

**AIR QUALITY REEVALUATION**

**I-95/SR 1 INTERCHANGE/  
I-95 TURNPIKE MAINLINE**

**DELDOT CONTRACT NO. 95-090-01  
FEDERAL AID PROJECT NO. IM-N056(27)**

**NEW CASTLE COUNTY, DELAWARE**



**DELAWARE DEPARTMENT OF TRANSPORTATION**

**DECEMBER 2008**

## **INTRODUCTION**

The Delaware Department of Transportation (DelDOT) is completing final design for the I-95/SR 1 Interchange portion of the I-95/SR 1 Interchange/I-95 Turnpike Mainline project in New Castle County, Delaware (see **Figure 1**). The I-95/SR 1 Interchange/I-95 Turnpike Mainline widening project involves the provision of an additional fifth lane in each direction on the I-95 mainline between the SR 1 Interchange and the SR 141 Interchange, as well as modifications to the I-95/SR 1 Interchange. The additional fifth lane has been constructed; however the modifications to the I-95/SR 1 Interchange are currently in design and have not been constructed.

This Air Quality Reevaluation is provided as a result of updated air quality rules and design changes, incorporated into the final design for the project, and provides an updated carbon monoxide (CO) analysis, a discussion of Mobile Source Air Toxics (MSATs) and an analysis of fine particulate matter (PM<sub>2.5</sub>).

### **A Brief History of the Project**

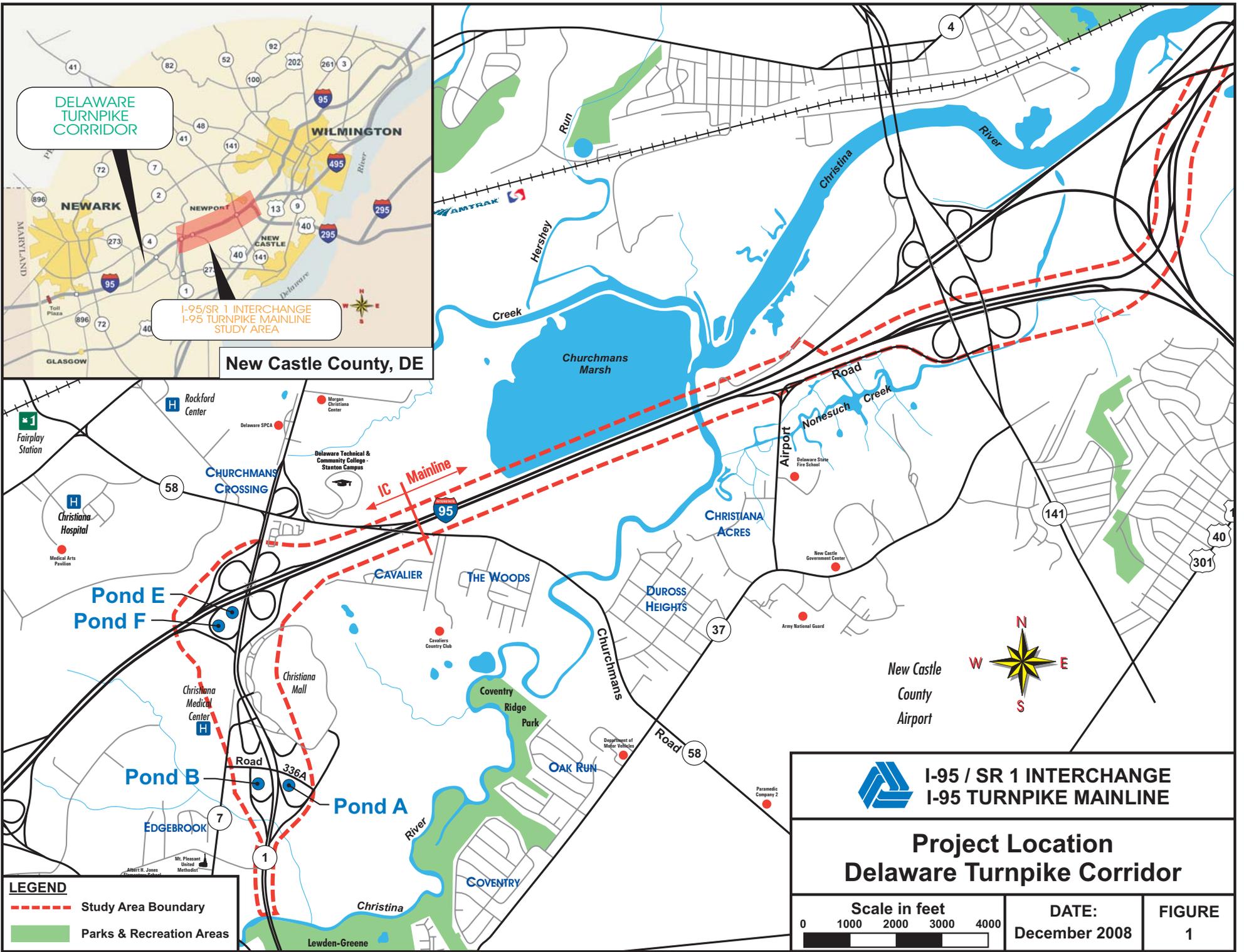
An Environmental Assessment (EA) for the I-95/SR Interchange/I-95 Turnpike Widening project was issued in January 2005, and a Finding of No Significant Impact (FONSI) for the project was issued by the Federal Highway Administration (FHWA) on March 2, 2005.

A previous reevaluation was completed in June 2006, which considered the extension of the project limits for the I-95 mainline widening portion of the project, in the northbound direction only, from the SR 141 Interchange to the I-495 split. The additional 1.2 miles did not result in a significant increase in impacts, and the FHWA concurred that the previously issued FONSI remained in effect (July 27, 2006). Following the submission of design plans to FHWA on December 2, 2006, the project was advertised and a contract awarded for construction. The fifth lane was opened to traffic in November 2008.

The current reevaluation details modifications in the design of the I-95/SR 1 Interchange portion of the project. The design changes are being incorporated into the project to provide additional traffic operational and safety improvements within the interchange. An environmental reevaluation of the currently proposed design is being completed, and the findings of this air quality analysis will be summarized in the reevaluation. This air quality analysis will be forwarded to the Environmental Protection Agency (EPA), FHWA, the Delaware Department of Natural Resources and Environmental Control (DNREC), the Delaware Department of Transportation (DelDOT), and the Wilmington Area Planning Council (WILMAPCO) for Interagency Consultation. After receipt of approval of the Interagency Consultation group, including addressing any comments received, this analysis will be posted on DelDOT's I-95 project website for public review and comment.

