

I-80 Reconstruction Project, Monroe County



EXECUTIVE SUMMARY

Final Report



Interstate 80 (I-80) is a vital component of our national and state transportation system. It also satisfies regional and local transportation needs for mobility, recreation and commerce. The eastern end of the I-80 corridor in Pennsylvania is the gateway to over 300 miles of one of the most important transportation and goods-movement corridors in the state.

Regionally, I-80 is the transportation link between the New York/New Jersey Metropolitan area and the Scranton/

Wilkes-Barre/Pocono region. From the Delaware River Water Gap crossing, I-80 connects the Monroe County region to I-380, US 209, I-476 and I-81; and PA Route 33.

As the region's population and economy grow, the I-80 corridor will continue to play an important role in the region. The focus of this corridor study and planning effort is the 18-mile stretch of I-80 from the Borough of Delaware Water Gap (Exit 310) to I-380 (Exit 293) in Monroe County. This section of I-80 supports the

economic backbone of Monroe County and the Stroudsburg-Pocono region.

The I-80 Corridor Study is a transportation planning study intended to provide the required background information for programming specific environmental/preliminary engineering studies and design/construction projects throughout the I-80 corridor. The study involved extensive environmental field work, traffic analysis, engineering and coordination with the public. Coordination with various stakeholders and area

municipalities resulted in a series of proposed transportation improvements designed to address safety issues and mobility needs. In addition, study team members met with legislative and municipal officials, and engaged in a robust media campaign in advance of public meetings held at two different locations in Monroe County.

During the I-80 Corridor Study, the Pennsylvania Legislature passed Act 44. Under this initiative, a 50-year lease and funding agreement between the Pennsylvania

Turnpike Commission (PTC) and the Pennsylvania Department of Transportation (PennDOT) was signed into law. The Act created a "public-public" partnership in which the PTC was directed to seek approval from the Federal Highway Administration to convert I-80 into a toll facility in order to pay for necessary transportation improvements along the I-80 statewide corridor. As part of the lease agreement, the PTC is currently developing a capital plan of infrastructure improvements for the length of I-80 in Pennsylvania, including pavement rehabilitation

projects, bridge replacements, interchange improvements and ITS improvements. As a result of this agreement, the I-80 Corridor Study team coordinated the prioritization of the roadway improvements in Monroe County with the PTC's engineering consultant.

STUDY CONCLUSIONS – EXISTING CONDITIONS OF THE ROADWAY

The I-80 Corridor Study included traffic studies, crash data analysis,

geometric deficiency survey and public involvement to illustrate and characterize the deficiencies of the existing system. Three (3) basic corridor-wide needs categories were documented:

1. Congestion

The existing roadway configuration will not accommodate existing traffic volumes at some locations and will fail system-wide with projected future increases in traffic.

2. Safety

The existing roadway system features design elements from 40 years ago that do not conform with the safety characteristics of high speed, high volume modern roadway design. As a consequence, there are operational safety concerns with the existing mainline and interchange configurations.



3. Deteriorating pavement and bridges

The western portion of the study area has relatively new pavement, especially in the area of the I-80/I-380 interchange which is nearing the end of a total reconstruction project. However, the eastern portion of the study area has 1960s vintage concrete pavement that has been overlain numerous times with bituminous (blacktop) pavement. In addition, many of the bridges along this 18-mile section of I-80 are reaching the

end of their available life span and are rated Structurally Deficient.

STUDY CONCLUSIONS – TRANSPORTATION SOLUTIONS

The study team explored a wide range of transportation solutions to improve the overall mobility on the I-80 corridor. Transportation Systems Management (TSM), Intelligent Transportation Systems (ITS) and transit improvements were considered in context with the traditional capacity-adding roadway improvements. The results of this investigation were that:

■ **The I-80 roadway corridor will need to be reconstructed**

The I-80 mainline and ramps will require reconstruction to correct the problem of deteriorating pavement, to add capacity, and to apply current design criteria to the roadway geometry. Each solution is designed to provide minimum operational requirements, which include current interstate standards, 60 mph design speed on the mainline, and three through lanes in each direction between interchanges.

■ **The I-80 study corridor was evaluated to determine a mainline widening concept for the roadway**

The 18-mile corridor was divided into two distinct sections based on geometric and environmental characteristics: **1. the western** rural section and **2. the eastern** urban section. In each section, mainline widening concepts were developed and key environmental features were identified.

■ **Interchange improvement concepts were developed**

The study team also looked at individual interchanges to develop improvement concepts that could provide measurable benefits and be funded and constructed independent of the mainline widening. Geometric deficiencies and environmental features were identified at key interchange areas and preliminary costs were estimated for each concept.

■ **TSM, transit and ITS strategies need to accompany any planned highway capacity increases**

TSM and transit strategies have the potential to reduce peak hour volumes on the highway and ITS initiatives can maximize the efficiency of the highway facility by pro-actively managing traffic flow.

During the course of this study, a substantial amount of technical information was acquired and documented. This technical information serves as back-up data and includes:

- Traffic Analysis Summary Report
- Analysis of Transportation Needs
- Geometric Deficiency Survey
- Environmental Overview
- Historic Resource Survey
- Archaeological Resource Reconnaissance Investigation
- Public Involvement Summary
- Preliminary Environmental Evaluation

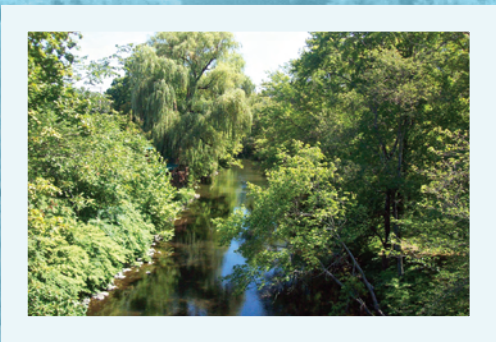
These reports and other technical files supporting this I-80 Corridor Study have been digitally archived and can be accessed by contacting: **Brian Graver, PennDOT District 5 Project Manager at 610-871-4560.**

In the end, the I-80 Corridor Study is intended to be a comprehensive transportation planning tool designed to assist the rural planning organization – the Northeastern Pennsylvania Alliance (NEPA) – as well as PTC and PennDOT in the planning and programming of future transportation projects on the I-80 corridor. 🚗

PART I: INTRODUCTION TO THE I-80 CORRIDOR STUDY

– Study Goals

– Coordination with Pennsylvania Turnpike Commission



The purpose of the I-80 Corridor Study is to identify transportation projects that will improve traffic operations and safety and will provide an upgraded transportation facility for 18 miles of I-80 from Exit 293 (I-380) to Exit 310 (Delaware Water Gap) in Monroe County, Pennsylvania.

Of the 59 exits distributed across the 311 miles of I-80 in Pennsylvania, 12 exits (or 20 percent) are located in this 18-mile section. The abundance and close proximity of interchanges for local access is a strong indication of I-80’s importance to the area. Several of these interchanges have recently been under study as separate projects, including Exits 298, 299, 308, 309 and 310.

This section of I-80 experiences high traffic volumes and congestion and the existing roadway configuration will not be able to accommodate future traffic volumes. These high traffic volumes combined with high truck percentages and roadway geometry have created concerns over safety throughout the corridor. Accidents along this section of I-80 have been the impetus for the creation of safety initiatives by the Safe 80 Task Force, including increased enforcement efforts by the state police. In addition, much of the corridor has deteriorating pavement and bridge conditions. Identifying safety and operational deficiencies and improving safety and operations are the main goals of this corridor planning effort.

STUDY GOALS

The objective of the I-80 Corridor Study is to identify and document deficiencies and needs, develop proposed solutions and alternatives, evaluate impacts and costs, and formulate a program to advance the best solutions that will provide measurable benefits in terms of safety, congestion, and/or replacing aging infrastructure.

The I-80 Corridor Study is the beginning of a series of actions that will address the transportation needs of the 18-miles from Exit 293 to Exit 310 in Monroe County. The study:

- Considers the corridor-wide transportation needs, identifying the areas and magnitude of problems within the corridor.
- Provides an inventory of environmental features within the corridor, so that the environmental and community issues of future projects can be predicted.
- Considers ways to make the highway corridor function more efficiently, such as Intelligent Transportation Systems (ITS) initiatives and public transit improvements.
- Presents highway improvement options for corridor widening and interchange improvements

- Includes an implementation plan for the future I-80 projects, taking into consideration the corridor-wide traffic, environmental and funding issues.

The final product of the I-80 Corridor Study is this Final Report which summarizes the efforts listed above.

COORDINATION WITH PENNSYLVANIA TURNPIKE COMMISSION

During the I-80 Corridor Study process, Pennsylvania law Act 44 was enacted. Under this law, a 50-year lease and funding agreement was signed between the Pennsylvania Turnpike Commission (PTC) and the Pennsylvania Department of Transportation (PennDOT), creating a “public-public” partnership. The PTC was directed to seek approval from the Federal Highway Administration to convert I-80 statewide into a tolled facility in order to pay for necessary transportation improvements along the entire I-80 corridor in Pennsylvania. The PTC is proposing Open Road Tolling (ORT) as the method of toll collection for I-80. ORT collects tolls electronically without the use of toll booths and allows drivers to pass through the toll area at highway speed without slowing down or stopping.

As part of the lease agreement, the PTC has committed to funding improvements to I-80 and is currently

developing a capital plan of infrastructure improvements for the entire 311-mile corridor to be undertaken over the 50-year duration of the lease. These improvements include ITS solutions and highway and bridge improvement projects. The entire length of I-80 will be reconstructed during the 50-year lease period. As part of the capital plan, the PTC is developing a prioritized schedule of infrastructure improvements to be undertaken in the first 10 years after tolling begins.

As a result of the passage of Act 44, the PTC may become the end user of this I-80 Corridor Study Final Report. As a result, the I-80 Corridor Study team coordinated with the PTC’s consultant team to incorporate the infrastructure improvements developed for the PTC’s Capital Plan for I-80 in Monroe County and the improvements developed as part of the I-80 Corridor Study into the I-80 Corridor Study Implementation Plan. However, the improvement options and implementation plan presented in this report are consistent with the District’s needs for I-80 in Monroe County. The PTC or the District can use the completed I-80 Corridor Study Final Report as a planning and programming tool for various transportation improvement projects. With this tool, informed and logical decisions can be made that will result in the sequential study, design and construction of transportation solutions for the I-80 corridor in Monroe County. 🚗

PART II: NEEDS

- **Need #1: Congestion**
- **Need #2: Safety**
- **Need #3: Deteriorating Pavement and Bridges**



The I-80 Corridor Study included an evaluation of I-80 from Exit 293 (I-380) to Exit 310 (Delaware Water Gap) to determine the corridor-wide needs. Transportation needs are typically defined as the problems identified with the operation of the existing facility. Traffic studies, crash data analysis, geometric deficiency surveys and public involvement were performed to determine the transportation deficiencies in the existing 18-mile corridor. As a result of this evaluation, three corridor-wide needs were identified:

1. **Congestion**
2. **Safety**
3. **Deteriorating Pavement and Bridges**

NEED #1: CONGESTION

The section of I-80 in Monroe County is the most heavily traveled section of I-80 in Pennsylvania. This area encompasses the Pocono Mountain region which draws a considerable amount of tourist and recreational visitors, but which has also effectively become an outer suburb of the northern New Jersey/New York City metropolitan area. The influx of residents from the NYC area and elsewhere has made Monroe County and neighboring Pike County two of the fastest growing counties in all of Pennsylvania. I-80 acts as a major route for local commuters as it is one of the only east-west roads connecting the major population centers in Monroe County.



I-80 is also a major cross-continental route that is heavily used by trucks. Average daily truck volumes range from 20 to 30 percent throughout the corridor study area. In addition, rolling terrain and a lengthy five-mile, 4.5 percent grade east of I-380 affects truck operating speed which in turn adversely affects the overall operating characteristics of the road.

The I-80 Corridor Study included the collection of traffic volumes, the projection of the traffic volumes to the design year of 2030 and the determination of existing and projected traffic operations, quantified by the term “Level of Service” or LOS. There are six levels of service designated as “A” through “F”, with “A” representing the best operating conditions and “F” representing the worst. These LOS are based on a certain measure of effectiveness, such as average delay per vehicle or density of the traffic stream, relative to the roadway facility being analyzed. LOS can be quantified for various roadway facilities such as signalized and unsignalized intersections, two-lane and multi-lane highways, and freeway components such as freeway sections, ramp junctions and weave sections.

Traffic projections and LOS analysis in the design year of 2030 predict that most of the corridor east of Exit 298/Scotrun will experience failing levels of service with the existing lane configuration.

