as D in a direct comparison. Alternatives D and K were compared and D was considered the Preferred Alternative primarily due to security issues, maintenance and operations, and its lower cost and shorter build time. The remaining steps of funding and preparing the DEIS, preparing the Conceptual Section 404 USACE Permit and the Section 4(f) documentation were then reviewed. The group agreed that there was consensus for recommending Alternative D as the Preferred Alternative.

11.3.6.3 Public Information Center

February 15, 2007

The purpose of this PIC was to present the TES findings, as well as the Alternatives Analysis process, in an open house setting and to solicit public comments to the Preferred Alternative. Presentation stations included the Project Purpose and Project Milestones (Flow Chart); 200 Scale Plans depicting the five alternatives (D, D1, G2, H1, and K) as well as their respective environmental impacts; a PowerPoint presentation of noise wall photo simulations; the Alternatives Analysis Process including the Summary of TES Findings/Summary of Engineering Criteria, Alternatives Comparison Matrix, Alternatives Analysis and a Concurrence Board; Alternative D, the Initially Preferred Alternative, was presented on 50 Scale Plans followed by the proposed noise wall locations and design process; the Section 106 Historic Preservation flow chart; and the Project Schedule. Discussion between the public and project representatives included noise wall placement and impacts, specific property impacts and acquisition, and project schedule.

11.3.6.4 Inter-Agency Correspondence

A letter was sent from NJHPO on August 16, 2006, regarding the opinion of eligibility added in the July 6, 2005 letter. It is the opinion of NJHPO that "the proposed project will have a direct effect on the Bellmawr Park Mutual Housing District" and that Alternative K represents the least overall impact. Additionally, NJHPO stated that they "would like to commend the staff of A.D. Marble and NJDOT, and especially recognize Dewberry-Goodkind, Inc. for their dedication to the NEPA process. [NJHPO] staff have been very impressed with the transparent and honest dialog that has occurred. The sheer project scope, with a half a billion-dollar project cost, has made it essential that the regulatory review community work collaboratively."

On March 30, 2007, NJHPO sent a concurrence letter to NJDOT in response to the NJDOT January 10, 2007 letter regarding agencies that should be invited to participate in the alternatives analysis process as consulting parties. On January 16, 2007, letters were sent to the consulting parties transmitting a copy of the *Archaeological Resources TES* and *Historic Architectural Resources TES* as well as the August 16, 2006 letter from NJHPO. On May 15, 2007, another letter was sent by NJDOT to the consulting parties again inviting the parties to participate in the project review process.

11.3.7 DEIS Circulation and Public Hearing

The public hearing was held on January 30, 2008, and served as a culmination of the public comment period initiated by the Notice of Availability (NOA) which was published in the December 7, 2007, Federal Register. The NOA and the DEIS distribution list are included in Appendix G. The DEIS was publicly available for comment through February 15, 2008. The purpose of this public hearing was to receive public comments on the project as a whole. In addition, presentation stations were set up to facilitate discussion. These stations included the Project Purpose and Project Milestones (Flow Chart); 200 Scale Plans depicting the five alternatives (D, D1, G2, H1, and K) as well as their respective environmental impacts; a PowerPoint presentation of noise wall photo simulations; the Alternatives Analysis Process including the Summary of TES Findings/Summary of Engineering Criteria, Alternatives Comparison Matrix, Alternatives Analysis and a Concurrence Board; Alternative D, the Initially Preferred Alternative, was presented on 50 Scale Plans followed by the proposed noise wall locations and design process; the Section 106 Historic Preservation flow chart; and the Project Schedule. Discussion topics between the public and project representatives included stream restoration, noise wall placement, funding, construction, and specific property impacts. The public generally agreed with Alternative D as the preferred alternative.

The Summary of Public Comments and Responses can be found in Appendix H. Written comments and the transcript of the oral testimony from the public hearing can be found in Appendix I. Formal written comments were received from the following agencies: USEPA, US Department of the Interior, NOAA/NMFS, USACE, NJDEP, DVRPC, DRPA/PATCO, NJ Board of Public Utilities, and Gloucester County. Written comments were received from six local residents during the public comment period, while oral testimony was presented by ten local residents at the public hearing. Substantive comments have been incorporated into the FEIS.

Since the circulation of the DEIS and receipt of comments, additional analysis has been performed on the selected alternative in order to prepare a more detailed cost estimate. The cost estimates used as the basis for the Alternative Analysis were based on 2006 data with escalation capped at 20%. A Cost Estimate Review (CER) workshop was conducted by FHWA in October 2008 to verify the accuracy and reasonableness of the total cost estimate and to develop a probability range for the cost estimate that represents the project's current stage of design. Based on the results of the CER workshop, the 2008 construction cost estimate for Alternative D is $902 million in year of expenditure dollars, which reflects an 80% confidence level that the cost estimate will not be exceeded. In addition, the 2008 construction cost estimate includes costs for breaking the project into four construction contracts, adding incentives to promote accelerated construction, traffic mitigation during construction to help minimize impacts on motorists, and reflected cost increases for materials, labor and Right of Way.

DATE	INDIVIDUAL STAKEHOLDER
June 25, 2003	DRPA
June 26, 2003	DVRPC
December 2, 2003	BPMHC
January 21, 2004	Local Businesses
February 20, 2004	Diocese of Camden
February 20, 2004	VFW
March 31, 2004	DRPA/PATCO
May 4, 2004	Bellmawr Baseball, Inc.
July 14, 2004	DVRPC/Borough of Bellmawr
November 9, 2004	Diocese of Camden
February 23, 2005	BPMHC
March 23, 2005	Diocese of Camden
May 10, 2005	BPMHC
May 23, 2005	Annunciation B.V.M. Church
May 23, 2005	Bellmawr Baseball, Inc.
May 23, 2005	Bellmawr Board of Education
June 6, 2005	BPMHC
August 17, 2005	Diocese of Camden
August 17, 2005	Mount Ephraim Senior Housing
November 7, 2005	Diocese of Camden
June 6, 2007	Section 106 Consulting Party Meeting
July 31, 2007	Bellmawr Board of Education
September 4, 2007	BPMHC
November 20, 2007	Section 106 Consulting Party Meeting
May 6, 2008	Section 106 Consulting Party Meeting
June 26, 2008	Section 106 Consulting Party Meeting
August 4, 2008	Section 106 Consulting Party Meeting

Table 11.3-1: Individual Stakeholder Meetings

11.3.8 Individual Stakeholder Meetings

Many meetings were held in small groups with individual stakeholders to discuss the project impacts and stakeholder concerns. A chronological summary of individual stakeholder meetings is provided in **Table 11.3-1**.