### **Changes in Air Quality Analysis Regulations Relevant to the Project**

On March 10, 2006, EPA issued amendments to the Transportation Conformity Rule to address localized impacts of particulate matter: *PM<sub>2.5</sub> and PM<sub>10</sub> Hot-Spot Analyses in Project-level Transportation Conformity Determinations for the New PM<sub>2.5</sub> and Existing PM<sub>10</sub> National Ambient Air Quality Standards (NAAQS)*, as published in 71 FR 12468. These rule amendments require the assessment of localized air quality impacts of federally-funded or approved transportation projects in PM<sub>10</sub> and PM<sub>2.5</sub> nonattainment and maintenance areas deemed to be *projects of air quality concern*. The project is in the PA-NJ-DE PM<sub>2.5</sub> non-attainment area. A PM<sub>2.5</sub> Project-Level Hotspot analysis was not included in the 2005 FONSI, which was prepared prior to the 2006 rule, nor was this analysis included in the 2006 Reevaluation approved by FHWA, as the mainline widening was considered an operational improvement not a capacity improvement. The PM<sub>2.5</sub> analysis will be included herein to provide a complete conformity determination.



DELAWARE  
TURNPIKE  
CORRIDOR

I-95/SR 1 INTERCHANGE  
I-95 TURNPIKE MAINLINE  
STUDY AREA

New Castle County, DE

**LEGEND**

- Study Area Boundary
- Parks & Recreation Areas

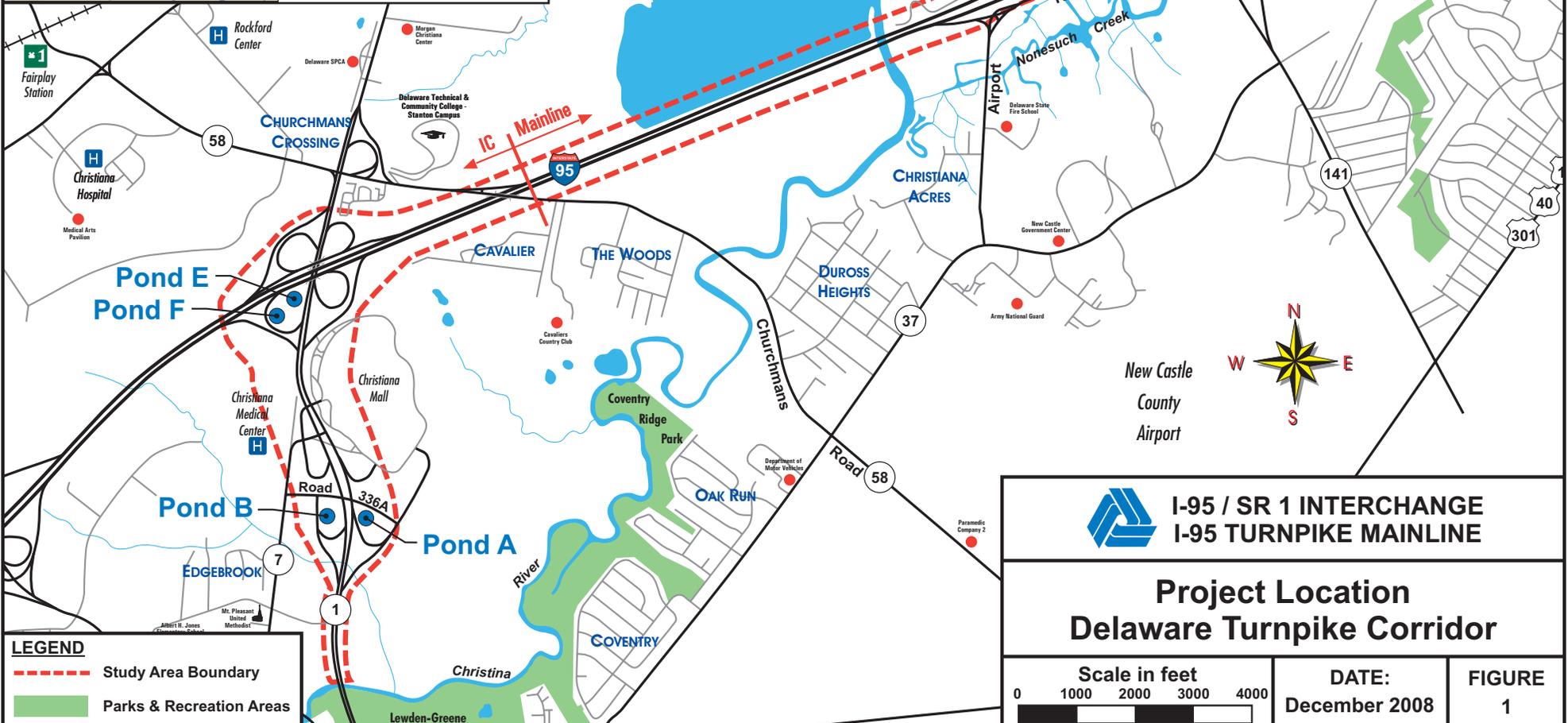
**I-95 / SR 1 INTERCHANGE  
I-95 TURNPIKE MAINLINE**

**Project Location  
Delaware Turnpike Corridor**

**Scale in feet**  
0 1000 2000 3000 4000

**DATE:**  
December 2008

**FIGURE**  
1



## **PROJECT DESCRIPTION**

### **FONSI Selected Alternative – March 2, 2005**

#### ***I-95/SR 1 Interchange/I-95 Turnpike Mainline***

The I-95/SR 1 Interchange/I-95 Turnpike Mainline widening project involved the provision of an additional fifth lane in each direction on the I-95 mainline between the SR 1 Interchange and the SR 141 Interchange, as well as modifications to the I-95/SR 1 Interchange.