I-80 in Monroe County has some unique travel characteristics:

- There is a very diverse composition of traffic flow on this road (commuters, tourists, local trips, and truckers).
- Although interstate highways were traditionally meant to be used primarily for intercity trips, I-80 serves as one of the main routes for local trips in Monroe County. A majority of the trips within the corridor are local trips (both starting and ending within the corridor).
- There is a significant seasonal fluctuation due to tourism. Traffic volumes are generally highest during the summer, with a smaller peak during winter ski season.
- Many residents have an unusually long commute to the northern New Jersey/New York City metropolitan area. Some commuters even maintain apartments in the NYC area in addition to their permanent homes in Monroe County, and will only travel back to Monroe County for the weekend.
- I-80 in New Jersey and at the Delaware River Bridge toll plaza experiences much greater levels of congestion, which may alter the commuting patterns of I-80 drivers. Congestion at the Delaware River Bridge plaza also meters traffic

flow into Pennsylvania. The Delaware River Joint Toll Bridge Commission (DRJTBC) is currently exploring ways to implement Open Road Tolling (ORT) at their toll plaza and expand capacity of the river crossing structure (Northerly Crossings Study). If that happens, traffic will be able to enter Pennsylvania more efficiently, introducing additional congestion on the Pennsylvania side of the River.

- I-80 experiences high levels of heavy truck volumes, which generally remain constant throughout the day.

Due to these unique travel patterns, I-80 experiences its highest traffic levels during Friday evenings because of motorists returning home for the weekend from the northern New Jersey/New York City area. For that reason, this Corridor Study focuses on the Friday evening peak hour periods. However, it is important to note that I-80 also experiences smaller peaks during other time periods. For example, on Sunday evenings and Monday mornings, there is a noticeable increase in the volume of traffic on eastbound I-80, as weekend tourists and commuters travel towards northern New Jersey/New York City. As individual sections of I-80 move into the more detailed Preliminary Engineering stages, these other

periods of congestion will need to be studied in greater detail.

Most traditional transportation projects evaluate “average” weekday conditions; in other words, conditions that are prevalent throughout the workweek (a typical Tuesday, Wednesday or Thursday). Because this project focuses specifically on Friday evening conditions, significant consideration was given to whether or not a possible capacity-adding improvement would be worth the expense, if it would address a problem that occurs only once a week.

Traditionally, urban highways are designed to provide for a LOS D or better in the design year. Recently, however, the transportation industry has begun to recognize that it is very difficult to achieve this without incurring enormous expense and/or creating significant adverse impacts on the surrounding community. If it is not feasible to provide for a LOS D for the highest peak hour(s), one factor that then becomes important is the number of hours of the day that the facility is projected to operate at a LOS E or F. For example, if a roadway is projected to operate at a LOS E or F with three lanes for three hours of the day, but is projected to operate at LOS D or better for the other 21 hours, it may be worthwhile to forgo the extra costs and impacts associated with increasing the design to a four-lane roadway just to achieve a minimum LOS D for all hours of the day.

NEED #2: SAFETY

Another noticeable issue associated with the I-80 study area is the tendency for recurring crashes, brought on by the high traffic volumes, high truck percentages, and highway design elements that do not meet today’s interstate standards. The Safe 80 Task Force, a coalition of local public officials, emergency service providers, and PennDOT, was formed several years ago to address the rapidly growing traffic and safety issues within the eastern portion of the I-80 corridor. Several safety improvements have already been implemented due, in part, to the recommendations of Safe 80, including the 50 mph speed limit and the tailgating dots in the eastern portion of the study area.



Tailgating dots on pavement in the eastern section of the study area.

The I-80 Corridor Study was intended to complement the previous and ongoing Safe 80 Task Force efforts by taking a “big picture” look at crash patterns throughout the entire corridor and identifying existing deficiencies or issues that should be addressed when developing improvement concepts for the I-80 corridor.

The crash analysis conducted for the I-80 Corridor Study shows that crash rates for the western, rural section of the study area are twice the statewide average for similar transportation facilities. These crashes were primarily rear-end crashes, fixed-object crashes, and deer-related crashes. A significant number of crashes appear to be speed-related as well. This section of I-80 is dominated by a 5-mile steep (4.5 percent) grade. In the eastbound direction, the steep downgrade promotes speeding while in the westbound direction, the steep upgrade forces trucks to slow down to lower speeds (45 mph or less), an unexpected condition for drivers accustomed to traffic traveling at 65 mph along other sections of the corridor.

Some locations of crash clusters in the western section included:

- **Exit 293** – the southbound I-380 merge onto eastbound I-80 and the eastbound I-80 off-ramp to northbound I-380;

- **Exit 298** – the PA 611 left-hand merge onto eastbound I-80;
- **Exit 299** – the westbound I-80 weave section between the Sullivan Trail Road on-ramp and PA 611 off-ramp;
- **Exit 302** – the northbound PA 33 approach to the PA 611 intersection; and
- **Exit 303** – the eastbound I-80 off-ramp to PA 611.

Segments in the eastern, urban section of I-80 were found to have crash rates either at or below the statewide average. Some locations of crash clusters in the eastern section included:

- **Exit 304** – the northbound US 209 merge onto eastbound I-80;
- **Exit 305** – the westbound I-80 off-ramp to Main Street (Bus. 209);
- **Exit 307** – the westbound I-80 off-ramp intersection with Broad Street;
- **Exit 308** – the Prospect Street on-ramp to westbound I-80; and
- the southbound US 209 merge onto eastbound I-80.

Locations of high crash incidences in both sections are likely due to congestion and deficient roadway design elements such as deficient ramp radii and acceleration lane, deceleration lane and weave section lengths. The improvement concepts developed for the I-80 Corridor Study focus on addressing these issues.

NEED #3: DETERIORATING PAVEMENT AND BRIDGES

The original construction of I-80 was completed in the early 1960s. Two sections of I-80 in the study corridor have recently been completely reconstructed. The first includes a portion of the I-80/I-380 interchange area, and the second is a section just west of the Exit 302 (PA Route 33 Bartonsville) interchange to just west of the Exit 304 (southbound US 209) interchange. However, a majority of the corridor has the original 1950s and 1960s vintage concrete pavement remaining in place that has been milled and overlaid with bituminous (blacktop) pavement in recent years.

This pavement structure is reaching the end of its serviceable life. As the pavement continues to deteriorate, maintenance activities to repair cracks and spalling become increasingly necessary and frequent. Periodic overlays can make the roadway appear new, but do not



fix the underlying deteriorated pavement structure. Consequently, resurfacing material which is placed on the roadway has a limited life expectancy. The ultimate solution is the reconstruction of both the base material as well as the riding surface.

In addition, many of the bridges over I-80 in the corridor are reaching the end of their available life span and are rated Structurally Deficient (SD). There is one SD bridge on I-80 at Exit 310. While PennDOT regularly inspects SD bridges to ensure that the safety of the traveling public is not compromised, SD bridges do require more frequent and costly maintenance.

Six of the bridges over I-80 in the study area also have deficient vertical underclearances (less than 16 feet). This forces trucks carrying tall loads to detour onto local streets in and around Stroudsburg and East Stroudsburg, causing significant disruption for both trucks and local residents. 🚚



PART III: ENVIRONMENTAL OVERVIEW

– Natural Resources

- Aquatic Resources
- Threatened and Endangered Species
- Natural and Wild Areas

- Hazardous or Residual Waste Sites
- Geology

– Cultural Resources

- Historic Structures
- Archaeological Resources

– Community Resources



A comprehensive preliminary analysis of the environmental features within the I-80 corridor in Monroe County was conducted to assist with the evaluation of project alternatives and identify potential resource impacts for the proposed improvement concepts. Results of this analysis are presented in the I-80 Corridor Study Environmental Overview which is contained in the Appendix. The following presents a brief summary of the environmental features identified in the corridor which could have a significant effect on project design, cost and/or permitting requirements.

NATURAL RESOURCES

■ Aquatic Resources

The I-80 study area lies within the Lehigh and Middle Delaware-Mongaup-Brodhead sub-watersheds, which empty into the Delaware River. The eastern edge of the corridor falls within the Delaware Water Gap National Recreational Area, which also includes a designated National Wild and Scenic River, the Delaware (Middle) River system. The Delaware (Middle) River has been designated for its scenic attributes and supports a number of recreational uses including boating, fishing and hiking.

In addition to the Delaware River, the corridor was found to support 26 high quality cold-water fisheries (HQ-CWF) streams and an Exceptional Value (EV) watercourse (Sand Spring Run). According to the Pennsylvania Fish and Boat Commission (PFBC), the majority of these watercourses are also known to support natural trout reproduction. These stream classifications afford the designated watercourse special protective consideration by the regulatory agencies when considering the design and effects of projects within their watershed. The most stringent of these is placed on EV watercourses, where Pennsylvania Department of Environmental Protection (PADEP)

regulations do not permit uses along the stream leading to any degradation of the stream quality.

National Wetlands Inventory (NWI) mapping and cursory field investigations revealed the presence of over 90 wetlands within the project corridor. The majority of the wetlands are palustrine forested systems associated with the streams and floodplains in the study area. Isolated wetlands, those not connected or in close proximity to watercourses, are also present in the western end of the study area near the Exit 293 (I-80/I-380) interchange. These wetlands are primarily palustrine scrub/shrub and forested systems.



HQ-CWF watercourses such as Pocono Creek run through much of the study corridor.

The majority of the project corridor wetlands are classified as EV systems as a result of their association with streams supporting natural trout production, flowing through natural areas and/or having EV status themselves. Additionally, there is the potential for several more wetlands to support threatened or endangered (T&E) species or have a close connection to wetlands supporting T&E species. These systems would also qualify as EV wetlands if T&E species were present. Similar to the previous

discussion of EV streams, EV wetlands are managed to protect their special value. PADEP regulations do not permit uses that could lead to impacts to the wetland without significant evidence the impact would not generate degradation of the associated wetland. Floodplains provide a myriad of functions including storing storm flow, reducing the intensity of flood events, recharging groundwater, providing habitat for riparian species, and protecting property of local residents. Floodplains are associated

with all of the streams identified in the watercourses discussion.

■ **Threatened and Endangered Species**

The I-80 study area is in the known range (historic and/or current) of 15 plants, two (2) reptiles, a bird and a mammal listed by state and/or federal agencies as threatened, endangered or a species of special concern (2005 Correspondence). **Table 1** lists each species, along with their status and



The Nature Conservancy's Long Pond Natural Area sits on both sides of I-80 at the western end of the study corridor.

associated habitats. The habitat types associated with many of the species of concern are present in various locations throughout the I-80 study area, particularly wetlands and woodland.

In addition to the plant and animal species, the project corridor also supports kettlehole bogs in the vicinity of the Exit 293 (I-80/I-380) interchange. This natural community is considered to be of special importance and given regulatory protection.

■ **Natural and Wild Areas**

There are a number and variety of natural areas located within or in close proximity to the project corridor. The majority of these areas are found in the western end of the corridor. The exception is the Delaware Water Gap National Recreation Area, which is

located at the eastern limits of the project corridor.

The Delaware Water Gap National Recreational Area preserves 40 miles of the middle Delaware River and almost 70,000 acres of land along the river's New Jersey and Pennsylvania shores. At the south end of the park, the river cuts eastward through the Appalachian Mountains at the scenic Delaware Water Gap. This area hosts the Appalachian Trail, a National Scenic Trail entering Pennsylvania along I-80, and provides a variety of recreational opportunities including canoeing, hiking, camping, fishing and hunting.

Pennsylvania State Game Land - No. 38 is split by I-80 just east of the Exit 293 (I-80/I-380) interchange. This land is used for hunting and trapping and can be used for biking and horseback

riding during certain times of the year. As State Game Land is open to the public, it is considered a Section 4(f) resource.

The Nature Conservancy owns and/or manages several natural areas also found in the vicinity of the Exit 293 (I-80/I-380) interchange. The most significant of these is the Long Pond Natural Area. The ecosystem of this natural area includes excellent examples of Acidic Shrub Swamp, Mesic Oak-Pine Barrens, and Ridgetop Dwarftree Forest natural communities. Dozens of plant and animal species of special concern inhabit these communities. The Long Pond area supports the highest concentration of globally rare species (seven) and natural communities in Pennsylvania. Parts of this unique area have been protected through the efforts of Monroe County, The Nature Conservancy, and the Commonwealth of Pennsylvania.

■ **Hazardous or Residual Waste Sites**

Seventy-six (76) potential waste sites have been identified within the project corridor study area. The majority of these sites lie within the urban (eastern) portion of the corridor and are associated with commercial and industrial facilities such as existing and former service stations, fabrication businesses, scrap yards and waste facilities.