Individual meetings were held with four stakeholder groups in order to present the proposed project and how it would impact their property(s). A meeting was held with local businesses on January 21, 2004, to discuss the potential impact of the project on their businesses. Two meetings were held with the Bellmawr Board of Education on May 23, 2005, and July 31, 2007, to discuss the relocation of their baseball field located at the Bellmawr Park Elementary School. A meeting with Annunciation B.V.M. Church was held on May 23, 2005, to discuss potential projects on their Browning Road property. A meeting with Mount Ephraim Senior Housing was held on August 17, 2005 to discuss potential project impacts (particularly noise) on their four-story building. Relevant correspondence and meeting minutes and for these meetings are listed in chronological order in Appendices B and D, respectively.

11.3.8.1 Bellmawr Park Mutual Housing Corporation (BPMHC)

Four meetings were held with representatives of the BPMHC. These meetings were attended by both board members and potentially impacted residents. The project was presented with emphasis on how the BPMHC will be affected. Potentially impacted residents had the opportunity to voice concerns and learn about relocation options and how residents would be compensated. These meetings were held on December 2, 2003, February 23, 2005, May 10, 2005, June 6, 2005, and September 4, 2007.

11.3.8.2 Diocese of Camden

Five meetings were held with representatives of the Diocese of Camden, the owners of New St. Mary's Cemetery. In the initial meeting, the project was presented with emphasis on how the Diocese will be impacted. In later meetings, there was considerable discussion regarding the right-of-way requirements and cemetery impacts. These meetings were held on February 20, 2004, November 9, 2004, March 23, 2005, August 17, 2005, and November 7, 2005.

11.3.8.3 Delaware River Port Authority (DRPA)

Two meetings were held with representatives of the DRPA. In these meetings the project was presented and representatives had the opportunity to voice concerns. There was discussion regarding the potential for the project to accommodate the possibility of a transit system without significant reconstruction of the interchange. The proposed project has been designed so as to not preclude the construction of light rail. These meetings were held on June 25, 2003 and March 31, 2004.

11.3.8.4 Delaware Valley Regional Planning Commission (DVRPC)

Two meetings were held with representatives of the DVRPC. In these meetings the project was presented and representatives had the opportunity to voice concerns. Additionally, construction options for local roads during construction were discussed. These meetings were held on June 26, 2003 and July 14, 2004.

11.3.8.5 Bellmawr Baseball, Inc.

Two meetings were held with representatives of Bellmawr Baseball, Inc. to present the project as it pertains to their property, located on Essex Avenue adjacent to the highway south of the Bellmawr Park Elementary School. In these meetings the project was presented and representatives had the opportunity to voice concerns and have questions answered. Field drainage was a particular concern and potential solutions were discussed. These meetings were held on May 4, 2004 and May 23, 2005.

11.3.8.6 Veterans of Foreign Wars (VFW)

One meeting was held with representatives of the VFW Crescent Park Post 9563, located on Essex Avenue adjacent to the existing highway. The VFW property will experience temporary easement impacts during construction, but will not be subject to permanent right-of-way acquisitions. This meeting was held to discuss options for project designs and the status of threatened and endangered species. This meeting was held on February 20, 2004.

11.3.8.7 Section 106 Consulting Parties

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR Part 800), consulting parties were identified and invited to participate as such in the Section 106 process. Six meetings were held with consulting parties in order to discuss impacts to historic properties located within the project study area. The first consulting party meeting was held on June 6, 2007. A meeting was held with the BPMHC Board on September 4, 2007, to discuss how the Bellmawr Park Mutual Housing Historic District may be impacted by the proposed project. A meeting was held on November 20, 2007, to discuss potential mitigation measures that could be included in a MOA for the project. A fourth meeting was held on May 6, 2008, to further discuss the draft MOA distributed to the participating consulting parties and the proposed mitigation. On June 26, 2008, the fifth meeting discussed revisions to the Draft MOA. The sixth meeting held on August 4, 2008 discussed the revised Draft MOA and the feasibility assessment for potential replacement residential unit sites. A copy of the MOA is included in Appendix J.

11.4 PROJECT NEWSLETTERS

Project newsletters have been a very powerful means to convey information to a broad audience about the project. This medium is particularly useful with a project that has users from a variety of locations and distances. It is an excellent medium to brand the project with name and identity, as well as making a regular, consistent connection with the communities and the traveling public. Newsletters have been published to coincide with the progress of the technical work, alternatives selection, and public meetings. The primary goal has been to convey technical information in clear and concise terms. Newsletters have been mailed to all the addressees on the project mailing list, which is updated regularly for accuracy. Five newsletters have been distributed at the time of this report and copies can be found in Appendix E.

11.5 PROJECT WEBSITE

Use of the Internet for disseminating information has become commonplace. It is an efficient and cost effective method of sharing information. Furthermore, it provides an opportunity for branding the project name, thereby giving it an identity and distinguishing it from other projects in the area. The project website is housed on the NJDOT server at *http://www.state.nj.us/transportation/works/studies/rt295* and includes information on project need, meetings, newsletters, project graphics, the Alternative Analysis process, the Alternatives Comparison Matrix, contact information for key project representatives, opportunities to provide input, and other features, including a summary of frequently asked questions. The website is updated as required to provide the public with current information. Links to the I-295/I-76/Route 42 Direct Connection website have been placed on several stakeholder websites, including the DRPA, DVRPC, and NJTA. The content of the website as of April 2008 has been included in Appendix F.