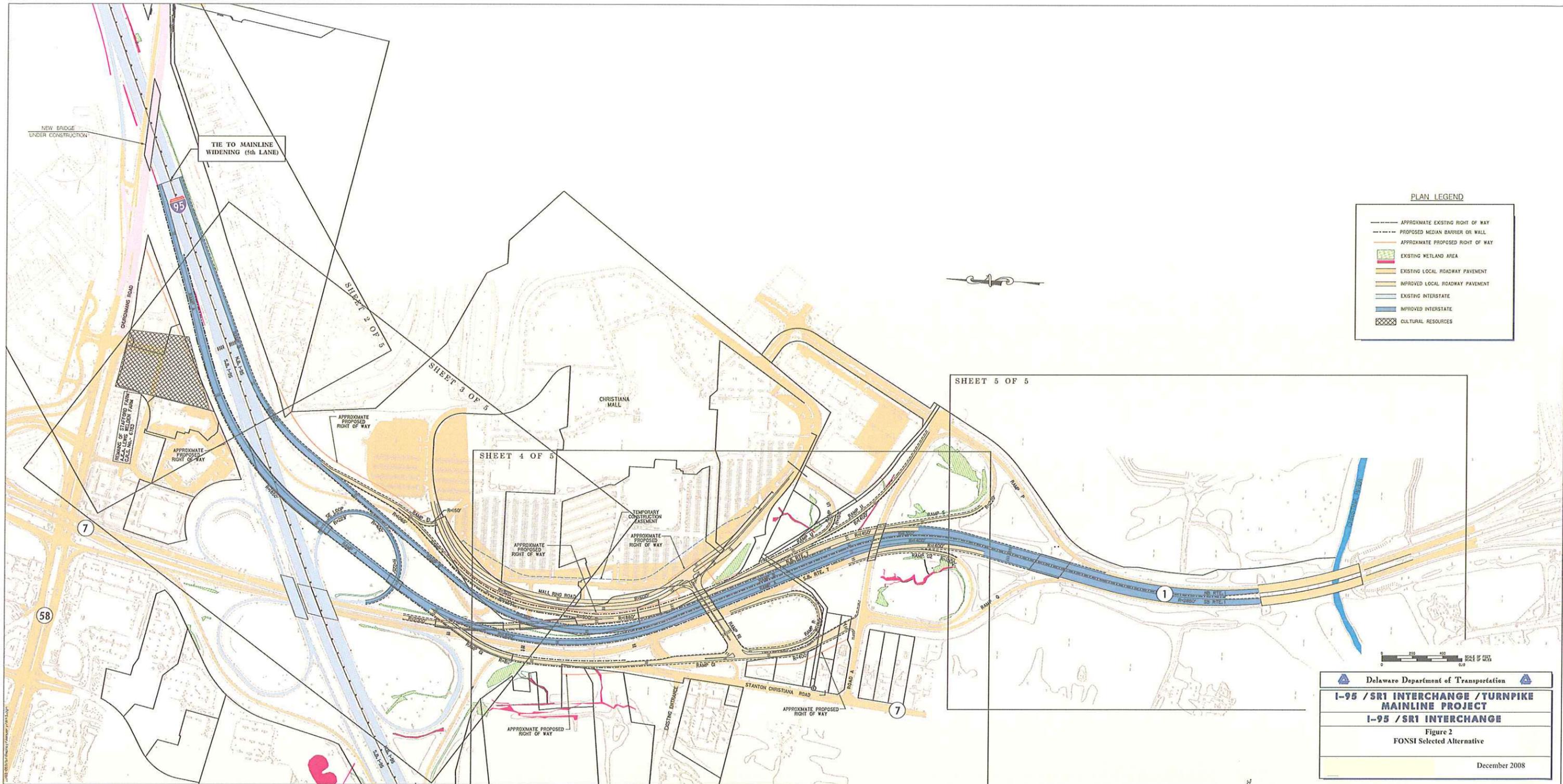
The FONSI Selected Alternative for the I-95/SR 1 Interchange (Alternative 3), located at the southern end of the project area, included the construction of separated northbound-to-northbound and southbound-to-southbound directional ramps between I-95 and SR 1, in order to separate freeway-to-freeway traffic from local traffic. The Selected Alternative also included modifications to the northbound SR 7 alignment, improved local access, and modifications to various ramps (as shown on **Figure 2**), to facilitate the flow of traffic. The following is a description of the original proposed interchange improvements (January 2005 EA/March 2005 FONSI).

Overview: Two new ramp movements would be constructed: Ramp A would provide for the direct movement of traffic from southbound I-95 to southbound SR 1, and Ramp B would provide for direct movement of traffic from northbound SR 1 to northbound I-95. Local roads and ramps within the existing interchange would be reconstructed or relocated as appropriate.

Southbound: Beginning north of the Churchmans Road bridge, I-95 would widen to the outside, with two new outside lanes forming the new direct southbound Ramp A to SR 1. The southbound Ramp A would cross over I-95. As the ramp crosses the southeast quadrant of the existing I-95/SR 1 interchange, it widens to four lanes. The two inside (left) lanes would continue directly to SR 1. The two outside (right) lanes would serve local traffic wishing to access the Christiana Mall Road (Ramp R1) and the SR 1/Road A Interchange area from the north.

Vehicles traveling southbound on existing SR 7 would continue to have the same options to access Christiana Mall Road, the SR 1/Road A Interchange, or continue to southbound SR 1. Southbound SR 7 and Ramp A would each provide two travel lanes that are physically separated through the interchange. South of Road A, Ramp A and SR 7 would merge and then taper to match the existing three-lane southbound SR 1 roadway section.

Northbound: Beginning south of Road A, northbound SR 1 would widen into a four-lane roadway. The two left lanes (Ramp B) would provide a direct two-lane connection through the interchange to northbound I-95 that is physically separated from Ramp A, local roadways and SR 7. As Ramp B approaches I-95, north of the Christiana Mall Road, local traffic from existing SR 7, Christiana Mall Road, and Road A area would merge into a single ramp before merging with Ramp B. Ramp B would extend and become the outside lane (5th lane) of the northbound I-95 mainline. Local traffic on SR 7 northbound would continue to have the same options to access the Christiana Mall Road, Road A, I-95 or continue on SR 7 northbound.



PLAN LEGEND

- APPROXIMATE EXISTING RIGHT OF WAY
- - - - - PROPOSED MEDIAN BARRIER OR WALL
- APPROXIMATE PROPOSED RIGHT OF WAY
- [Green Hatched Box] EXISTING WETLAND AREA
- [Yellow Box] EXISTING LOCAL ROADWAY PAVEMENT
- [Orange Box] IMPROVED LOCAL ROADWAY PAVEMENT
- [Blue Box] EXISTING INTERSTATE
- [Dark Blue Box] IMPROVED INTERSTATE
- [Cross-hatched Box] CULTURAL RESOURCES

Delaware Department of Transportation
I-95 / SR1 INTERCHANGE / TURNPIKE MAINLINE PROJECT
I-95 / SR1 INTERCHANGE
Figure 2 FONS1 Selected Alternative
December 2008

## Post-FONSI Modifications – June 2006 Reevaluation

A previous reevaluation was completed in June 2006, which considered the extension of the project limits for the I-95 mainline widening portion of the project, in the northbound direction only, from the SR 141 Interchange to the I-495 split. The construction of this widening is complete and open to traffic.

## Post-FONSI Modifications – October 2008 Reevaluation (Figure 3)

The current design would modify the I-95/SR 1 Interchange design in the following manner:

- The existing southeast quadrant loop ramp (from I-95 northbound to SR 7 northbound) has been eliminated and replaced by a semi-directional flyover ramp (Ramp C) that extends from the southwest outer ramp from northbound I-95, passes over SR 7 and merges with northbound SR 7.
- The existing northbound lanes of I-95, north of the interchange, are shifted approximately 40 feet to the outside to accommodate Ramp B, which will fly over northbound I-95 and extend as the median lane of I-95.
- Ramp B (SR 1 northbound to I-95 northbound) will split in the vicinity of the southeast quadrant, fly over northbound I-95, and become the median lane of the northbound I-95 mainline, as noted above. The right lane of Ramp B (Ramp B1) will extend along the outside of existing northbound I-95 and remain barrier-separated from the northbound I-95 mainline until north of the Churchmans Road bridge, where the lane merges with the existing outside I-95 northbound mainline lane.
- The ramp (Ramp R1) to/from the Christiana Mall Road will be relocated approximately 150 feet south of its present location.