■ **Geology**

The geology in the vicinity of Exit 303 to Exit 306 presents a potential concern for any activities requiring excavation, especially in locations where excavation below the water table may be required. The Marcellus Formation is found in this area and it can contain pyrite (an iron sulfide). As pyrite weathers it naturally frees sulfur to leaching, which can result in acid rock drainage.

CULTURAL RESOURCES

■ **Historic Structures**

The greatest density of historic resources is found in the eastern end of the study area. This is due to the urban and suburban nature of the study area as it passes through the Boroughs of Stroudsburg, East Stroudsburg, and Delaware Water



The Central House/Deerhead Inn (circa 1884) is one of the many buildings found within the Delaware Water Gap Historic District. The district is bisected by I-80.

TABLE 1 – PLANT SPECIES AND NATURAL COMMUNITIES OF SPECIAL CONCERN

Scientific Name	Common Name	Status★	Habitat	Scientific Name	Common Name	Status★	Habitat
Plants				Plants			
Carex longii	long’s sedge	TU	Swamps, open thickets, moist meadows, old gravel pits, swales	Polygonum ramosissimum	bushy knotweed	PX	Sandy shores, railroad ballast, waste ground and rubbish heaps
Cares oligosperma	few-seeded sedge	PT	Bogs	Prunus pumila var. susquehanae	appalachian sand cherry	PT	Dry, exposed rock outcrops and mountain tops
Cares paupercula	bog sedge	PT	Sphagnum bogs and boggy woods	Schoenoplectus smithii	smith’s bulrush	PE	Moist shores and tidal mudflats
Gaultheria hispidula	creeping snowberry	PR	Wet woods and bogs	Scirpus ancistrochaetus	northeastern bulrush	FE	Ponds, wet depressions, vernal pools and other wetland habitats
Glyceria obtusa	coastal mannagrass	PE	Swamps, bogs and moist, sandy peaty ground	Animals			
Isotria medeoloides	small-whorled pogonia	FT	Mixed deciduous or deciduous/coniferous upland forests	Clemmys muhlenbergii	bog turtle	FT/PE	Spring-fed wetlands with soft/mucky soils
Juncus filiformis	thread rush	PR	Bogs and sandy shores	Crotalus horridus	timber rattlesnake	PC	Forested mountains and talus areas
Ledum proenlandicum	common Labradortea	PR	Bogs and peaty wetlands	Haliaeetus leucocephalus	bald eagle	PT	Lakes, reservoirs, large rivers, and wetlands
Muhlenbergia uniflora	fall dropseed muhly	PE	Marshes, bogs, and moist sandy roadsides	Myotis sodalist	Indiana bat	FE/PE	Forests, caves and mines
Myrica gale	sweet gale	PT	Bogs and shallow water of lake, pond and stream edges	Natural Community Name			
Polygala nuttalli	nuttall’s milkwort	TU	Open woods, peaty thickets, sphagnum bogs	Oligotrophic glacial kettlehole bog		PV	
★ NOTE: FE – Federal Endangered FT – Federal Threatened PC – Pennsylvania Candidate PE – Pennsylvania Endangered PT – Pennsylvania Threatened PR – Pennsylvania Rare PX – Pennsylvania Extirpated PV – Pennsylvania Vulnerable TU – Tentatively Undetermined							

Gap, as well as Pocono and Stroud Townships. The heaviest development in this area is north of I-80 (the majority of Stroudsburg and East Stroudsburg are north of the interstate); however, there is some intensive development south of I-80 where U.S. 209 and I-80 meet. PA 611 also parallels I-80 to the north between Exits 307 and 298. Prior to the construction of I-80, PA 611 was the major east-west corridor through the area and connected the Poconos to Philadelphia. Recently, PA 611 has become a major commercial corridor in the area. West of Exit 299, the study area becomes mostly rural and heavily forested.

Within the corridor study area there are 11 historic structures determined to be eligible for or listed on the National Register of Historic Places. They all lie in the eastern end of the study area. **Table 2** presents these places.

There are also three linear resources traversing the project corridor study area – PA 611; the Delaware, Lackawanna, and Western Railroad (DL&W); and the former Wilkes-Barre and Eastern Railroad (WB&E) right-of-way (ROW). PA 611, also known as the Lackawanna Trail, in most instances followed the route of the present PA 611. However, as PA 611 was straightened and rebuilt over the years, portions of the older road were

abandoned. The DL&W enters the study area where I-80 crosses over the Delaware River in Delaware Water Gap. Its route follows the Brodhead Creek into East Stroudsburg from where it continues north to Scranton. The DL&W remains an active freight line and studies are underway regarding the reactivation of passenger rail service (the Lackawanna Cut-Off) between Scranton and New York City along these tracks. The WB&E was part of the New York, Susquehanna, and Western Railroad (NYS&W). The tracks have been removed, but portions of the right-of-way are still visible and structures (i.e., bridges, culverts, buildings, etc.) associated with the line may still exist. The former

route of the WB&E roughly paralleled I-80 west from the Delaware Water Gap to I-380, where the railroad turned north.

■ **Archaeological Resources**

An archaeological sensitivity model was used to identify the potential for encountering archaeological sites along the I-80 corridor. This model found the western section (Exit 293 to Exit 298) of the corridor has the lowest overall sensitivity for archaeological resources; however, it is the least disturbed section of the corridor and therefore it may be easier to identify sites having a higher chance of being intact.

The central section (Exit 298 to Exit 303) of the corridor possesses broad areas of both precontact and historic archaeological sensitivity with moderate to high potential for encountering sites of significance. Areas surrounding the confluences of upland runs (e.g. Reeder’s Run, Rocky Run, Wigwam Run) with Pocono Creek are particularly sensitive locations. However, because modern development has been much more extensive in this area, ground disturbance has undoubtedly had an adverse effect on archaeological resources.

As with the central section, the eastern section (Exit 303 to Exit 310) of the corridor contains areas of moderate and high precontact archaeological sensitivity located along the floodplains

and alluvial terraces of the major creeks that parallel I-80. Pocono Creek and Brodhead Creek are particularly sensitive for deeply buried, large-scale Native American sites. Additionally, the eastern section of the I-80 study area intersects a series of chert-bearing geologic formations in the vicinity of Marshall’s Creek. Chert was an important natural resource heavily utilized by precontact Native Americans for stone tool production. Stream cuts in this area could contain Native American lithic quarry sites and related occupation sites. A vast complex of such sites was identified just to the north of the I-80 study area along Marshall’s Creek (Baublitz, et al. 1995).

Historic archaeological sensitivity areas are found in portions of both the central and eastern sections of the I-80

corridor. These are associated with the numerous 19th-century and early 20th-century dwellings within parts of Tannersville, Bartonsville, Stroudsburg, East Stroudsburg and Wind Gap. Additionally, several 18th-century sites are found within the aforementioned communities and a number of 18th- and 19th-century farmsteads are found along this stretch of the corridor.

COMMUNITY RESOURCES

The Monroe County Comprehensive Plan addresses the issues of planning and zoning, in addition to land use and development. The County’s plan focuses on open space preservation, economic development, legislative change, and infrastructure. While public services, infrastructure, and economic growth are important, the

comprehensive plan is also devoted to the preservation of natural resources and open space, which are prevalent throughout the area.

The U.S. Census Bureau estimated the total population of Monroe County to be 138,687 in 2000, an increase of approximately 45 percent since 1990. The county anticipates the population will continue to rise through the year 2020. Due to the large area of undeveloped land within the study corridor and the growth anticipated for the region, there is the potential for future development in these areas. Consequently, community and regional growth could result from additional employment, housing and recreational opportunities associated with potential development. The county has identified the proposed improvements to the I-80 corridor as

a need and regional planning efforts are anticipated to provide relief from the increasing traffic volumes associated with the future development of the region.

Numerous schools, libraries, places of worship and health facilities are present within the study area. Fire and emergency services are provided by the individual municipality or by volunteer organizations; however, police protection is generally supplied by the Pennsylvania State Police.

The percent of people living below the poverty level in the study area ranges from 6 percent in Pocono Township to 19 percent in Stroudsburg Borough. Concentrations of these populations are located to the north and west of Tannersville and within Stroudsburg and East Stroudsburg in the immediate vicinity of the I-80 corridor. Monroe County’s minority population is small (only 7 percent) and the county does not expect this figure to change substantially in the future. The minority population ranges from 7.4 percent in Delaware Water Gap to 13.7 percent in Stroud Township. The greatest concentration of minorities is located within Stroudsburg and East Stroudsburg in the immediate vicinity of the I-80 corridor. Although impacts to poverty level and minority populations cannot be determined prior to project design, any improvements within Stroudsburg and East Stroudsburg are likely to impact these populations. 🌳

TABLE 2 – HISTORIC RESOURCES DETERMINED ELIGIBLE FOR LISTING OR LISTED IN THE NATIONAL REGISTER

Municipality	Name	Status; Date Listed
Delaware Water Gap	Delaware, Lackawanna and Western Railroad Water Gap Station	Listed; 11/27/2002
Delaware Water Gap	Delaware Water Gap Historic District	Eligible
Delaware Water Gap	Church of the Mountain	Eligible
Mt. Pocono	Pocono Manor Historic District	Listed; 4/11/1997
Stroudsburg	Stroudsburg Historic District	Eligible
Stroudsburg	United States Post Office	Eligible
Stroudsburg	George Tillotson House	Eligible
Stroudsburg	Wallace Hardware Building	Eligible
Stroudsburg	Academy Hill Historic District	Listed; 1/4/1990
Stroudsburg	Kitson Woolen Mill	Listed; 1/12/1984
Stroudsburg	Stroud Mansion	Listed; 8/1/1979



The Dansbury Depot (East Stroudsburg) served the D,L&W Railroad, one of four historic linear transportation corridors found within the study corridor.



The Stroudsburg Cemetery is one of numerous community resources lying adjacent to I-80. It abuts the highway right-of-way and westbound off-ramp at Exit 306.

EXIT 303 (NINTH STREET)

- Exit 303 – As it Exists Today
- Exit 303 – Improvement Options
- Exit 303 – Preliminary Environmental Assessment
- Exit 303 – Constructability, System Continuity and Traffic Operations



Exit 303 – As It Exists Today

The existing Exit 303 interchange is a half-interchange that provides access from eastbound I-80 to southbound PA 611 (Ninth Street) and from northbound PA 611 to westbound I-80. There are no significant operational issues directly associated with the interchange; however, the current configuration helps contribute to the significant levels of congestion regularly experienced on PA 611. PA 611 is rapidly developing on both sides of the bridge carrying PA 611 over the westbound I-80 on-ramp. As part of those developments, PA 611 is expected to be widened in the future to have a continuous five-lane cross section; however, the interchange bridge would have to be widened to facilitate that improvement. At least one developer has already agreed to



PA 611 Bridge over Westbound I-80 On-Ramp

contribute \$300,000 towards widening of that structure. In addition, regional mobility is somewhat confusing and circuitous due to the missing ramps.

The crash analysis conducted for the I-80 Corridor Study revealed that crashes occurred on the eastbound I-80 off-ramp to PA 611. This ramp terminus is controlled by a stop sign and queues on southbound PA 611 from the signalized intersection of PA 611 and Bridge Street routinely extend beyond the off-ramp, causing significant queuing on the off-ramp. This congestion could be a source of the reported crashes. PennDOT and Stroud Township are currently in the preliminary design phase for the SR 0611 Section 05S project, which will widen PA 611 to five lanes from the I-80 interchange through the Stroud



Eastbound I-80 Off-Ramp intersection with Eastbound PA 611

Mall area to Phillips Street. All of the traffic signals along PA 611 would become part of a closed-loop system. This project should alleviate the queuing and congestion that occurs on the I-80 off-ramp.

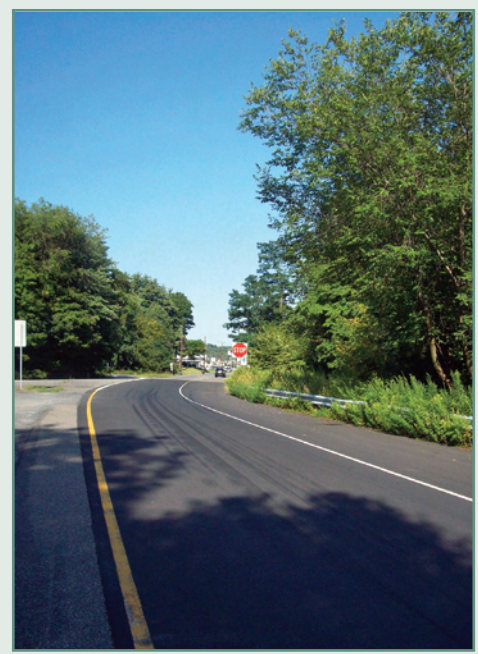
Exit 303 – Improvement Options

The I-80 Corridor Study Team developed three interchange improvement options to address the issues with this interchange.