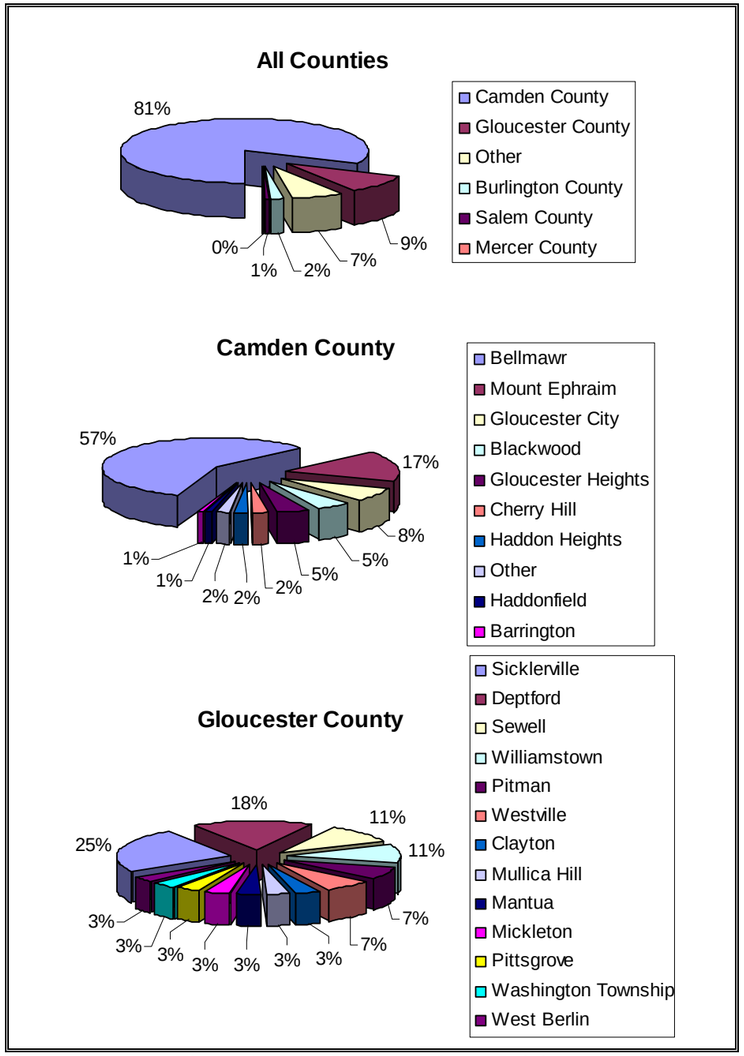


Figure 11.6-1: Correspondence Origins

11.6 PUBLIC CORRESPONDENCE

Input from the public was received from more than five counties throughout the scoping, development and NEPA process. A total of 294 pieces of correspondence were received. These generally came through the website comment submittal page and PIC questionnaires, though some direct e-mails and written letters have been received. A correspondence log has been maintained archiving all inquiries and responses along with some basic information about each inquiry. As shown in **Figure 11.6-1**, 81% of the correspondence came from Camden County with 57% of these from Bellmawr.

All correspondence received appropriate responses, including answers to the questions posed and an explanation of the project's facet in question. Often one piece of correspondence would have more than one comment or question within it. A total of 166 requests to be added to the mailing list was received. A total of 99 comments was received regarding existing conditions which generally illustrated traffic problems and high noise volumes. A total of 82 comments was received regarding the proposed improvements which generally dealt with the potential for home loss and concern over community degradation.

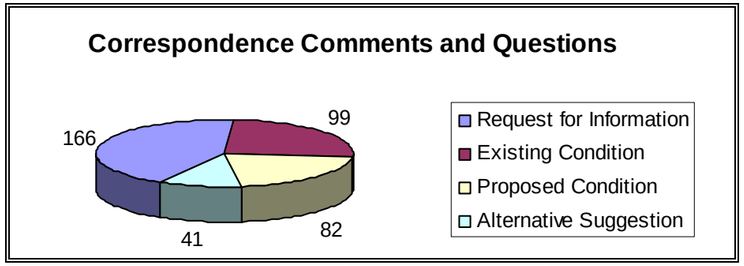


Figure 11.6-2: Correspondence Comments and Questions

As shown on **Figure 11.6-2**, a total of 41 suggestions for alternatives was received. All suggestions regarding alternatives were reviewed and compared to the already developed alternatives. As shown on **Figure 11.6-3**, 40% of the alternatives suggested were alternatives that had been already developed and satisfied the purpose and need of the project. These suggestions are all accommodated by the Preferred Alternative. Of the ideas submitted, 29% of them pertained to the proposed Missing Moves project adjacent to the I-295/I-76/Route 42 Direct Connection project. Suggestions that either did not meet the purpose and need or were part of an alternative already developed that had been dismissed made up 31% of the suggestion submittals.

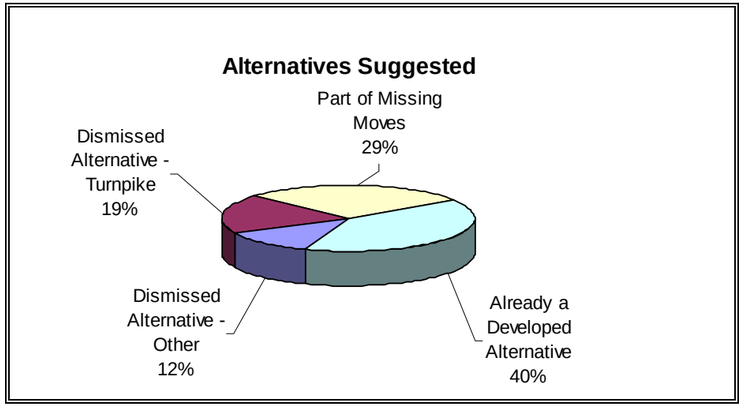
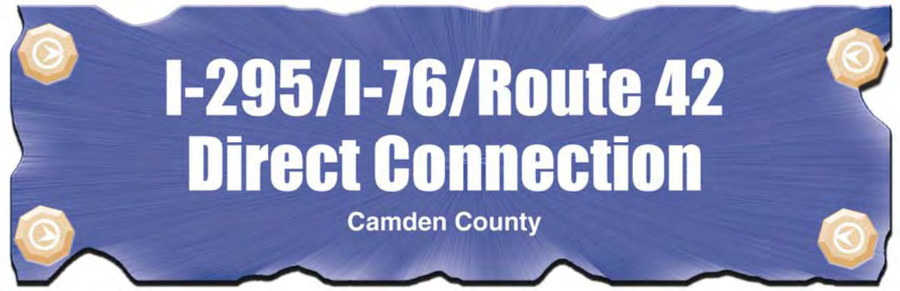


Figure 11.6-3: Alternatives Suggested



CHAPTER 12:
GLOSSARY AND ABBREVIATIONS

"A" Weighted Sound Level – A method of representing the human ear's interpretations of the loudness of an equal sound level throughout the audible frequency range. The scale is usually expressed in units "dBA" and normally referenced to the loudness at 1 kHz.

AASHTO (American Association of State Highway Transportation Officials) – An advocate for multimodal and intermodal transportation, this group serves the USDOT, Congress, and member departments by providing leadership, technical services, information, and advice, as well as by contributing a national policy on transportation issues.

ACBM (Asbestos-Containing Building Material) – ACBM can be found within piping insulation, ceiling and floor tiles, wallboard, roofing and siding materials, and mastic.

ACHP (Advisory Council on Historic Preservation) – An independent federal agency that promotes the preservation, enhancement, and productive uses of the nation's historic resources, and advises the President and Congress on national historic preservation policy.

ACM (Agency Coordination Meeting) – Regularly scheduled project review meetings attended by representatives from state and federal resource and regulatory agencies, FHWA and NJDOT. The ACM goal is to foster effective agency communications during the development of projects so that environmental issues are identified, clearly understood, and properly addressed early in the process.

Acoustic Reflection – The process by which the general direction of sound waves is reversed by barriers.

ADT (Average Daily Traffic) – The total traffic volume during a given time period (in whole days, greater than one day and less than one year) divided by the number of days in that time period.

Adverse Effect – An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

Air Pollution – The undesirable addition to the atmosphere of substances (gases, liquids, and solid particles) that are either foreign to the atmosphere or in quantities exceeding their natural concentrations.

Air Quality – The composition of air with respect to quantities of pollutants frequently used in connection with "standards" of maximum acceptable pollutant concentrations.