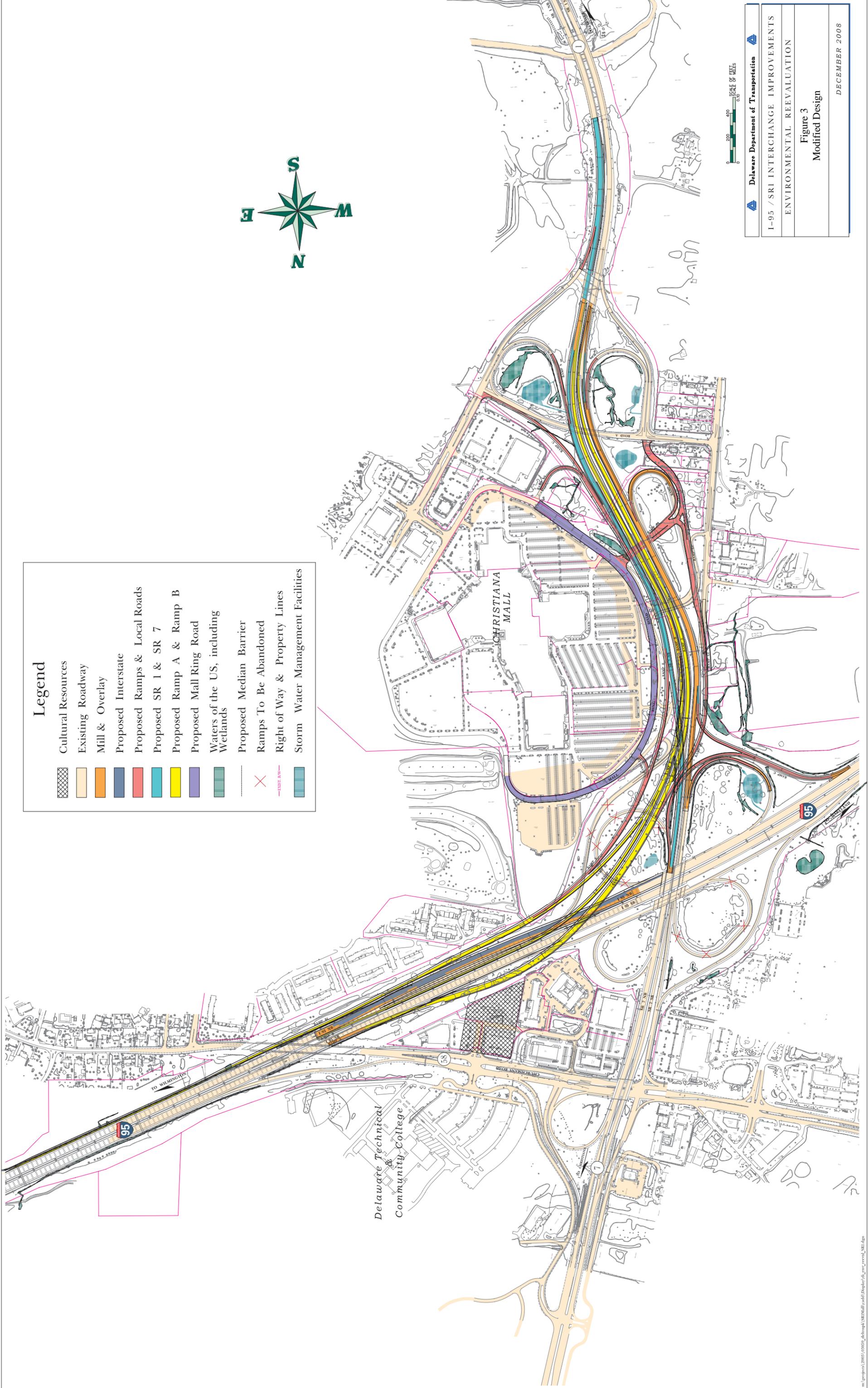
## AIR QUALITY ANALYSIS

### General

As part of the January 2005 EA/March 2005 FONSI studies, an analysis of air quality was performed which included the widening of I-95 and the I-95/SR 1 Interchange. The results this analysis are included in a report entitled “I-95: Delaware Turnpike from MD/DE Line to SR 141, Air Quality Analysis”, dated January 2004. This 2004 analysis consisted of determination of Carbon Monoxide (CO) concentrations at nine (9) receptors.

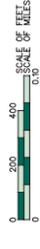
On March 10, 2006, EPA issued amendments to the Transportation Conformity Rule to address localized impacts of particulate matter: *PM<sub>2.5</sub> and PM<sub>10</sub> Hot-Spot Analyses in Project-level Transportation Conformity Determinations for the New PM<sub>2.5</sub> and Existing PM<sub>10</sub> National Ambient Air Quality Standards*. These rule amendments require the assessment of localized air quality impacts of federally-funded or approved transportation projects in PM<sub>10</sub> and PM<sub>2.5</sub> nonattainment and maintenance areas deemed to be *projects of air quality concern*. The project is in of the PA-NJ-DE PM<sub>2.5</sub> non-attainment area. As discussed in the Transportation Conformity Guidance, “*The March 10, 2006 final rule requires a qualitative PM<sub>2.5</sub> hot-spot analysis to be completed for project-level conformity determinations for projects of air quality concern completed on or after April 5, 2006, when PM<sub>2.5</sub> conformity requirements apply and the final rule is effective*”, except as discussed below.

On March 29, 2006, the FHWA published *Guidance on Qualitative Hot-Spot Analysis for PM<sub>2.5</sub> and PM<sub>10</sub>* in non-attainment areas. Although the project is in a non-attainment area for PM<sub>2.5</sub>, a PM<sub>2.5</sub> Project-Level Hotspot analysis was not included in the 2006 Reevaluation, approved by FHWA. The 2006 FONSI Reevaluation stated that: “*There are no changes in impacts associated with air quality as a result of the additional widening. The extension of widening in the northbound direction between SR 141 and I-295 is not a capacity improvement, and will not increase or decrease the Average Annual Daily Traffic (AADT), only facilitate its movement through this section of I-95. No additional air quality analysis is required.*” Therefore a PM<sub>2.5</sub> Project-Level Hotspot analysis was not included in the 2006 Reevaluation, because at that time the mainline



**Legend**

-  Cultural Resources
-  Existing Roadway
-  Mill & Overlay
-  Proposed Interstate
-  Proposed Ramps & Local Roads
-  Proposed SR 1 & SR 7
-  Proposed Ramp A & Ramp B
-  Proposed Mall Ring Road
-  Waters of the US, including Wetlands
-  Proposed Median Barrier
-  Ramps To Be Abandoned
-  Right of Way & Property Lines
-  Storm Water Management Facilities



 Delaware Department of Transportation
I-95 / SRI INTERCHANGE IMPROVEMENTS ENVIRONMENTAL REEVALUATION
Figure 3 Modified Design
DECEMBER 2008

widening was considered an operational improvement, not a capacity improvement, and there were no changes predicted in the amount of vehicles (ADT) or the percentage of diesel vehicles using the expanded roadway.