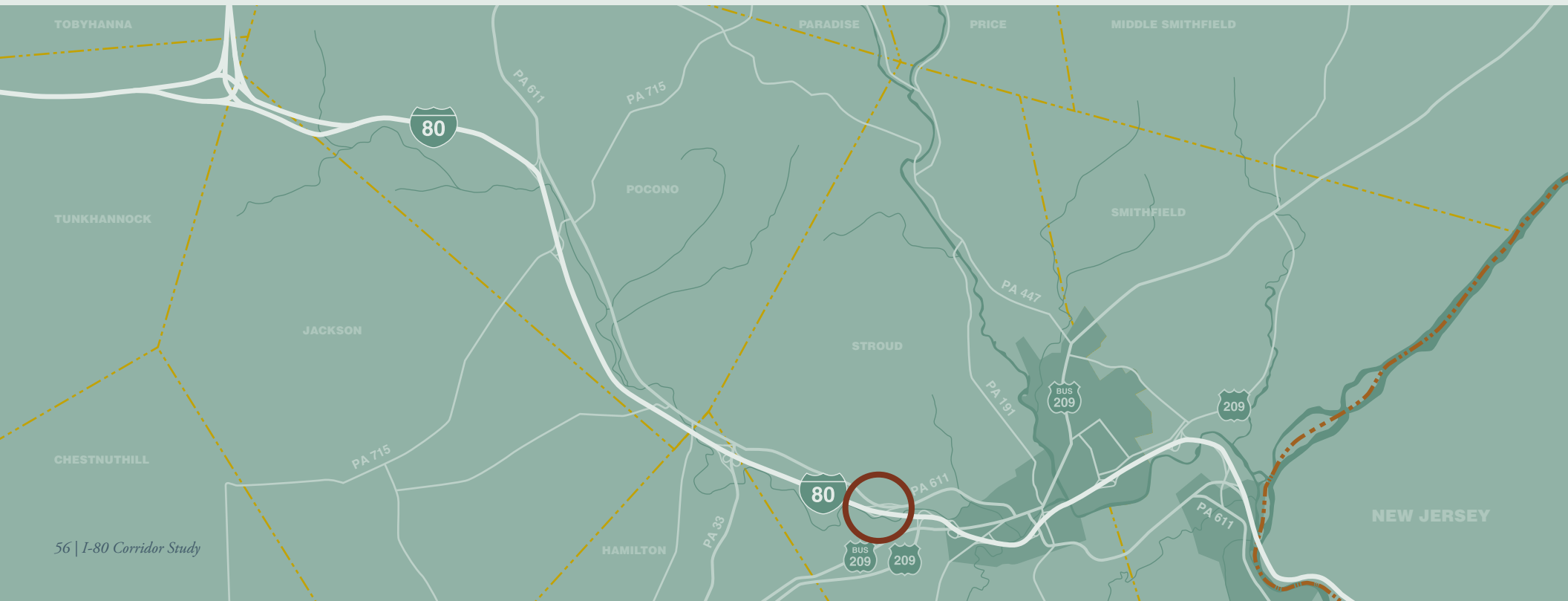
Option 1 entails the complete reconstruction of the interchange to create a full-movement, diamond interchange. This option involves realigning PA 611, constructing a new connector road and structure over I-80 and constructing four new interchange ramps.

Option 2 involves realigning the eastbound I-80 off-ramp to tie into PA 611 at a new intersection that would allow all movements from eastbound I-80 to northbound and southbound PA 611. The realigning of the ramp would be accomplished without impacting the eastbound I-80 off-ramp bridge over I-80. This option also involves constructing a short connector road from PA 611 to the existing westbound I-80 on-ramp to allow access from northbound and southbound PA 611 to westbound I-80.

Option 3 involves constructing a jug-handle along southbound PA 611 and a short connector road from PA 611 to the westbound I-80 on-ramp to accommodate movements from southbound PA 611 to the westbound I-80 on-ramp. This jug-handle could also be used by eastbound I-80 off-ramp traffic to access northbound PA 611.



Eastbound I-80 Off-Ramp



Exit 303
--Option 1

OVERVIEW

- Provides new full-movement diamond interchange
- Removes existing PA 611 bridge over westbound I-80 on-ramp which will allow five-lane width on PA 611
- Flattens curve on PA 611 by realigning roadway

ESTIMATED COST (X 1,000) *

Engineering Design	\$ 3,766
Construction	\$ 37,657
Total	\$ 41,423

* Excludes mainline widening, right-of-way, utility relocation and environmental mitigation costs.

- I-80 Proposed Mainline

I-80 Proposed Ramp

Existing Road

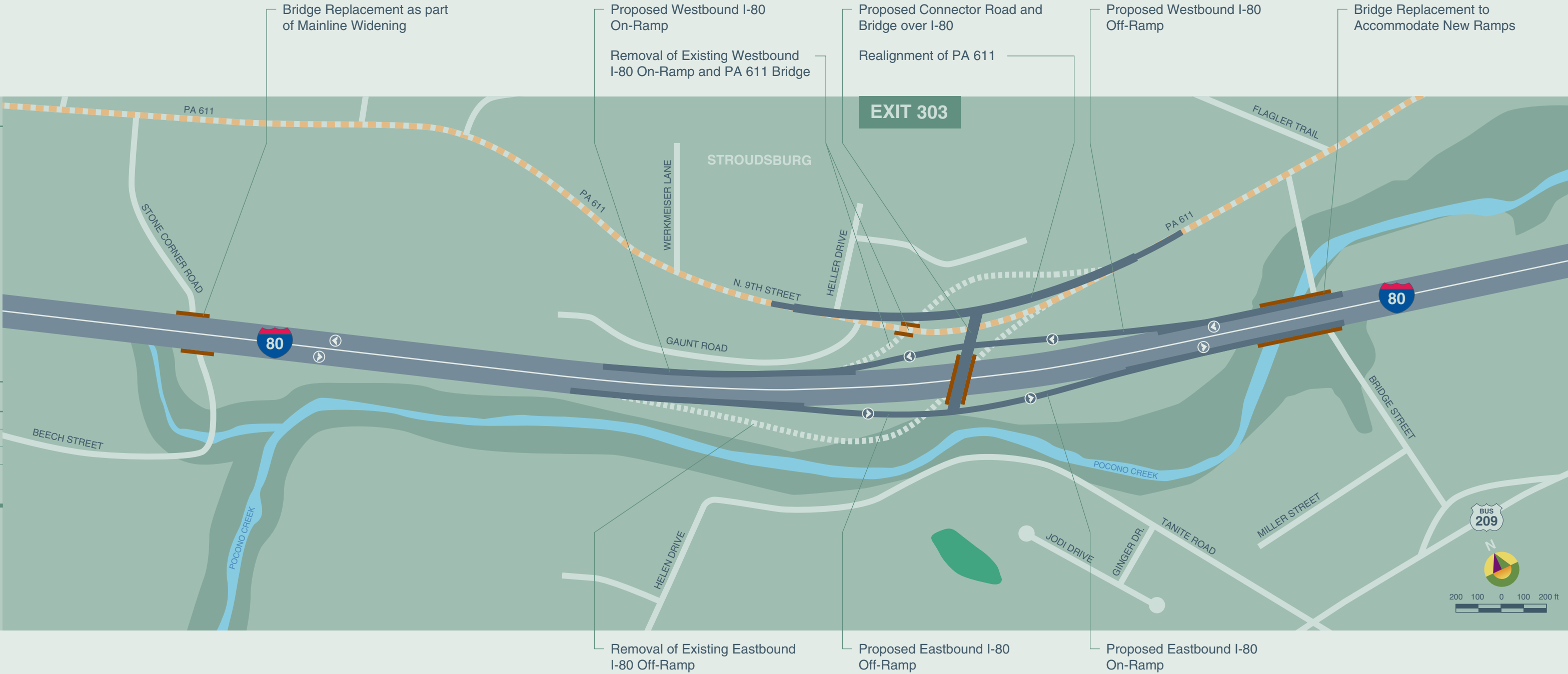
Proposed Ramp Elimination

Municipalities Boundary
- Bridge

NWI Wetlands

FEMA 100 Year Floodplain
- Waterways

Historic Roadway



Exit 303
--Option 2

OVERVIEW

- Allows for left and right turns from eastbound I-80 off-ramp to PA 611 by realigning and signaling intersection
- Allows for left and right turns from PA 611 to westbound I-80 on-ramp by realigning and signaling intersection

ESTIMATED COST (X 1,000) *

Engineering Design	\$ 43
Construction	\$ 429
Total	\$ 472

* Excludes mainline widening, right-of-way, utility relocation and environmental mitigation costs.

- I-80 Proposed Mainline

I-80 Proposed Ramp

Existing Road

Proposed Ramp Elimination

Municipalities Boundary
- Bridge

NWI Wetlands

FEMA 100 Year Floodplain
- Waterways

Historic Roadway



Exit 303
--Option 3

OVERVIEW

- Allows for left turns from eastbound I-80 off-ramp to PA 611 via jughandle
- Allows for left and right turns from PA 611 to westbound I-80 on-ramp by realigning and signalizing intersection

ESTIMATED COST (X 1,000) *

Engineering Design	\$ 145
Construction	\$ 1,448
Total	\$ 1,593

* Excludes mainline widening, right-of-way, utility relocation and environmental mitigation costs.

- I-80 Proposed Mainline

I-80 Proposed Ramp

Existing Road

Proposed Ramp Elimination

Municipalities Boundary
- Bridge

NWI Wetlands

FEMA 100 Year Floodplain
- Waterways

Historic Roadway



Exit 303 – Preliminary Environmental Assessment

Option 1 by far has the most extensive environmental impacts. This option would involve encroachment of Pocono Creek, a high quality, cold water fishery identified as supporting natural trout production, and its floodplain. It would also encroach on woodland that has some potential to support threatened/endangered species and involve 16 property acquisitions, one full and 15 partial. It would be the only one of the options to have a high potential of encountering an archaeology site and would affect a historic linear transportation resource, PA 611. The option would also require earthmoving activities on nearly four acres of land underlain by the Marcellus Formation, giving it the

highest chance of encountering pyrite and acid drainage concerns.

The amount of potential impacts associated with Option 1 incurs the most substantial design and environmental clearance constraints of all the options. It will be necessary to demonstrate that there are no practical alternatives to the Pocono Creek impacts, and substantial efforts will have to be made to prevent changes in water volumes and quality. Detailed investigations into the presence and extent of reproducing trout may also be required to determine potential effects on the fish and its associated habitat. The woodland areas will have to be evaluated for their potential to host species of concern, as well as for the presence of potential archaeology sites. The potential

effect the option would have on the historic PA 611 corridor will require investigation and coordination with the Pennsylvania Historical and Museum Commission (PHMC). Geological investigations will be required to determine the presence/absence of pyrite, which if found present would have a significant potential to require special design/construction efforts be undertaken to ensure acid drainage issues will not occur with the construction of the project. Lastly, Option 1 would displace one business and potentially require the greatest amount of compensation for real estate acquisition.

The impacts for Options 2 and 3 are limited in comparison with Option 1. The only issue of concern associated with Option 2 is a limited need for

geological investigations and special design/construction undertakings in conjunction with minimal potential disturbance of possible pyrite supporting rock. Option 3 has a greater potential to encounter pyrite than Option 2, but to a much lesser degree than for Option 1. Additionally, Option 3 would utilize a small amount of land with the moderate potential of supporting an archaeological site and may have a minor effect on the historic PA 611 corridor. It would also require the acquisition of two commercial properties and have a partial acquisition of another commercial property.

While the latter two options would still require environmental analysis to obtain environmental clearance in the form of geological, T&E species, and

archaeology investigations, to name a few, the extent of these studies would be significantly less than what must be conducted for Option 1. Due to the proximity of Exit 303 to Pocono Creek, it will also be necessary to address water volume and quality issues associated with any discharges that will reach the watercourse. However, this effort should also be considerably less for Options 2 and 3 than what would be needed for Option 1.