Alternative – One of a number of specific transportation improvement proposals, alignments, options, design choices, etc. Following detailed analysis, one improvement alternative—the Preferred Alternative—would be chosen for implementation.

Alternatives Analysis – Systematic and multidisciplinary process to compare alternatives. In the preliminary alternatives analysis, the objective is to reduce the number of alternatives so they may be studied in more detail. After conducting substantial and detailed engineering and environmental studies, a more refined comparison (analysis) can be made to select the best alternative based on agreed-upon criteria.

AM – Ante Meridiem.

AMNET – Ambient Biomonitoring Network.

AOC (Area of Concern) – Potential areas of soil or groundwater contamination, lead-based paint, or asbestos containing material.

APE (Area of Potential Effect) – The geographic area within which the proposed project may directly or indirectly cause changes in the character or use of National Register-listed or eligible properties, if any such properties exist.

Aquifer – A water-bearing unit of permeable rock, sand, or gravel that yields quantities of water to springs or can be extracted through wells.

AST (Above-ground Storage Tank) – One or a combination of storage tanks with capacity in excess of 250 gallons, in which 90% or more of this volume is stored above the ground surface.

Average Travel Speed – The summation of distances traveled by all vehicles or a specified class of vehicles over a given section of highway during a specified period of time, divided by the summation of overall travel lanes.

Background Level – The concentration of a pollutant that would exist in the absence of the particular source under study.

bgs – below ground surface.

BMPs – Best Management Practices.

BPMHC – Belmawr Park Mutual Housing Corporation.

Building Attenuation – The reduction in the energy of a sound field resulting from its passage through a building's structural elements.

CAA – Clean Air Act of 1970.

CAAA – Clean Air Act Amendments of 1990.

CAC (Community Advisory Committee) – A group of residents, community leaders, and public officials that meets regularly to represent community interests and contribute valuable information about the location, design, and implementation of proposed transportation improvements.

CAL3QHC – The USEPA-approved air dispersion model for predicting carbon monoxide levels near highways and arterial streets.

Capacity – Maximum rate of traffic flow expected to pass a certain point, usually expressed in vehicles per hour.

Car – Vehicle having two axles and four tires and designated primarily for transportation of nine or fewer passengers.

CEQ (Council on Environmental Quality) – The agency responsible for the development of national environmental policy and the oversight of federal agencies implementing NEPA.

CFR (Code of Federal Regulations) – The codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government.

cfs – cubic feet per second.

CO (Carbon Monoxide) – A colorless gas, odorless under atmospheric conditions, having molecular form CO.

Community Cohesion – The ability of a community to function and thrive as a unit. Factors contributing to cohesion include social spaces (i.e., opportunities for social interaction), community facilities, ease of movement, clean environment, civic and religious organizations, aesthetics, public health, and safety and economic opportunities.

Commuter Bus – Vehicle having two or three axles and designated for transportation of nine or more passengers.

Corridor – A band of determined width in which alternatives are located and studied.

CR – County Road.

Cultural Resources – Building, site, structure, object, or district evaluated as having historic or prehistoric significance.

Cumulative Impact – 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 regardless of what agency (federal or non-federal) or person undertakes such other actions.

CWA (Civil Works Administration) – This administration was established during the Great Depression to create jobs for millions of the unemployed.

dB (Decibel) – A unit of measure of sound pressure level used to describe the loudness of sound.

$dB = 10 \log (P/P_o)2$

Where: $P_o = 0.00002$ microbar

P = root mean square sound pressure

(0.00002 microbar is the threshold of hearing for a normal, healthy human ear)

dBA – Unit commonly used to define the human ear's interpretation of the loudness of an equal sound level throughout the audible range.

de minimis impact – For the purposes of Section 4(f), a *de minimis* impact is a minimal impact to a Section 4(f) resource that is not considered to be adverse.

DEIS – Draft Environmental Impact Statement.

Dendritic – A drainage pattern that resembles the branches of a tree.

Design Year – The future year for which a roadway facility is designed, normally 20 years in the future, to be used as a base for projections on a proposed project. **Developed Land –** Those tracts of land, or portions thereof, which contain improvements or activities devoted to frequent human use or habitation.

DHV (Design Hourly Volume) – The 30th highest hourly volume of vehicles of all hourly volumes recorded for a section of roadway over a one-year period.

Disability – According to the U.S. Census, any of the following long-lasting conditions: (a) blindness, deafness, or a severe vision or hearing impairment (sensory disability) and (b) a condition that substantially limits one or more basic physical activities, such as walking, climbing stairs, reaching, lifting, or carrying (physical disability). The DVRPC only uses data from physically disabled populations to determine areas of community concern.

DO – Dissolved Oxygen.

DRBC (Delaware River Basin Commission) – Agency responsible for water quality protection, watershed planning and conservation, water supply allocation, regulatory review, drought management, flood control, and recreation in the Delaware River Watershed. It was formed in 1961 by compact with the four basin states (Pennsylvania, New Jersey, New York, and Delaware) and the federal government.

DRKN (Delaware Riverkeeper Network) – A nonprofit membership organization responsible for environmental advocacy, volunteer monitoring programs, stream restoration projects, and public education throughout the entire Delaware River Watershed including portions of Pennsylvania, New Jersey, New York, and Delaware.

DRPA (Delaware River Port Authority) – Agency responsible for regional transportation and economic development in southeastern Pennsylvania and southern New Jersey. DRPA owns and operates several transportation entities including: major bridges, PATCO Speedline, RiverLink Ferry, the Philadelphia Cruise Terminal at Pier 1, and the AmeriPort Intermodal Rail Center.

DVRPC (Delaware Valley Regional Planning Commission) – Works with member governments (city, county, and state representatives) and others to foster regional cooperation in a nine-county, two-state area regarding transportation, land use, environmental protection and economic development through planning analyses, data collection, and mapping services.

EFH (Essential Fish Habitat) – Those waters and substrate necessary for fish spawning, breeding, feeding, or growth to maturity.

e.g. – For example.

EIS (Environmental Impact Statement) – Detailed statements required under NEPA that federal agencies are required to prepare to assess the environmental impact of and alternatives to major federal actions significantly affecting the environment.

EJ (Environmental Justice) – A 1994 Presidential Executive Order that directed every federal agency to identify and address the effects of all programs, policies, and activities on minority populations and low-income populations.

Emission Factor – The amount of a pollutant discharged over a distance traveled, measured in grams per mile.

EO – Executive Order.

EPT – Ephemeroptera, Plecoptera and Trichoptera species.

ETC (Estimated Time of Completion) – The year that a particular proposed project is completed and opened for utilization.

Existing Air Quality – Present day or base year air quality levels.

Existing Noise – That noise which is characteristic of an area before the construction of the proposed project.