Included hereinafter is a summary and update of the previous CO analysis for the modified I-95/SR 1 Interchange. Analyses of Mobile Source Air Toxics (MSAT) and PM<sub>2.5</sub> are also included for the I-95/SR 1 Interchange. These analyses were not required at the time that the January 2004 air quality analyses were completed, but have been added to this assessment to provide a complete analysis of air quality.

Federal regulations provide the requirements for determining the frequency of air quality conformity determinations. Specifically, 40CFR93.104(d) requires a redetermination of conformity “if one of the following occurs: a significant change in the project’s design concept and scope; three years elapse since the most recent major step to advance the project; or initiation of a supplemental environmental document for air quality purposes. Major steps include NEPA process completion; start of final design; acquisition of a significant portion of the right-of-way; and, construction (including Federal approval of plans, specifications and estimates).” All major National Environmental Policy Act (NEPA) steps have been completed for the I-95 widening extension, and that portion of the project, as described in the 2006 FONSI Reevaluation, is currently constructed; because a PM<sub>2.5</sub> Hot-Spot analysis and conformity determination was not included in the 2006 FONSI Reevaluation, the I-95 widening extension is included as part of this PM<sub>2.5</sub> analysis, discussed hereinafter, to verify conformity determination for the widening.

## CO Analysis

Traffic volumes were projected for the years 2000 and 2025 for the January 2004 air quality analysis, and for the years 2008 and 2030 for the current reevaluation. Linear interpolation was used to determine 2010 volumes. The traffic volumes and truck percentages (%) provided were equal for the Build and No-Build scenarios.

A comparison of traffic volumes between those reported in the January 2004 Air Quality Report for I-95: Delaware Turnpike from MD/DE Line to SR 141 and the current reevaluation is shown on **Table 1**. This table demonstrates that projected 2030 traffic volumes for the I-95/SR-1 Interchange vary from the 2025 volumes used for the January 2004 analysis. The 2030 ADT volumes vary by 30% higher to 20% lower depending on the roadway being considered.

**Table 1: Traffic Comparison**

	Traffic from January 2004 Air Quality Analysis			Current Traffic (September 2008)			Percent Change	
	2000 ADT	2010 ADT	2025 ADT	2008 ADT	2010 ADT	2030 ADT	2010	2025-2030
I-95: South of SR 1	169,570	176,718	187,441	185,925	204,955	233,500	16%	25%
I-95: North of SR 1	205,580	213,174	224,565	207,625	233,725	272,875	10%	22%
SR 7: West of I-95	56,405	75833	104,975	71,375	76,635	84,525	1%	-20%
SR 1: East of I-95	89,765	92751	97,229	92,700	106,090	126,175	14%	30%

In the January 2004 Air Quality Analysis, emission factors were predicted using the EPA's MOBILE6 (Version 6.02.01) emissions model. The emissions factors were recalculated for this reevaluation using current version of MOBILE6 (Version 6.02.03). These emissions factors, in grams per mile, are shown in **Table 2**. The values are listed for freeways and arterial roadways. A comparison of predicted idle emissions show that emissions in Version 6.02.03 are 17% lower in 2010, and 13% lower in 2030 as compared to the

values from Version 6.02.01 in 2025. Predicted running source emissions are from 9% to 14% lower in the Version 6.02.03 as compared to the values from Version 6.02.01.

**Table 2: Comparison of emission factors used in the 2004 Air Quality Technical Report and the Current Reevaluation.**

	Emission Factors used in the January 2004 Air Quality Analysis MOBILE 6.02.01		Emission Factors used for Current Reevaluation MOBILE 6.02.03		Percent Difference MOBILE 6.02.01 to MOBILE 6.02.03	
	2010	2025	2010	2030	2010	2025/2030
Arterial/Ramp						
Idle	35.2	24.6	29.3	21.5	-17%	-13%
30	14.2	10.7	12.3	9.7	-13%	-9%
35	14.2	10.7	12.3	9.7	-13%	-9%
40	14.6	10.9	12.6	9.9	-14%	-9%
45	15.1	11.2	13.0	10.2	-14%	-9%
50	15.5	11.5	13.3	10.4	-14%	-10%
55	16.0	11.8	13.7	10.7	-14%	-10%
Freeway						
45	15.4	11.4	13.3	10.4	-14%	-9%
50	15.9	11.8	13.7	10.6	-14%	-9%
55	16.5	12.2	14.2	11.0	-14%	-9%
60	17.3	12.8	14.8	11.5	-14%	-10%

The maximum 1-Hour CO concentrations at the I-95/SR 1 Interchange determined by the January 2004 analysis was 2.4 parts per million (ppm) in 2025, which included a 1.6 ppm background concentration. The maximum 8-Hour concentration was 1.7, which included a 1.2 ppm background concentration. The 1-Hour National Ambient Air Quality Standard (NAAQS) is 35.0 ppm and the 8-Hour NAAQS is 9.0 ppm.

A review of the above demonstrates that the construction of the modified I-95/SR1 will not result in violations of the NAAQS for CO for the following reasons:

- No predicted CO violations were predicted to result from the No-Build or Build Alternative in the January 2004 Air Quality Analysis. The maximum 1-Hour concentration was only 6.8% of the 1-Hour NAAQS and the maximum 8-Hour concentration was only 18.8 % of the 8-Hour NAAQS.
- As shown in Table 1, predicted 2030 traffic volumes are not significantly (22% - 25%) greater than the 2025 predicted traffic volumes used in the January 2004 Air Quality Analysis.
- Predicted idle emission factors and running emission factors from the current MOBILE 6.02.03 for all speeds used in the are less (9% - 17%) than the corresponding predicted emission factors from MOBILE 6.02.01 used in the January 2004 Air Quality Analysis.
- The study area is not within a CO non-attainment or Maintenance area.

## MSAT Analysis

### General

FHWA *Guidance on Air Toxic Analysis in NEPA Documents*<sup>1</sup> requires analysis of Mobile Source Air Toxics (MSAT) under specific conditions. The EPA has designated six prioritized MSATs, which are known or probable carcinogens or can cause chronic respiratory effects. The six prioritized MSATs are: Benzene;

<sup>1</sup> Interim Guidance on Air Toxic Analysis in NEPA Documents, February 3, 2006

Acrolein; Formaldehyde; 1,3-Butadiene, Acetaldehyde; and Diesel Exhaust (Diesel Exhaust Gases and Diesel Particulate Matter). The I-95/SR 1 Interchange project would be a project that “serve[s] to improve operations of highway, transit or freight without adding substantial new capacity or without creating a facility that is likely to meaningfully increase emissions”<sup>2</sup>. Therefore, the I-95/SR 1 Interchange would be considered a **Project with Low Potential MSAT Effects** as discussed in the referenced guidance

As demonstrated by the traffic analysis, summarized in **Table 3**, the 2030 Build traffic volumes (ADT) and truck percentages are equal to the 2030 No-Build traffic volumes (ADT) and truck percentages.