Exit 303 – Constructability, System Continuity and Traffic Operations

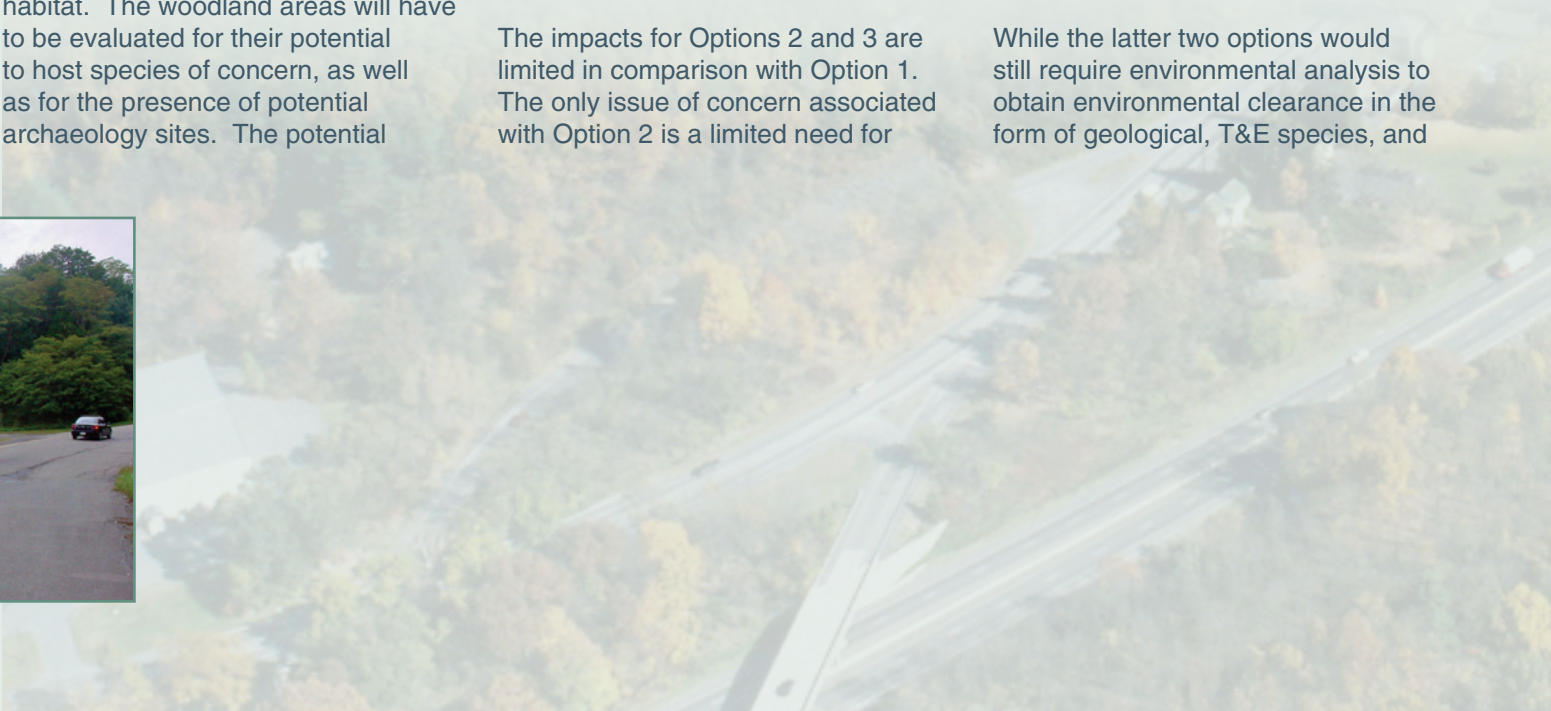
The constructability, system continuity and traffic operations of each option were rated qualitatively. There are no unsolvable Maintenance and Protection of Traffic (MPT) issues with any option. The constructability of Option 1 is rated as “Fair” and the constructability of Options 2 and 3 is rated as “Good”. Option 1 requires reconstructing PA 611 on a new alignment. Tying the new alignment in with the existing roadway will need to be accomplished while maintaining PA 611 traffic at all times. Options 2 and 3 will likely involve minor impacts to traffic.

The system continuity and operational characteristics of Option 1 are rated as “Good” and those of Options 2 and 3 are rated as “Fair”. Option 1 provides a full-movement interchange at Exit 303. Options 2 and 3 provide some additional movements at the existing interchange, but do not provide full access between both directions of I-80 and PA 611.

The traffic operations for Option 1 are rated as “Good”. All ramp junctions are expected to operate with acceptable levels of service in the design year of 2030. The new Connector Road intersections with Ramps A and B and Ramps C and D are expected to operate with acceptable levels of service as two-way stop-controlled intersections with stop-control on the

exit ramps. The intersection of the new connector road and PA 611 will require signalization to operate at acceptable levels of service in the design year.

Options 2 and 3 are rated as having “Good” traffic operations. The ramp junctions of the eastbound I-80 off-ramp and the westbound I-80 on-ramp are expected to operate with acceptable levels of service in the design year for both options. In Option 2, the new intersections of the realigned east-bound I-80 off-ramp with PA 611 and the realigned westbound I-80 on-ramp and PA 611 will require signalization to operate acceptably in the design year. In Option 3, the new intersection of PA 611 and the new jug-handle will require signalization to operate acceptably in the design year. 🚦



Exit 303 (Ninth Street)

	OPTION 1 Full-Movement Tight Diamond	OPTION 2 Off-Ramp Realignment	OPTION 3 Jug-Handle and Connector
Construction Cost ¹	\$ 41,423,000	\$ 472,000	\$ 1,593,000
Constructability/ MPT	Fair	Good	Good
System Continuity	Good	Fair	Fair
Traffic Operations	Good	Good	Good
Notable Engineering Issues for Consideration	Extensive ROW impacts likely	None	Some ROW impacts likely
Waterway Encroachment ²	187 linear ft. of Pocono Ck. (HQ-CWF with Natural Trout Production)	None	None
Wetlands Impacts ³	None	None	None
100-Year Floodplains Encroachments	0.54 acre	None	None
T & E Species Involvement	Potential – Forested Area	Not Likely	Not Likely

¹ Excludes mainline widening costs

² Placement of SWM Facilities was not evaluated in the Aquatic Resources Impacts

³ NWI and Cursory Field Investigation Identified

	OPTION 1 Full-Movement Tight Diamond	OPTION 2 Off-Ramp Realignment	OPTION 3 Jug-Handle and Connector
Natural/Wild Areas & Natural Landmarks Encroachments	None	None	None
Potential Hazardous & Residual Waste Sites Involvement	None	None	None
Other Land Resources	3.9 acres of Marcellus Formation ⁴	0.2 acres of Marcellus Formation ⁴	1.1 acres of Marcellus Formation ⁴
Historic Structures Directly Affected	None	None	None
Archaeological Resources Encroachments	Moderately high/high potential = 0.57 acres Moderate potential = 0.21 acres	None	Moderate potential = 0.1 acre
Property Acquisitions	1 full acquisition (services) and 15 partial acquisitions (3 residential, 7 services, 2 commercial, 3 vacant)	None	2 full acquisitions (services) and 1 partial acquisition (commercial)
Environmental Justice Populations Involvement	None	None	None

⁴ Can contain pyrite, which is associated with acid drainage concerns when weathered

B. INTERCHANGE IMPROVEMENTS

EXITS 304, 305 AND 306 (SOUTHBOUND US 209, BUSINESS 209/MAIN STREET, AND DREHER AVENUE)

- Exits 304, 305 and 306 – As They Exist Today
- Exits 304, 305 and 306 – Improvement Options
- Exits 304, 305 and 306 – Preliminary Environmental Assessment
- Exits 304, 305 and 306 – Constructability, System Continuity and Traffic Operations



Exits 304, 305, and 306 – As They Exist Today

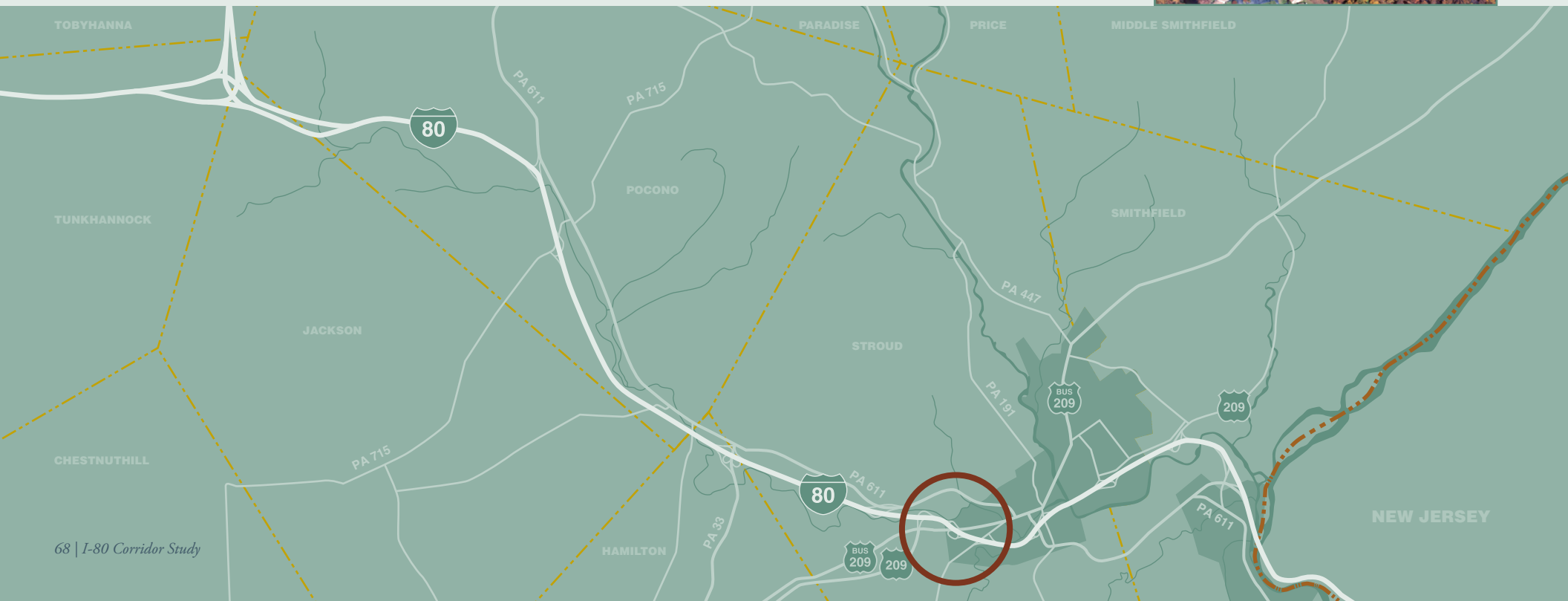
Exits 304, 305 and 306 were considered as one interchange system for the purposes of developing improvement options for the I-80 Corridor Study. Exit 304 is a partial interchange between I-80 and US 209 which provides access from westbound I-80 to southbound US 209 and from

northbound US 209 to eastbound I-80. Exit 305 is a full-movement interchange between I-80 and Main Street (Bus. 209). Exit 306 is a partial interchange between I-80 and Dreher Avenue which provides access from westbound I-80 to Dreher Avenue, and from Dreher Avenue to eastbound I-80.

The most notable deficiencies of the current interchanges include:

- The short weaving segment on westbound I-80 between the Exit 305 on-ramp from Main Street and the Exit 304 off-ramp to southbound US 209;
- The deficient acceleration lane length for traffic merging from northbound US 209 onto eastbound I-80;
- The deficient ramp curvature on the Exit 305 interchange ramps;
- The lack of a full interchange at Dreher Avenue; and
- The confusing nature of these interchanges which inhibit easy access between US 209, Business 209, and the Stroud Mall area of PA 611.

The crash analysis conducted for the I-80 Corridor Study revealed that many roadway segments within these



Westbound I-80 weave area between Exit 305 on-ramp and Exit 304 off-ramp



interchanges have crash rates that greatly exceed the statewide average, including the eastbound I-80 segment where northbound US 209 merges as well as the segment of US 209 approaching eastbound I-80 at Exit 304. One likely contributing factor for the high crash rates is the merge from two lanes to one lane on northbound US 209, followed soon thereafter by a sharp curve and short acceleration lane for merging onto eastbound I-80.

On the westbound I-80 off-ramp to southbound US 209 at Exit 304, there were a number of crashes that involved vehicles driving too fast on the sharp curve. These high speeds resulted in either hit-fixed-object or non-collision (overturned vehicle) crashes. The majority, but not all, of these crashes involved small trucks or large trucks. These occurred despite the presence of large “Truck Rollover” signs with flashing yellow lights and 35-mph advisory speed plates.