E-Z Pass (Electronic Toll Collection) – Electronic toll collection program that has been instituted by several states in the northeast United States and offers discount programs, helps reduce congestion, auto emissions, and fuel consumption.

FEIS (Final Environmental Impact Statement) – Detailed study of the proposed alternatives and the impact of those alternatives. All substantive comments and questions on the DEIS received during the review period are addressed in this document.

FEMA (Federal Emergency Management Agency) – Agency dedicated to preparing the nation for all hazards and which effectively manages federal response and recovery efforts following any national incident (i.e., natural disaster).

FHWA (Federal Highway Administration) – A federal agency that carries out the federal highway programs in partnership with the state and local agencies to meet the nation's transportation needs. FHWA administers and oversees federal highway programs to ensure that federal funds are used efficiently.

Final Design – The development of detailed drawings, specifications, and estimates for approved transportation projects. Final Design follows the receipt of necessary design and/or environmental approval, and includes right-of-way acquisition, utility relocation, and contract advertisement and award.

FIRM (Flood Insurance Rate Map) – Depicts the spatial extent of special flood hazard areas and other thematic features related to flood risk assessment.

Floodplain – The lowland adjacent to a river, lake, or ocean. Floodplains are designated by the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will be covered by the 10-year flood, and the 100-year floodplain by the 100-year flood. The 100-year floodplain is the flood elevation that has a 1-percent chance of being equaled or exceeded each year.
Floodway – The channel of a river, or other watercourse, and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

Flora – Plant life, especially those of a specific region or period.

ft – feet.

FW1 (Fresh Water Designated One Waters) – Fresh waters, as designated in N.J.A.C. 7:9B-1.15(h) Table 6, that are to be maintained in their natural state of quality (set aside for posterity) and not subjected to any man-made wastewater discharges or increases in runoff from anthropogenic activities. These waters are set aside for posterity because of their clarity, color, scenic setting, other characteristic of aesthetic value, unique ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resource(s).

FW2 (Fresh Water Designated Two Waters) – The general surface water classification applied to those fresh waters that are not designated as FW1 or Pinelands Waters. There are three (3) sub-categories within the FW2 designation:

- FW2-TP - Trout production waters for trout spawning or nursery during their first summer;
- FW2-TM - Trout maintenance water for the support of trout throughout the year;
- FW2-NT – Non-trout waters – these are not considered suitable for trout, but may be suitable for many other fish species.

Geometric – Vertical and horizontal configuration of a roadway.

GIS (Geographic Information System) – A collection of computer hardware, software, geographic data, and personnel designed to efficiently capture, store, update, manipulate, analyze, and display all forms of geographically referenced information.

Glauconite – A mineral, green in color, and chemically comprised of a hydrous silicate of iron and potassium.

Grade Separation – A crossing with an overpass or underpass.

Groundwater – Water located beneath the ground surface in soil pore spaces and in the fractures of geologic formations.

HABS – Historic American Buildings Survey.

Hazardous Waste – Defined by 40 CFR Part 261, as any material that is: a) a solid waste, and b) is a listed hazardous waste (Subpart D), or c) exhibits any of the characteristics of ignitability, corrosivity, reactivity, or toxicity (Subpart C).

HC (Hydrocarbons) – A collective term used to describe a long list of organic air contaminants. A major component in total hydrocarbons is methane, which is considered unreactive. Hydrocarbons, other than methane, are considered capable of entering into photochemical reaction and, therefore, are referred to as being reactive.

Head-of-Tide – The inland or upstream limit of water affected by the tide.

Heavy Trucks – Vehicle with three or more axles and more than six tires. Any motor vehicle designated primarily for the transportation of property and rated at more than 8,500 pounds gross vehicle weight or designated primarily for transportation of people and having a capacity of more than 12 persons.

Hectare – A metric unit of surface area equal to 100 acres.

Historic – Of, relating to, or existing in times post dating the development of written records.

Historic Cultural Resources – All evidence of human occupations that date to recorded periods in history. These resources include documentary data (e.g., records, archival material, photographs, maps, etc.), sites, artifacts, environmental data, and all other relevant information. Historic resources also may be considered archaeological resources when archaeological work is involved in their identification and interpretation.

Historic District - a geographically definable area possessing a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united by past events or aesthetically by plan or physical development. A district may also comprise individual elements separated geographically but linked by association or history.

Historic Integrity – The unimpaired ability of a property to convey its historical significance.

Historic Resource – A building, site, district, object, or structure evaluated as historically significant.

Hot-Start Operation – Vehicle startup after less than the one-hour engine-off period.

HOV – High Occupancy Vehicle Lanes

hr – hour.

Hydric Soil – Soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile.

Hydrophyte, Hydrophytic Vegetation – Any plant that grows in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content; plants typically found in wet habitats.**Hz (Hertz) –** Frequency in cycles per second.
i.e. – that is.

IES – Illuminating Engineers Society.

in – inches.

Interchange – A grade separated intersection where ramps are provided to connect the intersecting streets.

Intersection – The at-grade crossing of two or more streets.

Interstate System – An interconnected system of over 4,000 miles of limited access highways across the United States. It is designated under the Intermodal Surface Transportation Efficiency Act to focus federal resources on roads that are the most important to interstate travel and national defense, that connect with other modes of transportation, and that are essential for international commerce.

ISC3 – The USEPA-approved Gaussian plume model utilized to assess pollutant concentrations from point sources.

ITS – Intelligence Transport System.

JD (Jurisdictional Determination) – A site survey performed by the USACE to officially determine whether or not a given parcel of land is subject to wetlands regulations, and if so, the extent of the area.

L_{10} Noise Level – That level of noise where the A-weighted sound pressure level in decibels is exceeded ten percent of the time.

L_{90} Noise Level – That level of noise where the A-weighted sound pressure level in decibels is exceeded 90 percent of the time.

L_{eq} Noise Level – That level of constant noise which contains the same amount of acoustic energy as time varying noise levels (e.g., traffic noise) during a given time interval.

LBP – Lead-based paint.

Light Trucks – Any motor vehicle designated primarily for transportation of property and rated at 8,500 pounds gross vehicle weight or less.

Limited Access – A specific level of access control which features only grade separated interchanges and no driveway connections of any kind on the mainline or ramps.

LOB (Local Officials Briefings) – Conducted as a method of keeping officials apprised of and involved in the project progress. These meetings typically consisted of presentations to the officials.

LOI (Letter of Interpretation) – Provides the NJDEP's official determination of the presence, absence, and/or location of freshwater wetlands, transition areas, and/or State Open Waters, as well as the resource values of freshwater wetlands for a given site.

LOS (Level of Service) – Operating conditions within a stream of traffic describing safety, traffic interruptions, speed, freedom to maneuver, comfort and convenience. Six levels of service are defined, designated A through F, with A representing the best conditions and F the worst.