**Table 3: Percent of Diesel Powered Traffic and Average Annual Daily Traffic (AADT) for the Existing (2008), Year 2030 No-Build, and Year 2030 Build Conditions for the I-95/SR 1 Interchange.**

Project Area	Existing (2008)	2030 No-Build	2030 Build
<b>I-95: South of SR 1</b>			
Percent Trucks and Buses <sup>3</sup>	10.6%	10.6%	10.6%
ADT	185,925	233,500	233,500
Number of Trucks and Buses	19,708	24,751	24,751
<b>I-95: North of SR 1</b>			
Percent Trucks and Buses <sup>3</sup>	10.6%	10.6%	10.6%
ADT	207,625	272,875	272,875
Number of Trucks and Buses	22,008	28,925	28,925
<b>SR 7: West of I-95</b>			
Percent Trucks and Buses <sup>3</sup>	10.6%	10.6%	10.6%
ADT	71,375	84,525	84,525
Number of Trucks and Buses	7,566	8,960	8,960
<b>SR 1: East of I-95</b>			
Percent Trucks and Buses <sup>3</sup>	10.6%	10.6%	10.6%
ADT	92,700	126,175	126,175
Number of Trucks	9,826	13,375	13,375

Because the traffic analysis demonstrates that the Build traffic volumes (ADT) and truck percentage are equal to the No-Build traffic volumes (ADT) and truck percentage, the I-95/SR 1 Project will not result in any meaningful changes in traffic volumes, vehicle mix, or any other factor that would cause an increase in emissions impacts. As such, it is determined that this project will generate minimal air quality impacts for the Clean Air Act criteria pollutants and has not been linked with any special MSAT concerns.

Unavailable Information for Project Specific MSAT Impact Analysis

Included herein, is a basic analysis of the likely MSAT emission impacts of this project. However, available technical tools do not enable us to predict the project-specific health impacts of the emission changes associated with the Build Alternative. Due to these limitations, the following discussion is included in accordance with Council of Environmental Quality (CEQ) regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information.

Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure

<sup>2</sup> ibid

<sup>3</sup> From January 2004 Air Quality Analysis. All roads assumed to have the same truck percent.

to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this project.

The EPA tools to estimate MSAT emissions from motor vehicles are not sensitive to key variables determining emissions of MSATs in the context of highway projects. The tools to predict how MSATs disperse are also limited. Even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude reaching meaningful conclusions about project-specific health impacts. Research into the health impacts of MSATs is ongoing. For different emission types, there are a variety of studies that show that some either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses. The EPA is in the process of assessing the risks of various kinds of exposures to these pollutants.

### *Project Specific MSAT Discussion*

As discussed above, technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions and effects of this project. However, even though reliable methods do not exist to accurately estimate the health impacts of MSATs at the project level, it is possible to qualitatively assess the levels of future MSAT emissions under the project. Although a qualitative analysis cannot identify and measure health impacts from MSATs, it can give a basis for identifying and comparing the potential differences among MSAT emissions -if any- from any build alternative.

For each alternative (No-Build and Build), the amount of MSATs emitted would be proportional to the annual average daily traffic (AADT), or vehicle miles traveled (VMT). Although the Build traffic volumes (ADT) and truck percentages are equal to No-Build traffic volumes (ADT) and truck percentages, the Vehicle Miles Traveled (VMT) within the study area estimated for the Build Alternative may be slightly greater than that of the No-Build, because the Build Alternative will reduce congestion and increase efficiency of the roadway, and may attract additional trips from elsewhere in the transportation network. This slight increase in VMT may lead to slightly higher MSAT emissions at the I-95/SR 1 Interchange for the Build Alternative. The emissions increase due to increased VMT is offset somewhat by lower MSAT emission rates due to increased speeds and reduced idling, since according to EPA's MOBILE6 emissions model, emissions of all of the priority MSATs, except for diesel particulate matter, decrease as speed increases. The extent to which these speed-related emissions decreases will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models.

The lanes and shifted ramp alignments contemplated as part of the Build Alternatives will have the effect of moving some traffic closer to nearby homes and businesses; therefore, there may be localized areas where ambient concentrations of MSATs could be higher under the Build Alternative than the No-Build Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the side where the roadways and ramps shift towards the residences and businesses. However, as discussed above, the magnitude and the duration of these potential increases compared to the No-Build Alternatives cannot be accurately quantified due to the inherent deficiencies of current models.

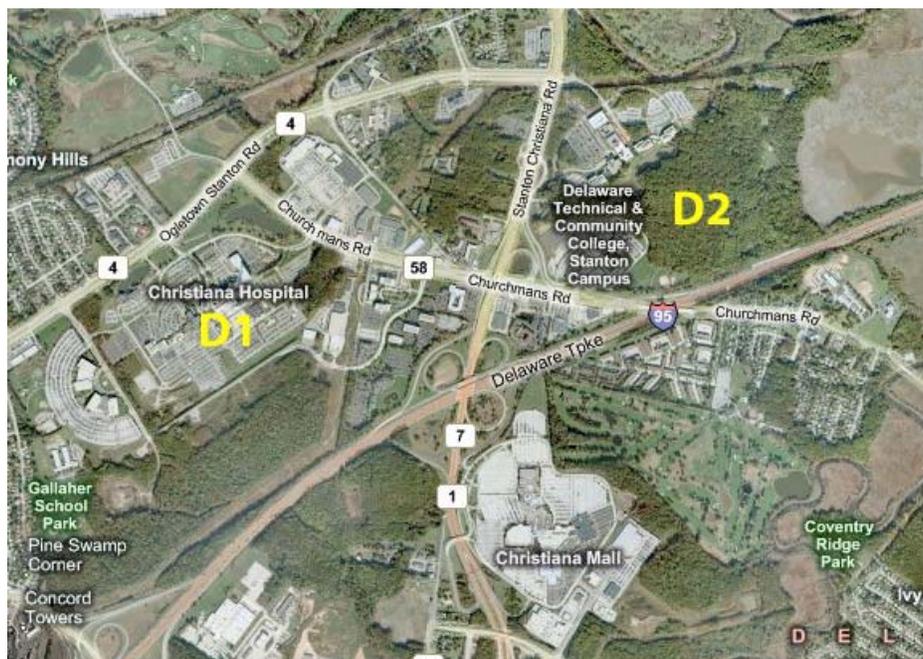
### *Sensitive Receptor Assessment*

As discussed above, there may be localized areas where ambient concentrations of MSATs are slightly higher in any build scenario than in the no build scenario. Dispersion studies have shown that air toxics from the roadway start to drop off at about 100 meters. By 500 meters, most studies have found it very difficult to distinguish the roadway air toxic concentrations from background air toxic concentrations in any given area. Sensitive receptors include those facilities most likely to contain large concentrations of the more sensitive population (hospitals, schools, licensed day cares, and elder care facilities). An assessment of potential sensitive receptors within both 100 and 500 meters reveals that there are no sensitive receptors within 100

meters of the I-95/SR 1 Interchange, and there are two sensitive receptors (D1 & D2) within 500 meters of the interchange as shown in **Table 4** and on **Figure 4**.