Westbound I-80 off-ramp at Exit 304

The eastbound I-80 segment between the northbound US 209 on-ramp at Exit 304 and the Main Street off-ramp at Exit 305 also had a crash rate that exceeds the statewide average and a small number of crashes occurred right at the Main Street off-ramp. Possible contributing factors include general congestion and the weaving and turbulence resulting from the short acceleration lane and heavy traffic coming from Exit 304.



At Exit 306, there were no significant occurrences of crashes on I-80, Dreher Avenue or the Exit 306 ramps. Both Dreher Avenue and the Exit 306 ramps are relatively lightly used roadways.

One possible short-term improvement could be painting “Curve Ahead” pavement markings on the westbound I-80 off-ramp to southbound US 209, given the history of crashes even with the flashing lights and signs currently in place.

Another slightly more expensive interim alternative would be a truck rollover warning system, similar to the system in place at the I-83/PA 581 “York Split” interchange in Cumberland County in District 8-0. The system would use radar or loop sensors to detect when a vehicle is going too fast to safely navigate that curve. When a speeding vehicle is detected, flashing lights and/or blank-out signs would activate, warning the driver to slow down.



The PTC’s capital plan includes providing an acceleration lane for the northbound US 209 to eastbound I-80 ramp acceleration and deceleration lanes at Exit 305 in Years 7-9.

Exits 304, 305 and 306 – Improvement Options

The I-80 Corridor Study team developed five improvement option concepts for this location to address the noted deficiencies of these

interchanges and to accommodate design year (2030) traffic volumes.

Option 1 focuses primarily on westbound I-80 and the improvements are aimed at improving the westbound I-80 weave section and improving access between Main Street (Bus. 209) and US 209. The improvements include: relocating the westbound I-80 off-ramp to Main Street further east on the mainline; constructing a new half-diamond interchange to connect Main Street with US 209; and relocating the ramp from Main Street to westbound I-80 so that this traffic does not merge onto westbound I-80 until after the off-ramp to US 209. This new ramp will be barrier separated from the westbound I-80 off-ramp to southbound US 209 as well. Main Street traffic to southbound US 209 would have to use the new half-diamond interchange in this option. The Dreher Avenue interchange (Exit 306) remains unchanged.

Option 2 includes the construction of C-D roads on both sides of I-80 between Main Street and Dreher Avenue and the reconfiguration of the I-80 on- and off-ramps at Main Street. On eastbound I-80, the C-D Road would tie into a new intersection with the existing Dreher Avenue on-ramp.

The existing Main Street on-ramp to eastbound I-80 would be removed and all Main Street traffic to eastbound I-80 would use the C-D Road to enter I-80 via the existing Dreher Avenue on-ramp. The westbound C-D road would tie into a new intersection with the realigned westbound I-80 on- and off-ramps at Main Street. In addition, a weaving lane would be provided on eastbound I-80 between the northbound US 209 on-ramp and the new off-ramp to Dreher Avenue. The Dreher Avenue interchange (Exit 306) remains unchanged in this option.

Option 3 is a hybrid of Options 1 and 2. It includes the same improvements for eastbound I-80 as in Option 2 and the same new half-diamond interchange between Main Street (Bus. 209) and US 209 as in Option 1. On westbound I-80, Option 3 includes relocating the westbound I-80 off-ramp to Main Street further east as in Option 1 and constructing a westbound C-D Road between Main Street and Dreher Avenue as in Option 2. The new off-ramp and westbound C-D road would merge together and form a new intersection with the new Main Street on-ramp to westbound I-80. As in Option 1, this ramp would be relocated so that this traffic does not merge onto westbound I-80 until after

the off-ramp to southbound US 209. Also, Main Street traffic to southbound US 209 would have to use the new half-diamond interchange.

Option 4 includes many of the improvements in Option 3: construction of the eastbound and westbound C-D roads, reconfiguration of the eastbound I-80 ramps and construction of a weaving lane on eastbound I-80. This option also involves reconfiguring the westbound I-80 on- and off-ramps but in a different fashion than Option 3. Option 4 relocates the Main Street on-ramp to westbound I-80 further east so that access to I-80 will be from Dreher Avenue, not Main Street. This new on-ramp would branch off of the westbound C-D road. This option also includes removing the existing westbound I-80 off-ramp at Main Street and realigning the westbound I-80 off-ramp to Dreher Avenue to tie into a new intersection with the new westbound C-D road. This option creates a full interchange at Dreher Avenue and eliminates the interchange at Main Street.

Option 5 is intended to address the main issue with these interchanges

– the short weaving length on westbound I-80 between Exit 304 and Exit 305. This option involves the construction of a barrier separated collector-distributor road on westbound I-80. The proposed C-D road begins after the Exit 306 off-ramp and would continue for the traffic traveling to southbound US 209 and Main Street (Bus. 209). The C-D road would have one lane plus a deceleration lane for the westbound Exit 305 off-ramp and an auxiliary/choice lane between the westbound Exit 305 on-ramp and the Exit 304 off-ramp to southbound US 209.

This design would require retaining walls along the stream. Standard shoulder widths would be provided everywhere. The structure over Main Street would be replaced and the structures over Dreher Avenue and Bridge Street would have to be widened. The tight loop on the north side would remain.

Exits 304, 305 and 306 – Preliminary Environmental Assessment

This stretch of I-80 possesses a wide range of environmental constraints

including residences and businesses lining the corridor, the presence of a historic railroad corridor, and the presence of high quality watercourses and EV wetlands. The magnitude of impacts on each of these resources, in balance with each other, will figure into determining which of the ultimate interchange improvement options moves forward to construction.

As indicated in the mainline discussion, community resources essentially line I-80 at this point in the study corridor. While none of the five interchange improvement options would necessitate the full acquisition of any of the homes and businesses lining I-80, all would have a measureable number of partial property acquisitions. Option 3 would have the most of these partial property acquisitions with 29, while Option 5 would have the least at 6. One of the partial acquisitions associated with Options 2 and 3 would involve the Stroudsburg Cemetery. This involvement will place a more significant burden on the environmental clearance, design and construction efforts associated with Options 2 and 3 than would occur with Options 1, 4 and 5.

The demographics of the residents along this part of the I-80 corridor indicate there is a potential for the properties being affected by the five options to support minority and/or poverty level populations. As such, environmental justice evaluations would have to be carried out for any of the options being considered for design and construction. Obviously, the options with greater property acquisitions have the greater chance of encountering environmental justice concerns. In addition to this issue, the concentration of homes and community facilities combined with the magnitude of the interchange configurations proposed for each of the options will require noise impact analysis be conducted for any option considered for design/construction.

While there are no known eligible or listed historic resources located within the anticipated footprint of the five interchange options, the age of many of the residential and commercial buildings surrounding the interchanges will mandate that historic structure studies be conducted throughout most of this part of the I-80 corridor. In particular there are large groupings

of buildings of 50 years and older on the south side of I-80 between Exits 304 and 305 and on the north side of I-80 between Exits 305 and 306. In addition to the potential historic structures present, the former path of the Wilkes-Barre and Eastern (WB&E) Railroad runs generally parallel to I-80 with portions of the highway having been constructed directly overtop of the former railroad bed. This resource will have to be evaluated as part of the historic and archaeology studies with whatever option moves forward.

From an archaeology impact standpoint, Options 1, 3 and 5 will encounter more than twice as much area with a moderate to high potential of possessing archaeological sites than Options 2 and 4. This is the result of the more extensive encroachment of the woodlands found along Pocono Creek on the north side of I-80.

The woodland area, and the wetlands found within it, is the main location that could support threatened/ endangered species in this portion of the I-80 corridor. Option 4 is the least intrusive in this area and therefore has the least chance of encountering

a species of concern. Options 1, 3 and 5 conversely would have the most extensive effect on this area increasing their chance of encountering threatened/endangered species issues. With all of the options having some impact to this area, there will be a need to evaluate them for potential impacts to the species of concern which are found in woodlands and/or wetlands.

The wetland impacts associated with the options are also significant as a result of the EV status they possess due to their association with the natural trout supporting streams running throughout this part of the I-80 corridor. Any impacts to EV wetlands will require a detailed avoidance alternative analysis to meet the permitting requirements of Pennsylvania Department of Environmental Protection (PADEP). Additionally, impacts to an EV wetland are not permissible unless the proposed project is necessary to abate a substantial threat to public health or safety and meets the seven additional qualifying criteria spelled out in Title 25, Chapter 105 including demonstrating “there is no practicable

alternative to the proposed project that would not involve a wetland or have less effect on the wetland, and not have other significant adverse effects on the environment”.

It appears Options 1 and 5 satisfy the wetland impact permitting requirements the best of the five options as they have the least impact to EV wetlands. However, it will be necessary to determine the exact location and number of EV wetlands present within any proposed design option at the onset of preliminary design to determine which option addresses the permitting requirements the best. Undertaking early coordination with PADEP and the other regulatory agencies will also enable the project team to identify what types of impacts and mitigation measures the agencies will consider acceptable, as well as reduce potential delays associated with design changes brought about by a failure to develop designs capable of meeting the stringent regulatory design requirements.

Like the wetland impacts, the impacts to the project area streams will also be of significant concern to the

regulatory agencies and have a key role in determining the eventual design carried forward into construction. As is the case throughout almost the entire I-80 corridor in Monroe County, the streams in this part of the corridor are classified as high quality, cold water fisheries that support the natural production of wild trout. This will make it necessary to avoid and minimize impacts to the streams to the extent possible and demonstrate there are no practical alternatives to the impacts. Additionally, substantial efforts will have to be made to prevent changes in water volumes and quality. Options 1 and 5 currently appear to address the avoidance and minimization of stream impacts the best, while Option 4 has the most extensive impacts and will have the greatest burden for reducing and justifying the impacts during design and permitting.

The remaining environmental issues of significance encountered in this section of the I-80 corridor are floodplains, hazardous waste sites, and the possible presence of pyrite. With all of the options requiring earthwork activity in the locations that potentially host pyrite, acid rock drainage

Exits 304, 305 and 306
--Option 1

OVERVIEW

- Eliminates westbound I-80 weave between Exits 304 and 305 by constructing new on-ramp barrier-separated from existing off-ramp
- Improves access between Main Street (Bus. 209) and US 209 and removes some traffic from eastbound I-80 off-ramp at Exit 305 via new half-interchange
- Improves geometry of eastbound I-80 Exit 305 ramps

ESTIMATED COST (X 1,000) *

Engineering Design	\$ 4,298
Construction	\$ 42,973
Total	\$ 47,271

* Excludes mainline widening, right-of-way, utility relocation and environmental mitigation costs.