LOS C (Level of Service "C") – With respect to vehicle movements, represents stable flow; however, most drivers have some moderate restriction in selecting their own speeds, change lanes or pass due to the presence and influence of other vehicles in the roadway. This combination of speed and volume usually creates the worst noise condition.

Low-Income Population – Any readily identifiable group of low-income persons who live in close geographic proximity and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed USDOT program, policy, or activity.

Macroinvertebrate – Invertebrates visible to the naked eye, such as insect larvae and crayfish.

MCL – Maximum Concentration Level.

Medium Truck – Vehicle with two axles and six tires.

Meteorology – The study of atmospheric phenomena, usually referring to weather conditions.

mg/L – milligrams per liter.

mg/m^3 – milligrams per cubic meter.

mi – mile.

Minority Population – Any readily identifiable groups of minority persons who live in geographic proximity and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed USDOT program, policy, or activity.

Mitigation Measures – Specific design commitments made during the environmental evaluation that serve to moderate, lessen, or replace impacts from the proposed action.

MOA (Memorandum of Agreement) – As part of the resolution of adverse effects under Section 106, a MOA outlines agreed-upon measures that the agency will take to avoid, minimize, or mitigate adverse effects.

MOBILE6.2 – The USAPE-approved motor vehicle emission factor model.

Motorcycle – Vehicle having two or three tires with an open-air driver and/or passenger compartment.

MP – Mile post.

mph – Miles per hour.
MPT – Maintenance and Protection of Traffic.

MSAT (Mobile Source Air Toxics) – Compounds emitted from highway vehicles and non-road equipment which are known or suspected to cause cancer or other serious health and environmental effects.

NAAQS (National Ambient Air Quality Standards) – The United States Environmental Protection Agency uses six criteria pollutants (carbon monoxide, ozone, nitrogen dioxide, particulate matter, sulfur dioxide, and lead) as indicators of air quality, and has established for each of them a maximum concentration above which adverse effects on human health occur.

NAC (Noise Abatement Criteria) – Noise levels established by FHWA in 23 CFR 772 for various land use activities. When the predicted noise level approaches or exceeds the NAC as given in Table 1 of 23 CFR 772, an impact exists and mitigation must be considered.

National Register of Historic Places - the United States government's official list of districts, sites, buildings, structures, and objects deemed worthy of preservation.

Natural Resources – Land, fish, wildlife, water (surface and groundwater), wetlands, and other resources, such as public beaches and parks, that are managed by or held in trust by the government for the benefit of the public.

NAVD (North American Vertical Datum, 1988) – A set of constants established in 1988 specifying the coordinate system used for geodetic control, i.e., for calculating the coordinates of points on the earth.

NEPA (National Environmental Policy Act) – Federal law that requires federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of proposed actions through the preparation of an EIS.

NFPA – National Fire Protection Association.

NJAC (New Jersey Administrative Code) – The compilation of the administrative regulations which specify how New Jersey state laws will be implemented.

NJDEP (New Jersey Department of Environmental Protection) – State agency responsible for preserving, sustaining, protecting, and enhancing the environment to ensure the integration of high environmental quality, public health, and economic vitality.

NJDFW (New Jersey Division of Fish and Wildlife) – State environmental agency responsible for the protection, management and wise use of New Jersey's fish and wildlife resources.

NJDOT (New Jersey Department of Transportation) – State agency funded by state and federal tax dollars that has jurisdiction, along with FHWA, over interstate highways in New Jersey.

NJDOT Core Group – Consists of technical specialists in all relevant fields who provide input to the project development process.

NJHPO (New Jersey Historic Preservation Office) – State agency responsible for identifying, protecting, preserving, and sustaining New Jersey's historic resources.

NJSA (New Jersey Statutes Annotated) – The collection of the state laws of New Jersey currently in effect.

NJTA – New Jersey Turnpike Authority.

NMFS (National Marine Fisheries Service) – Federal agency responsible for conserving, protecting, and managing living marine resources.

No Build Alternative – An alternative that serves as a baseline for comparison of alternatives considered. Option of maintaining the status quo by not building transportation improvements.

NO_x (Nitrogen Oxides) – A highly toxic gas under atmospheric conditions, essentially nitric oxide (NO) and nitrogen dioxide (NO_2).

NOA – Notice of Availability.

NOAA – National Ocean and Atmospheric Administration.

Noise – Unwanted or undesirable sound, usually characterized as being so loud as to interfere with, or be inappropriate to, normal activities such as communication, sleep, study, or recreation.

Noise Abatement – A solid wall, earth berm, or other methodology located between the roadway and receiver location, which breaks the line of sight between the receiver and roadway noise sources. Noise abatement is considered warranted for areas where predicted noise levels are expected to approach or exceed NAC or substantially exceed existing noise levels.

Noise Contours – Areas along a roadway within which noise levels would exceed a specified noise level. (Not to be interpreted as any single line.)

Noise Sensitive Areas or Locations – General areas of land or specific locations having activities that are affected by excessive noise levels.

Noise Wall – Solid wall located between the roadway and receiver location, intended to reduce traffic noise levels.

Non-Attainment – A condition where a pollutant exceeds the NAAQS established.

NOPA – Notice of Planned Action.

NRCS (Natural Resources Conservation Service) – Formerly the Soil Conservation Service. This agency is part of the United States Department of Agriculture and provides leadership in a partnership effort to help America's private land owners and managers conserve their soil, water, and other natural resources.

NRHP – (National Register of Historic Places) – Official federal list of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture.

NWI (National Wetlands Inventory) – Produces and provides information on the characteristics, extent, and status of wetlands and deepwater habitats and other wildlife habitats in the United States.

O_3 – Ozone.

OCPPC – NJDEP Office of Coastal Planning and Program Coordination.

O&D (Origin and Destination) – The beginning point (origin) and ending point (destination) recorded for each trip generated in a particular area.

ONRW (Outstanding Natural Resource Waters) – Waters of exceptional recreational or ecological significance. Waters designated as ONRW include: Fresh Water One (FW1) and Pinelands waters (PL). All remaining waters are categorized as Fresh Water Two (FW2).

Palustrine Wetlands – All non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 %.

PATCO – Port Authority Transit Corporation.

Pb – Lead.

Peak Hour Traffic – The highest number of vehicles found to be passing over a section of a lane or roadway during 60 consecutive minutes of a designated year.

PEM (Palustrine Emergent) – A Palustrine wetland characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens, that may be temporarily to permanently flooded at the base but does not tolerate prolonged inundation of the entire plant. This vegetation is present for most of the growing season in most years. Perennial plants usually dominate these wetlands.

PEMR (Palustrine, Emergent, Seasonal-Tidal) – A Palustrine Emergent wetland that experiences both seasonal and tidal flooding.

PEMV (Palustrine, Emergent, Permanent-Tidal) – A Palustrine Emergent wetland that experiences flooding at all times of the year in all years.