**Table 4: Sensitive Receptors**

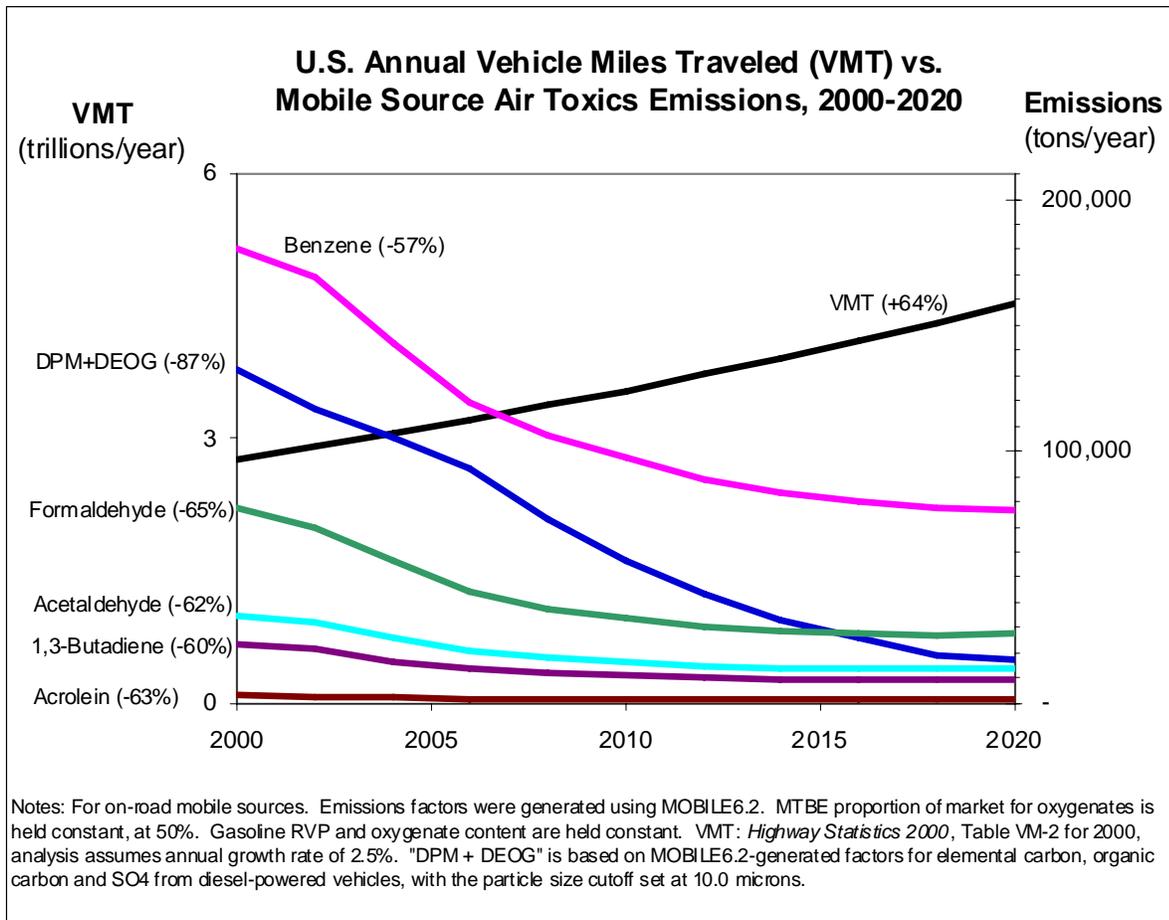
Map ID	Name	Address	City	Zip Code
D1	Christiana Hospital	4755 Ogletown-Stanton Rd.	Newark, DE	19718
D2	Delaware Technical & Community College	400 Stanton-Christiana Road	Newark, DE	19713



**Figure 4**

**MSAT Summary**

In summary, when a highway is widened and, as a result, moves closer to receptors, the localized level of MSAT emissions for the Build Alternative could be higher relative to the No-Build Alternatives, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSATs will be lower in other locations when traffic shifts away from them. Furthermore, both at the project location and regionally, MSAT concentrations will decrease in future years due to EPA's vehicle emission and fuel regulations. It has been shown that as a result of EPA's national emissions control programs MSAT emissions are projected to be reduced by 57% to 87%, between 2000 and 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases. Refer to **Figure 5**.



*Reference:* Interim Guidance on Air Toxic Analysis in NEPA Documents, February 3, 2006

**Figure 5**

## PM<sub>2.5</sub> Analysis

### General

This project is located in the PA-NJ-DE PM<sub>2.5</sub> nonattainment area. The area was designated as nonattainment for PM<sub>2.5</sub> on January 5, 2005 by the US EPA. This designation became effective on April 5, 2005, 90 days after EPA's published action in the Federal Register. Transportation conformity for the PM<sub>2.5</sub> standards applied on April 5, 2006, after the one-year grace period provided by the Clean Air Act. Although much of the I-95 widening construction is complete, as previously discussed, phases of the overall I-95 project remain that still require FHWA additional authorization and or approval. The I-95 widening extension requires payment authorization, and the I-95/SR 1 Interchange requires FHWA approval. As discussed on FHWA's frequently asked questions website for "PM<sub>2.5</sub> Project-Level Conformity and Hot-Spot Analyses," if a project still requires a FHWA approval or authorization, a project-level conformity determination is required prior to the first such action on or after April 5, 2006, even if the project has already completed the NEPA process, or for multi-phase projects, even if other phases of the project have already been constructed. Therefore, the PM<sub>2.5</sub> hot-spot analysis for this reevaluation will focus on the I-95 fifth lane widening extension and the I-95/SR 1 Interchange.