- I-80 Proposed Mainline

I-80 Proposed Ramp

Existing Road

Proposed Ramp Elimination

Municipalities Boundary
- Bridge

Proposed Retaining Wall

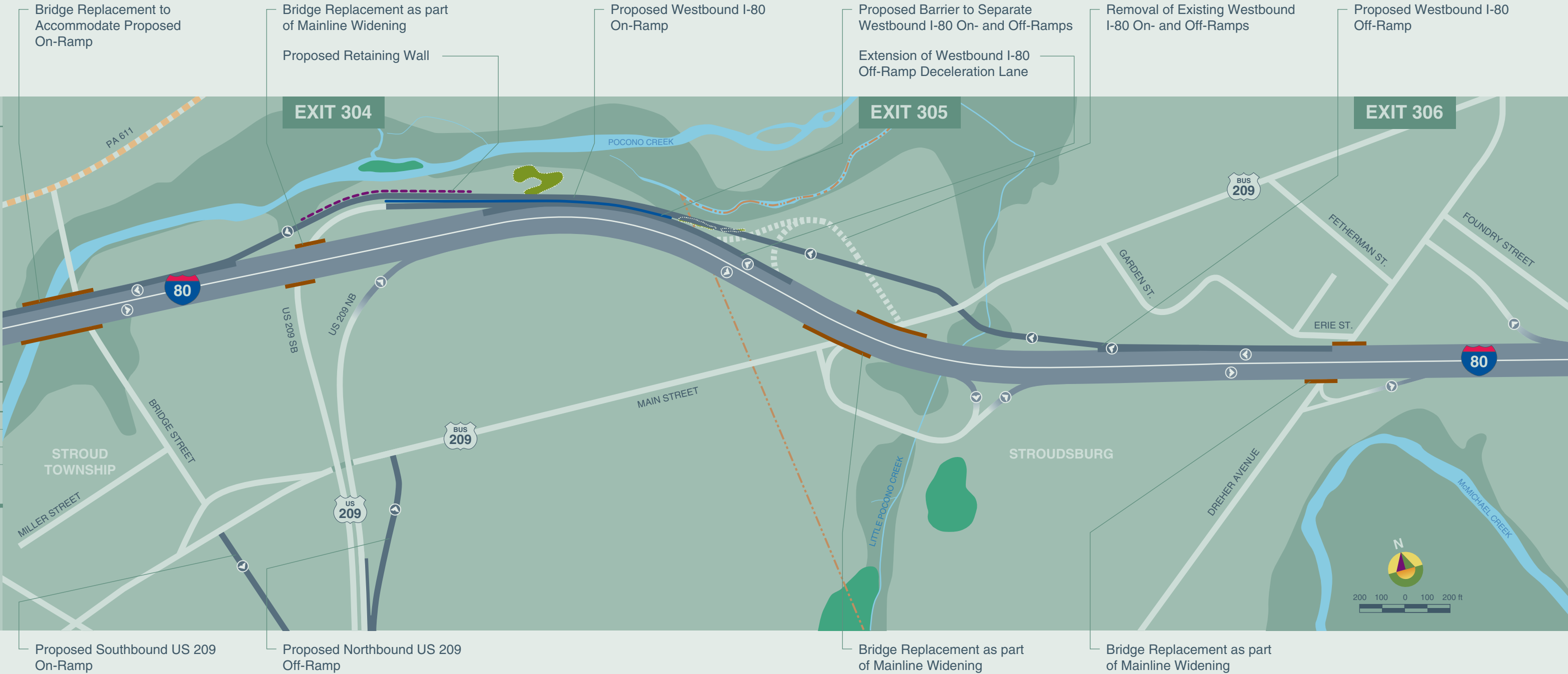
Proposed Barrier

Field Wetlands

NWI Wetlands
- FEMA 100 Year Floodplain

Waterways

Historic Roadway



Exits 304, 305 and 306
-- Option 2

OVERVIEW

- Provides lane for eastbound I-80 weave between Exits 304 and 305
- Relocates eastbound I-80 on/off movements at Exit 305 to Exit 306 interchange by constructing new ramps and eastbound collector-distributor road
- Provides lane for westbound I-80 weave between Exits 304 and 305
- Improves access between Dreher Avenue, Main Street and westbound I-80 by constructing westbound collector-distributor road

ESTIMATED COST (X 1,000) *

Engineering Design	\$ 3,292
Construction	\$ 32,915
Total	\$ 36,207

* Excludes mainline widening, right-of-way, utility relocation and environmental mitigation costs.

I-80 Proposed Mainline

I-80 Proposed Ramp

Existing Road

Proposed Ramp Elimination

Municipalities Boundary

Bridge

Proposed Retaining Wall

Proposed Barrier

Field Wetlands

NWI Wetlands

FEMA 100 Year Floodplain

Waterways

Historic Roadway



- Addition of Lane for Eastbound I-80 Weaving Movement
- Bridge Replacement to Accommodate Weave Lane
- Realignment of Eastbound I-80 On- and Off-Ramps
- Proposed Eastbound Collector-Distributor Road
- Bridge Replacement as part of Mainline Widening
- Extension of Eastbound I-80 On-Ramp Acceleration Lane

Exits 304, 305 and 306

--Option 3

OVERVIEW

- Provides lane for eastbound I-80 weave between Exits 304 and 305
- Eliminates westbound I-80 weave between Exits 304 and 305 by constructing new on-ramp barrier-separated from existing off-ramp
- Improves access between Main Street (Bus. 209) and US 209 via new half-interchange
- Improves geometry of eastbound and westbound I-80 Exit 305 ramps
- Improves access between Dreher Avenue, Main Street and I-80 by constructing eastbound and westbound collector-distributor roads

ESTIMATED COST (X 1,000) *

Engineering Design	\$ 5,375
Construction	\$ 53,745
Total	\$ 59,120

* Excludes mainline widening, right-of-way, utility relocation and environmental mitigation costs.

- I-80 Proposed Mainline

I-80 Proposed Ramp

Existing Road

Proposed Ramp Elimination

Municipalities Boundary
- Bridge

Proposed Retaining Wall

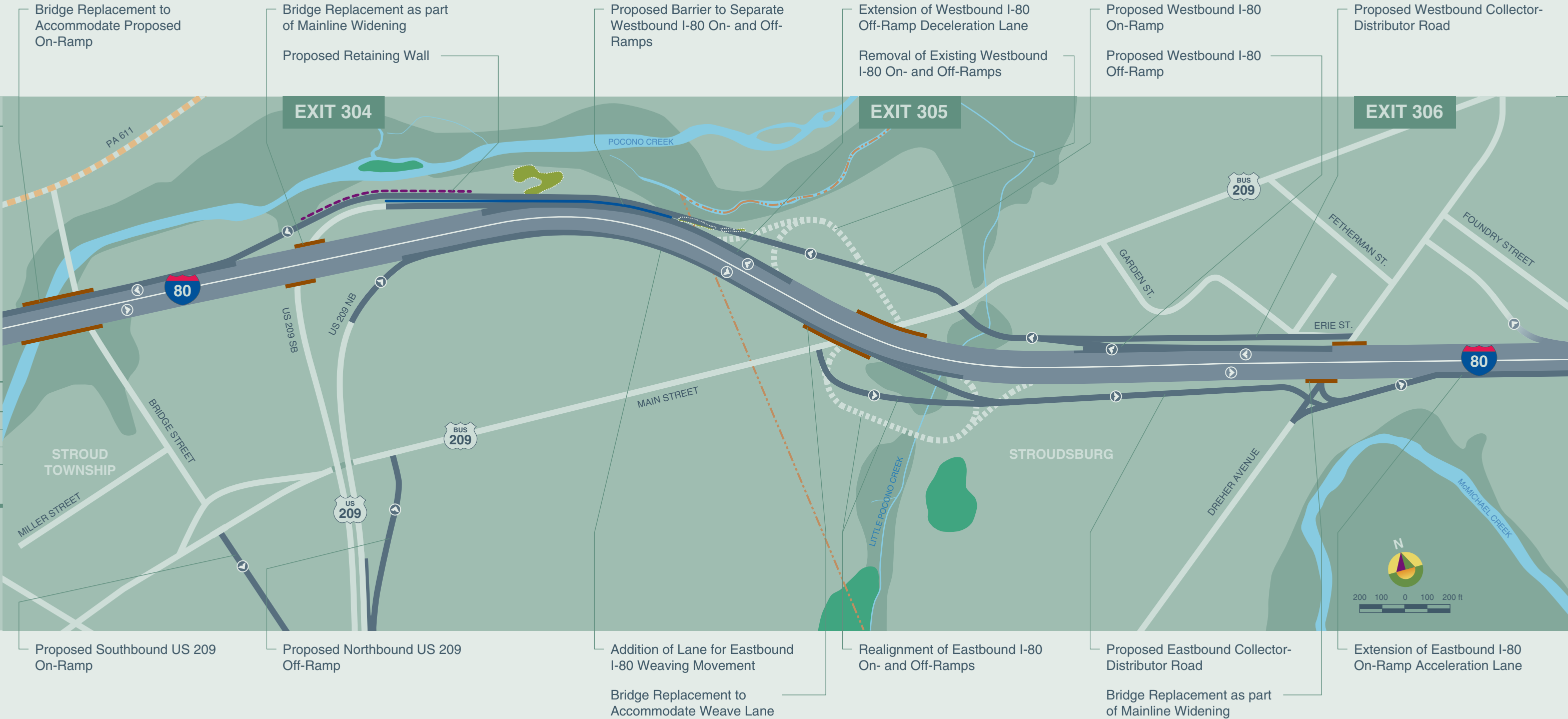
Proposed Barrier

Field Wetlands

NWI Wetlands
- FEMA 100 Year Floodplain

Waterways

Historic Roadway



Exits 304, 305 and 306
--Option 4

OVERVIEW

- Provides lane for eastbound I-80 weave between Exits 304 and 305
- Eliminates westbound I-80 weave between Exits 304 and 305 by relocating Exit 305 on and off-ramps to Exit 306
- Improves access between Main Street (Bus. 209) and US 209 via new half-interchange
- Improves geometry of eastbound I-80 Exit 305 ramps
- Improves access between Dreher Avenue, Main Street and I-80 by constructing eastbound and westbound collector-distributor roads

ESTIMATED COST (X 1,000) *

Engineering Design	\$ 3,720
Construction	\$ 37,198
Total	\$ 40,918

* Excludes mainline widening, right-of-way, utility relocation and environmental mitigation costs.

- I-80 Proposed Mainline

I-80 Proposed Ramp

Existing Road

Proposed Ramp Elimination

Municipalities Boundary
- Bridge

Proposed Retaining Wall

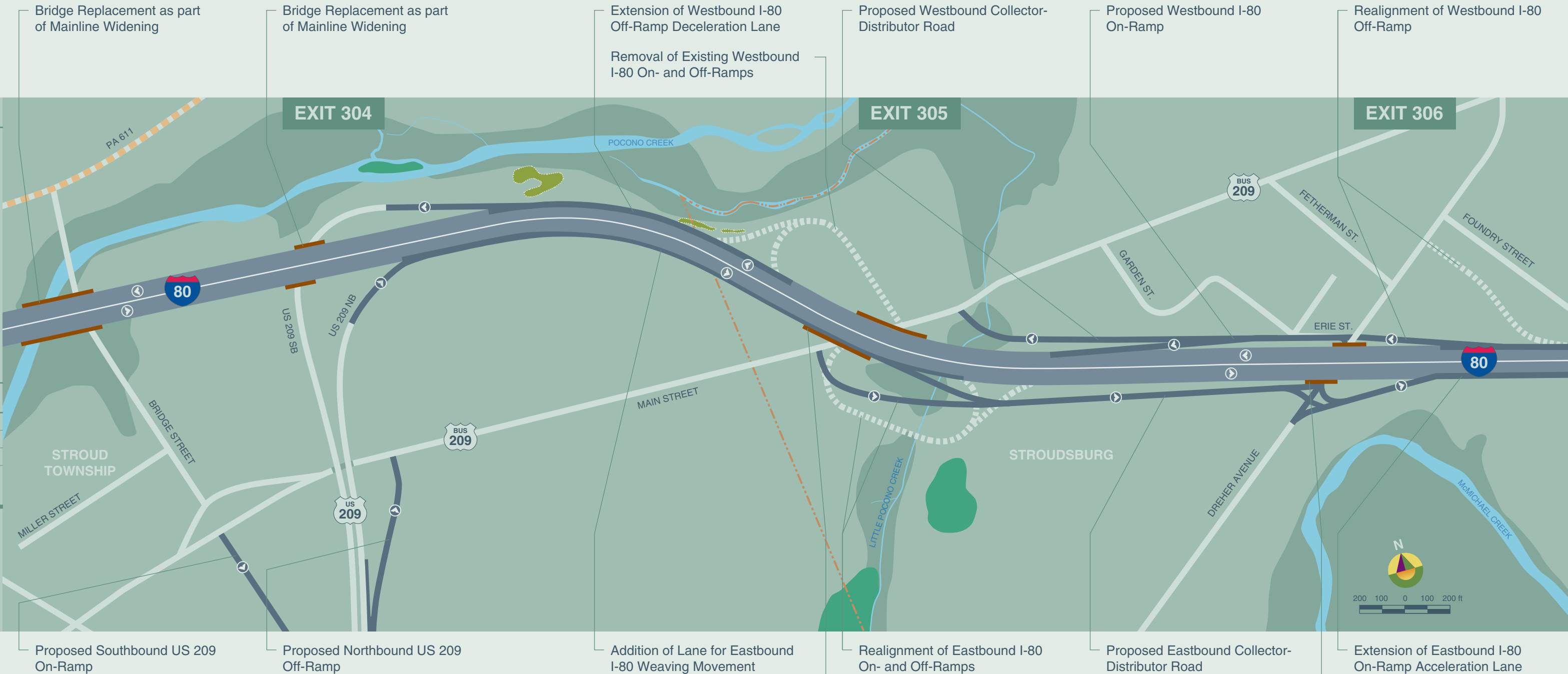
Proposed Barrier

Field Wetlands

NWI Wetlands
- FEMA 100 Year Floodplain

Waterways

Historic Roadway



Exits 304, 305 and 306
-- Option 5

OVERVIEW

Provides collector-distributor road separated from mainline for westbound I-80 Exits 304 and 305 on and off movements

I-80 bridge over Main Street (Bus. 209) does not have to be replaced; it can be widened to accommodate collector-distributor road

ESTIMATED COST (X 1,000) *

Engineering Design	\$ 3,095
Construction	\$ 30,947
Total	\$ 34,042

* Excludes mainline widening, right-of-way, utility relocation and environmental mitigation costs.