PFLR (Palustrine, Flat, Seasonal-Tidal) – A Palustrine Emergent wetland of shallow grade that experiences both seasonal and tidal flooding (e.g., a mud flat).

PFO1 (Palustrine, Forested, Broad-Leaved Deciduous) – A Palustrine wetland dominated by broad-leaved deciduous woody vegetation that is 6.0M or taller.

PIAP – Public Involvement Action Plan.**PIC (Public Information Center) –** Held at key milestones during the project and provide an opportunity for members of the community to ask questions and provide input directly to the project team. These meetings are advertised in local newspapers and at civic group meetings.

PL (Pinelands Designated Waters) – One of the two Outstanding Natural Resource Waters in New Jersey.

PM – Post Meridiem.

$PM_{2.5}$ – Inhalable particulate matter smaller than 2.5 micrometers in diameter.

PM_{10} – Inhalable particulate matter smaller than 10 micrometers in diameter.

Post-Discharge – Condition after which stormwater runoff has been combined with the waters of the receiving water body.

ppm – Parts per million.

Prehistoric – Of, relating to, or existing in times antedating written history.

Prehistoric Cultural Resources – Those resources that antedate written records of the human cultures that produced them.

Preliminary Design – All major design steps associated with the development and comparison of alternate locations, alternate alignments, detailed engineering and environmental studies, ongoing public and agency interaction, project review, and final project selection of a project alternative.

PRM – Potomac-Raritan-Magothy aquifer.

Project Partnering Session – Provides a forum for meeting with a large number of critical stakeholders at the same time. The stakeholders invited to the partnering sessions include local and county officials, business owners, and members of the public who would be affected by the project, in addition to agency representatives.

PSS Wetland (Palustrine, Scrub-Shrub) – A Palustrine wetland dominated by woody vegetation less than 6.0 m tall. The species may include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions.

Public Hearing – An advertised, open meeting required by the NEPA process. It is normally scheduled to be held within 45 days after the distribution of the DEIS to receive public comment.

Public Meeting – Meeting conducted to facilitate participation in the decision-making process and to assist the public in obtaining project information.

Receiver – A location at which noise levels are predicted and analyzed.

Receptor – A location where carbon monoxide levels and noise levels are determined.

Reconnaissance – Inspection, survey, or exploration of an area.

RFL Wetlands – A Riverine wetland of shallow grade that experiences both seasonal and tidal flooding (e.g., a mud flat).

Right-of-Way – Land, property, or interest therein acquired for and devoted to transportation purposes, including construction, maintenance, operations, and protection of a facility.

Riverine Wetland – All wetlands and deepwater habitats contained in natural or artificial channels periodically or continuously containing flowing water or which forms a connecting link between the two bodies of standing water. Upland islands or Palustrine wetlands may occur in the channel, but they are not part of the Riverine System.

ROD (Record of Decision) – A document prepared by an agency in order to identify all alternatives considered by the agency reaching its decision, specifying the alternative or alternatives which were considered to be environmentally preferable, as well as stating the decision.

SAFETTEA-LU – Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users.

SCADA – Supervisory Control and Data Acquisition System.

SDRP – State Development and Redevelopment Plan.

Section 106 – A provision of the National Historic Preservation Act of 1966 that requires federal agencies to take into account the effects of their undertakings on historic properties, and afford the ACHP a reasonable opportunity to comment.

Section 4(f) – A component of the Department of Transportation Act of 1966 that protects historic sites, parks, recreation areas, and wildlife or waterfowl refuges.

Section 404 of the Clean Water Act – A provision that requires approval by the USACE prior to the dredging or placement of any fill materials into the waters of the United States, including wetlands.

SI&A – Structural Inventory and Appraisal.

SIP – State Implementation Plan.

SO_2 – Sulfur dioxide.

Sole Source Aquifer – An aquifer designated by the USEPA as the “sole or principal source" of drinking water for a given aquifer service area.

Sound Proofing – Improvements to public-use buildings to assist in reducing interior sound levels, such as air conditioning, sealing windows, installing noise-absorbing materials in walls, etc.

SOW (State Open Waters) – An open water or wetland area over which NJDEP exerts jurisdiction.

spp – Species.

SRP – NJDEP Site Remediation Program.

STIP – Statewide Transportation Improvement Program.

Surface Atmospheric Stability – The tendency of the atmosphere near the ground surface to enhance vertical motions (instability) or to damp out vertical motions (stability).

TES – Technical Environmental Study.

TIP (Transportation Improvement Program) – Long-range plan established by the Metropolitan Planning Organization consisting of a prioritized list of transportation projects or project segments to be implemented within the next three years after its adoption.

TIS – Transportation Investment Study.

TNM (Traffic Noise Model) – A FHWA-approved model.

Topography – Natural surface features of a region, including its relief.

TRSR – Technical Requirements for Site Remediation.

TSP – Total Suspended Particulates.

Type I Project – A proposed project for the construction of a highway on a new location, or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes.

Type II Project – A proposed project of noise abatement on an existing highway.

UEZ – Urban Enterprise Zone.

ug/m^3 – Micrograms per cubic meter or 1/1,000 mg/m^3.

Undeveloped Land – Tracks of land, or portions thereof, which contain no improvement or activities devoted to frequent human use or habitation.

USACE (United States Army Corps of Engineers) – Federal agency that has regulatory authority over all activities in navigable waters of the United States and the discharge of dredged or fill material into all waters of the United States, including wetlands.

USC (United States Code) – The compilation and codification of the general and permanent federal law of the United States.

USEPA (United States Environmental Protection Agency) – Federal agency that has review and policy-setting authority under Section 404 of the Clean Water Act and which is responsible for enforcing environmental regulations.

USFWS (United States Fish and Wildlife Service) – Bureau within the United States Department of the Interior responsible for conserving, protecting, and enhancing fish and wildlife and their habitats.

USGS (United States Geological Survey) – Federal agency that provides current cartographic information to describe and understand the earth.

USRA – United States Railway Administration.

UST (Underground Storage Tank) – Any tank, including underground piping connected to the tank, which is or was used to store a hazardous substance, including petroleum, with 10% or more of the tank volume, including piping, beneath the ground surface.

Vehicle Operating Mode – A term used to describe the type of speed changes undergone by traveling vehicles. Operating modes are a reaction of acceleration and deceleration, periods of idle, and a steady state of cruise conditions that vehicles experience on a traffic facility.

VFW – Veterans of Foreign Wars.

VHT (Vehicle Hours of Travel) – The total number of hours of vehicle travel on a designated set of roadways.

VMT (Vehicle Miles Traveled) – Vehicle Miles of Travel are key data for highway planning and management, and a common measure of roadway use. It is the amount of vehicle travel on a designated set of roadways, multiplied by the total mileage of those roadways.

VOC – Volatile Organic Compound.

VPH – Vehicles per hour.