On March 10, 2006, EPA issued amendments to the Transportation Conformity Rule to address localized impacts of particulate matter: "*PM<sub>2.5</sub> and PM<sub>10</sub> Hot-Spot Analyses in Project-level Transportation Conformity Determinations for the New PM<sub>2.5</sub> and Existing PM<sub>10</sub> National Ambient Air Quality Standards*" (71 FR 12468). These rule amendments require the assessment of localized air quality impacts of Federally-funded or approved transportation projects in PM<sub>10</sub> and PM<sub>2.5</sub> nonattainment and maintenance areas deemed to be *Projects of Air Quality Concern*. Projects that require hotspot analysis for PM<sub>2.5</sub> are those projects that are *Projects of Air Quality Concern* as enumerated in 40 CFR 93.123(b)(1):

- (i) *New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;*
- (ii) *Projects affecting intersections that are at Level-of-Service D, E, or F with a significant number of diesel vehicles, or those that will change to Level-of-Service D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;*
- (iii) *New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;*
- (iv) *Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and*
- (v) *Projects in or affecting locations, areas, or categories of sites which are identified in the PM<sub>10</sub> or PM<sub>2.5</sub> applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.*

As discussed in the examples to the preamble to the March 10, 2006 *Final Rule for PM<sub>2.5</sub> and PM<sub>10</sub> Hot-Spot Analyses in Project-Level Transportation Conformity Determinations* (71 FR 12491), for projects involving the expansion of an existing highway, 40 CFR 93.123(b)(1) has been interpreted as applying only to projects that would involve a significant increase in the number of diesel transit buses and diesel trucks on the existing facility. This has been further clarified in a proposed rule amendment as "*EPA is proposing to clarify this provision as "New highway projects that have a significant number of diesel vehicles, and expanded projects that have a significant increase in the number of diesel vehicles."*"<sup>4</sup>

#### PM<sub>2.5</sub> Analysis

DELDOT has prepared the following analysis of the proposed improvements:

- The I-95 Fifth Lane Widening Extension is considered under 40CFR 93.123(b)(1)(i) which includes "*New or expanded highway projects that have a significant number of or significant increase in diesel vehicles.*"
- The I-95 Fifth Lane Widening Extension does not meet the criteria set forth in 40 CFR 93.123(b)(1)(i), as amended, to be considered a *project of air quality concern* because it affects an expanded highway that does not have a significant increase in diesel vehicles. Refer to Table 4.
- The I-95/SR 1 Interchange is considered under 40CFR 93.123(b)(1)(ii) which includes "*Projects affecting intersections that are at Level-of-Service D, E, or F with a significant number of diesel vehicles, or those that will change to Level-of-Service D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project*"
- The I-95/SR 1 Interchange does not meet the criteria set forth in 40 CFR 93.123(b)(1)(ii), as amended, to be considered a *project of air quality concern* because it affects an interchange that will not change to Level-of-Service D, E or F because of increased traffic volumes from a significant increase in number of diesel vehicles related to the project.

---

<sup>4</sup> Transportation Conformity Rule Amendments to Implement Provisions Contained in the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) [Federal Register: May 2, 2007 (Volume 72, Number 84)] [Proposed Rules] [Page 24489]

- The I-95 widening extension and the I-95/SR 1 Interchange reconstruction will improve traffic flow and reduce congestion as well as increase associated safety on the roadways. Thus, it would be expected to have a neutral or positive influence on PM<sub>2.5</sub> emissions.
- As discussed below the construction will not result in any meaningful changes between No-Build and Build traffic volumes, vehicle mix, or location of the existing facility:
  - A review of the traffic data in Table 3 demonstrates that there will not be a "significant" increase in the number of trucks from the No-Build condition to the Build. The projected 2030 No-Build ADT for I-95 and for the I-95/SR 1 Interchange, as shown in Table 3, represents the unconstrained user demand. This demand will not change under a Build scenario, assuming that the real demand includes traffic that has previously shifted to alternate routes in the network due to congestion at the intersection and returns with the availability of additional capacity. Depicted truck percentages represent the amount of light, medium and heavy truck activity along a given roadway segment. Unless predicated by significant land use changes (heavy truck generators), existing truck percentages are used as the primary factor in determining future percentages. The Build condition will improve operation of the interchange, relieving system congestion, but will not necessarily inducing new truck traffic origin-destination patterns.
  - There are no functionally comparable, parallel facilities from which to draw additional traffic.
    - Users will take the shortest origin-destination path; user unfamiliarity with alternative routes and conditions encourages drivers to remain on I-95
    - During peak traffic periods, diversion to alternate routes would not be attractive to the majority of users. Traffic conditions on these alternative routes are generally as bad as or worse during these peak travel periods, with significant congestion, slower speeds and numerous traffic lights, all factors translating into longer travel times.
    - Trucks, which are the primary emitter of mobile source PM<sub>2.5</sub>, will tend to stay on I-95 since the alternative routes would require frequent stop/start conditions due to traffic signals, and may not have lane widths, roadway grades, and curves that suit these types of vehicles.
- Section 176(c) of the Clean Air Act and the federal conformity rule requires that transportation plans and programs conform to the intent of the state air quality implementation plan (SIP) through a regional emissions analysis in PM<sub>2.5</sub> nonattainment areas. The project is located in the PA-NJ-DE PM<sub>2.5</sub> nonattainment area and is under the jurisdiction of the Wilmington Area Planning Council (WILMAPCO). WILMAPCO is the federally recognized Metropolitan Planning Organization (MPO) for transportation planning in New Castle County, Delaware and Cecil County, Maryland. The FY 2009 – 2012 Transportation Improvement Program (TIP) and the 2030 Regional Transportation Plan (RTP) were created by the WILMAPCO staff and member agencies. The 2030 RTP was adopted by the WILMAPCO Council on March 22, 2007, and the FY 2009-2012 TIP was adopted on April 10, 2008.<sup>5</sup> Emission totals calculated for each analysis year were tested against the 2002 Base Year budget for PM<sub>2.5</sub>, and thus there is a currently conforming transportation plan and TIP in accordance with 40 CFR 93.114. The current conformity determination is consistent with the final conformity rule found in 40 CFR Parts 51 and 93. The I-95 Widening/I-95 SR 1 Interchange project was included in the regional emissions analysis and there have been no significant changes in the project's design concept or scope, as used in the conformity analyses. Therefore, this project comes from a conforming plan and program in accordance with 40 CFR 93.115. Conformity means that the transportation activity will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant national ambient air quality standards (NAAQS or "standards").

---

<sup>5</sup> New Castle County Air Quality Conformity Determination for the FY 2009-2012 Transportation Improvement Program and 2030 Regional Transportation Plan, WILMAPCO, April 10, 2008.

PM<sub>2.5</sub> Summary

Based on review and analysis as discussed above, it is determined that the I-95 Widening Extension and the I-95/SR 1 Interchange reconstruction meet the Clean Air Act and 40 CFR 93.109 requirements. These requirements are met for particulate matter (PM<sub>2.5</sub>) without a project-level hot-spot analysis, since the project has been found **not to be a project of air quality concern** as defined under 40 CFR 93.123(b)(1)(i & ii). Since the project meets the Clean Air Act and 40 CFR 93.109 requirements, the project will not cause or contribute to a new violation of the PM<sub>2.5</sub> NAAQS, or increase the frequency or severity of a violation.

This assessment will be sent to FHWA, WILMAPCO, DNREC and EPA for interagency review and approval. Upon approval by the Interagency Consultation group, this analysis will be placed on the I-95 web site for public review and comment.