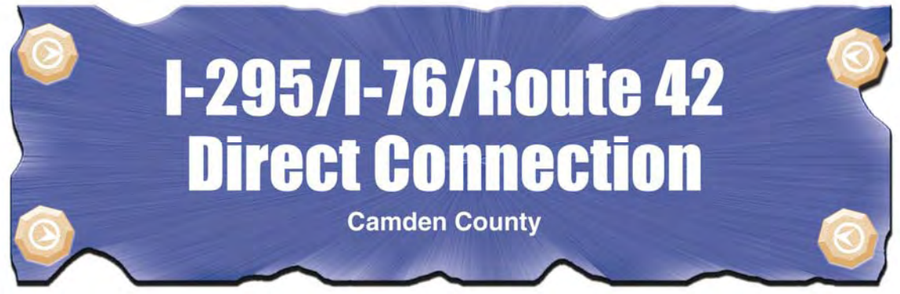
Watershed – A specific geographic area drained by a major stream or river.

Wetland – Those areas that are inundated or saturated by surface or groundwater at a frequency and duration to support, and that under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Wetland Delineation – The process of determining the jurisdictional boundary of a wetland for regulatory purposes.

WMA – Watershed Management Area.

WPA (Works Progress Administration) – The largest and most comprehensive New Deal agency created in 1935. The administration provided jobs and income to the unemployed during the Great Depression.



CHAPTER 13: BIBLIOGRAPHY

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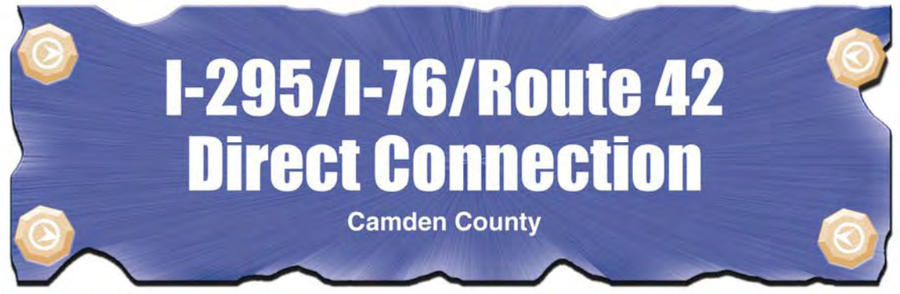

CHAPTER 14: LIST OF PREPARERS

FEDERAL HIGHWAY ADMINISTRATION

Jeanette Mar, Environmental Coordinator
Bachelor of Science, Biology, University of San Francisco

Daniel Mott, Area Engineer
Bachelor of Science, Civil Engineering Technology, State University of New York Institute of Technology at Utica/Rome

NEW JERSEY DEPARTMENT OF TRANSPORTATION

Jody Barankin, Project Manager
Bachelor of Science, Business Administration, St Joseph's College

Nicholas Caiazza, Environmental Project Manager
Master of Science, Botany, Rutgers University
Bachelor of Science, Biology, Northeastern University

Jo Ann Asadpour, Environmental Team Leader
Bachelor of Science, Environmental Earth Science, Mary Washington College

PROJECT TEAM CONSULTANTS

Dewberry-Goodkind, Inc.

Craig Johnson, PE, Project Manager
Bachelor of Science, Civil Engineering, Lafayette College

Ileana Ivanciu, PG, Deputy Project Manager
Master of Science, Geology and Geophysics, University of Bucharest
Bachelor of Science, Geology and Geophysics, University of Bucharest

James Heeren, PE, Environmental Task Manager
Master of Science, Environmental Engineering, New Jersey Institute of Technology Bachelor of Science, Civil Engineering, New Jersey Institute of Technology

Executive Summary, Project Description, Purpose and Need, and Alternatives

Andrea Burk, Editor
Master of Science, Historic Preservation, Columbia University
Bachelor of Arts, History and Communication, Rutgers College

Executive Summary, Introduction, Archaeological Resources, Historic Architectural Resources, and Section 4(f) Evaluation

Peter Agnello, PE, Project Engineer
Bachelor of Science, Civil Engineering, Rutgers University

Jennifer Baer, AICP
Master of Arts, Master of Public Administration, New York University
Bachelor of Arts, Political Science, Drew University

Socioeconomics, Land Use and Environmental Justice, Other Projects in Study Area, Secondary and Cumulative Impacts, and Temporary Construction Impacts

Sara Dougherty
Master of Science, Geology, Vanderbilt University
Bachelor of Science, Geology, Hamilton College

Hazardous Materials and Glossary and List of Abbreviations

Miguel Gavino, PE
Master of Science, Civil Engineering (Transportation), University of Washington
Bachelor of Science, Civil Engineering, University of Washington

Traffic and Transportation

Christina Gray
PhD (ABD), Urban Planning and Policy, Rutgers University
Master of Science, Management, Florida Institute of Technology
Bachelor of Science, Environmental Science, University of Massachusetts

Alternatives Analysis

Clifford Moore
Bachelor of Arts, Geography/Cartography, Rutgers University

Graphic Design

Brian Sayre
Master of Science, Environmental Studies, Montclair State University
Bachelor of Arts, Environmental Sciences, University of Virginia

Natural Ecosystems and Section 404 Permit

Matthew Schlitzer
Bachelor of Science, Natural Resource Management, Colorado State University

Natural Ecosystems and Section 404 Permit

Mehmet Secilmis, REP
Master of Science, Environmental Technology, New York Institute of Technology
Bachelor of Science, Chemistry, University of Marmara

Graphic Design

Sara Weimer
Bachelor of Science, Geology, State University of New York

Consultation and Coordination and Glossary and List of Abbreviations

Paul Carpenter Associates, Inc

Sharon Paul Carpenter
Bachelor of Science, Meteorology, Rutgers University

Noise and Air Quality

Jane Burns
Bachelor of Science, Computer Science, Rutgers University

Noise and Air Quality

AD Marble and Company

Elizabeth Amisson
Bachelor of Science, Architectural Studies, Philadelphia University

Review of Historic Architectural Resources

John Lawrence
Master of Arts, Anthropology, University of Pennsylvania
Bachelor of Arts, Anthropology, University of Texas at Austin

Review of Archaeological Resources

Dresdner Robin

Edward Robin
Bachelor of Law, University of Pennsylvania Law School
Bachelor of Arts, English Literature, Harvard College

Review of Socioeconomics, Land Use and Environmental Justice and Natural Ecosystems

Lawrence Smith, PP
Master of Environmental Planning, Arizona State University
Bachelor of Arts, Environmental Studies, Binghamton University

Review of Socioeconomics, Land Use and Environmental Justice and Natural Ecosystems

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Federal Highway Administration
Region 1

Federal Project No. IM-295-2 (115)

US Department of Transportation
Federal Highway Administration
New Jersey Department of Transportation