I-80 Proposed Mainline

I-80 Proposed Ramp

Existing Road

Proposed Ramp Elimination

Municipalities Boundary

Bridge

Proposed Retaining Wall

Proposed Barrier

Field Wetlands

NWI Wetlands

FEMA 100 Year Floodplain

Waterways

Historic Roadway



concerns have the greatest potential to significantly affect project costs and timing. Geological investigations and appropriate design/construction practices will have to be conducted regardless of the option pursued in order to ensure acid drainage does not become a major issue as a result of earthmoving activities.

While not as significant a factor as the pyrite concern, both the hazard waste sites and floodplains found within the project area will have an effect on project design and cost. Options 1 through 4 would involve the same five or six known potential hazardous waste sites. This will result in nearly the same uniform need to

conduct appropriate hazardous waste investigations and if determined necessary, the need for remedial action. Option 5 would involve just 3 of the hazardous waste sites, reducing but not eliminating the need for hazardous waste investigations and the potential need for remediation. The floodplain encroachments projected for Options 2, 3 and 4 are also fairly uniform and would result in similar design efforts. Options 1 and 5 have significantly lower involvement with the area’s floodplains. None of the floodplain encroachments projected for the five options are expected to be significant enough to require the need for floodplain mapping revisions, but all will require analysis to demonstrate this is the case.



Exits 304, 305 and 306 – Constructability, System Continuity and Traffic Operations

The constructability, system continuity and traffic operations of all options were rated qualitatively. The constructability for all five options is rated as “Fair”. There are no unsolvable Maintenance and Protection of Traffic (MPT) issues, yet all five options will require extensive analysis of the project staging during the design phase to ensure traffic on I-80, Main Street (Bus. 209) and US 209 is not adversely affected during construction. In addition, in Options 1, 3 and 5, the existing retaining wall adjacent to Pocono Creek on westbound I-80 may present constructability issues.

The system continuity and traffic operations ratings of the five options vary. Option 1 is rated as having “Fair” system continuity and traffic operations. This option eliminates the westbound I-80 weaving movement, allows some traffic to avoid I-80 entirely through the use of the new Main Street/US 209 half-interchange and provides room for the eastbound I-80 weave movement.

All ramp junctions analyzed in Option 1 are expected to operate acceptably

(LOS D or better) in the design year. The eastbound I-80 weave section between the US 209 on-ramp and Main Street off-ramp is expected to operate at LOS F. All intersections analyzed are expected to operate acceptably in the design year, although the Main Street intersections with the eastbound and westbound I-80 ramps and US 209 off-ramp will require signalization.

The system continuity and traffic operations of Option 2 are rated as “Fair/Poor”. The new eastbound and westbound C-D roads in this option provide improved connections between Main Street, Dreher Avenue and I-80. Also, this option removes some duplicate ramps and provides a weaving lane on eastbound I-80, although the proposed weave section length is slightly shorter than the existing length. This option does not make any improvements to the existing westbound I-80 weaving movement or to access between US 209 and Main Street.

All ramp junctions analyzed in Option 2 are expected to operate acceptably in the design year, except for the Dreher Avenue on-ramp to eastbound I-80. The eastbound I-80 weave section between the US 209 on-ramp and Main Street off-ramp and

the westbound I-80 weave section between the Main Street on-ramp and US 209 off-ramp are not expected to operate acceptably in the design year. All intersections are expected to operate acceptably, although the Main Street intersections with the eastbound and westbound I-80 ramps will require signalization.

Option 3 is rated as having “Good/Fair” system continuity and “Fair” traffic operations. This option provides many of the same benefits as Option 1: it eliminates the westbound I-80 weaving movement, allows some traffic to avoid I-80 entirely through the use of the new Main Street/US 209 half-interchange and provides room for the eastbound I-80 weave movement, although like Option 2, the proposed weave section length is slightly shorter than the existing length. This option also provides improved connections between Main Street, Dreher Avenue and I-80 with the new eastbound and westbound C-D roads as in Option 2. The drawback to this option is that eastbound I-80 traffic must use a circuitous route to get to Main Street (exit to Dreher Avenue and use the westbound C-D road).

All ramp junctions analyzed in Option 3 are expected to operate acceptably in the design year, except for the Dreher

Avenue on-ramp to eastbound I-80. The eastbound I-80 weave section is not expected to operate acceptably in the design year. All intersections are expected to operate acceptably, although the Main Street intersections with the eastbound and westbound I-80 ramps and US 209 off-ramp and the Dreher Avenue intersection with the eastbound C-D road will require signalization.

Option 4 is rated as having “Fair” system continuity and “Fair/Poor” traffic operations. Like Option 1 and Option 3, this option eliminates the westbound I-80 weaving movement, allows some traffic to avoid I-80 entirely through the use of the new Main Street/US 209 half-interchange and provides room for the eastbound I-80 weave movement, although like Option 2 and Option 3, the proposed weave section length is



slightly shorter than the existing length. This option also provides improved connections between Main Street, Dreher Avenue and I-80 with the new eastbound and westbound C-D roads as in Options 2 and 3. However, like Option 3, eastbound I-80 traffic must use a circuitous route to get to Main Street. In addition, with this option, Main Street traffic must also use a circuitous route to get to westbound I-80 (eastbound C-D road to Dreher Avenue to the westbound C-D road to the new westbound I-80 on-ramp).

In Option 4, only the proposed US 209 ramp junctions are expected to operate acceptably in the design year. The eastbound I-80 weave section and the new westbound I-80 weave section between the new Main Street on-ramp and the US 209 off-ramp are not expected to operate acceptably. All

intersections analyzed are expected to operate acceptably, although the Main Street and Dreher Avenue intersections with the eastbound and westbound C-D roads and the Main Street intersection with the US 209 off-ramp will require signalization.

The system continuity and traffic operations of Option 5 are rated as “Fair”. This option separates the westbound weaving movements and on/off movements at Exits 304 and 305 from the mainline but does not address any deficiencies in the eastbound direction. The westbound weave section on the C-D road is expected to operate at LOS F, although the weaving movements will be separated from the mainline. The exit ramp to the C-D road is expected to operate at LOS F, although the entrance ramp from the C-D road is expected to operate at LOS C. 🐼

Exits 304, 305 and 306 (Southbound US 209, Business 209/Main Street, and Dreher Avenue)

	OPTION 1 Westbound Improvements and Half-Interchange	OPTION 2 Eastbound and Westbound C-D Roads	OPTION 3 Westbound Improvements & Half-Interchange. Eastbound and Westbound C-D Roads	OPTION 4 Eastbound and Westbound C-D Roads and Half- Interchange	OPTION 5 Westbound Improvements
Construction Cost ¹	\$ 47,271,000	\$ 36,207,000	\$ 59,120,000	\$ 40,918,000	\$ 34,042,000
Constructability/ MPT	Fair	Fair	Fair	Fair	Fair
System Continuity	Fair	Fair/Poor	Good/Fair	Fair	Fair
Traffic Operations	Fair	Fair/Poor	Fair	Fair/Poor	Fair
Notable Engineering Issues for Consideration	Extensive ROW impacts likely Retaining wall required along Pocono Creek	Extensive ROW impacts likely	Extensive ROW impacts likely Retaining wall required along Pocono Creek	Extensive ROW impacts likely	Moderate ROW impacts Retaining wall required along Pocono Creek
Waterway Encroachment ²	23 linear ft. of Pocono Ck. 59 linear ft. of Little Pocono Ck. (Both HQ-CWF with Natural Trout Production)	45 linear ft. of McMichael Ck. 143 linear ft. of Little Pocono Ck. (Both HQ-CWF with Natural Trout Production)	23 linear ft. of Pocono Ck. 45 linear ft. of McMichael Ck. 101 linear ft. of Little Pocono Ck. (All HQ-CWF with Natural Trout Production)	30 linear ft. of McMichael Ck. 318 linear ft. of Little Pocono Ck. (Both HQ- CWF with Natural Trout Production)	23 linear ft. of McMichael Ck. 52 linear ft. of Little Pocono Ck. (Both HQ-CWF with Natural Trout Production)
Wetlands Impacts ³	0.13 acre of exceptional value	0.31 acre of exceptional value	0.35 acre of exceptional value	0.22 acre of exceptional value	0.13 acre of exceptional value
100-Year Floodplains Encroachments	0.47 acre	1.78 acre	1.41 acre	1.48 acre	0.56 acre
T & E Species Involvement	Potential – Wetland & Forested Area	Potential – Wetland & Forested Area	Potential – Wetland & Forested Area	Potential – Wetland & Forested Area	Potential – Wetland & Forested Area

¹ Excludes mainline widening costs

² Placement of SWM Facilities was not evaluated in the Aquatic Resources Impacts

³ NWI and Cursory Field Investigation Identified

	OPTION 1 Westbound Improvements and Half-Interchange	OPTION 2 Eastbound and Westbound C-D Roads	OPTION 3 Westbound Improvements & Half-Interchange. Eastbound and Westbound C-D Roads	OPTION 4 Eastbound and Westbound C-D Roads and Half- Interchange	OPTION 5 Westbound Improvements
Natural/Wild Areas & Natural Landmarks Encroachments	None	None	None	None	None
Potential Hazardous & Residual Waste Sites Involvement	None	5 sites	6 sites	5 sites	3 sites
Other Land Resources	9.4 acres of Marcellus Formation ⁴	6.5 acres of Marcellus Formation ⁴	10.1 acres of Marcellus Formation ⁴ Encroachment of Stroudsburg Cemetery	10.8 acres of Marcellus Formation ⁴ Encroachment of Stroudsburg Cemetery	5.7 acres of Marcellus Formation ⁴
Historic Structures Directly Affected	None	None	None	None	None
Archaeological Resources Encroachments	Moderately high/high potential = 1.4 acres Moderate potential = 0.4 acres	Moderately high/high potential = 0.4 acres Moderate potential = 0.3 acres	Moderately high/high potential = 1.6 acres Moderate potential = 0.6 acres	Moderately high/high potential = 0.5 acres Moderate potential = 0.3 acres	Moderately high/high potential = 1.4 acres Moderate potential = 0.4 acres
Property Acquisitions	21 partial acquisitions (3 residential, 6 services, 7 commercial, 1 industrial, 4 vacant)	17 partial acquisitions (6 residential, 2 services, 5 commercial, 4 vacant)	29 partial acquisitions (9 residential, 6 services, 7 commercial, 1 industrial, 6 vacant)	25 partial acquisitions (9 residential, 4 services, 6 commercial, 2 industrial, 4 vacant)	6 partial acquisitions (5 commercial, 1 vacant)
Environmental Justice Populations Involvement	Potential	Potential	Potential	Potential	Potential

⁴ Can contain pyrite, which is associated with acid drainage concerns when weathered

EXIT 307 (BROAD STREET/PARK AVENUE)

- Exit 307 – As It Exists Today
- Exit 307 – Improvement Options
- Exit 307 – Preliminary Environmental Assessment
- Exit 307 – Constructability, System Continuity and Traffic Operations



Exit 307 – As It Exists Today

Exit 307 is actually two closely spaced half-interchanges that provide access to downtown Stroudsburg – one half-interchange between eastbound I-80 and Park Avenue (Route 611) and one half-interchange between westbound I-80 and Broad Street (Route 191).

The existing deficiencies with these interchanges are:

- The confusing nature of the existing interchanges;
- The lack of a clear, identifiable route between downtown Stroudsburg and I-80;
- Deficient acceleration and deceleration lane lengths; and

- The Broad Street Bridge over I-80 has a deficient 14'6" under clearance.

The crash analysis conducted for the I-80 Corridor Study revealed a number of crashes at the westbound I-80 off-ramp intersection with Broad Street. A majority of these crashes were rear-end crashes and occurred between the hours of 4:00 and 6:00 PM which is likely a result of afternoon peak-hour congestion on PA 611 causing queues on the westbound I-80 off-ramp.

The Congested Corridors Improvement Program (CCIP) Report prepared by Edwards & Kelcey in 2002 for the PA 611 corridor also identified a high occurrence of crashes at the Five Points intersection of Main Street, Broad Street and Ann Street. There is an ongoing project at that intersection to improve the signage and signal indications controlling movement through that intersection.

Exit 307 – Improvement Options

The I-80 Corridor Study team developed five improvement option concepts for this location. These five improvement options represent ultimate solutions for the issues at this interchange. Taking into account the current infrastructure funding

challenges, the team brainstormed some smaller-scale improvement ideas that can be constructed and improve conditions until funding is available for design and construction of the ultimate solution.

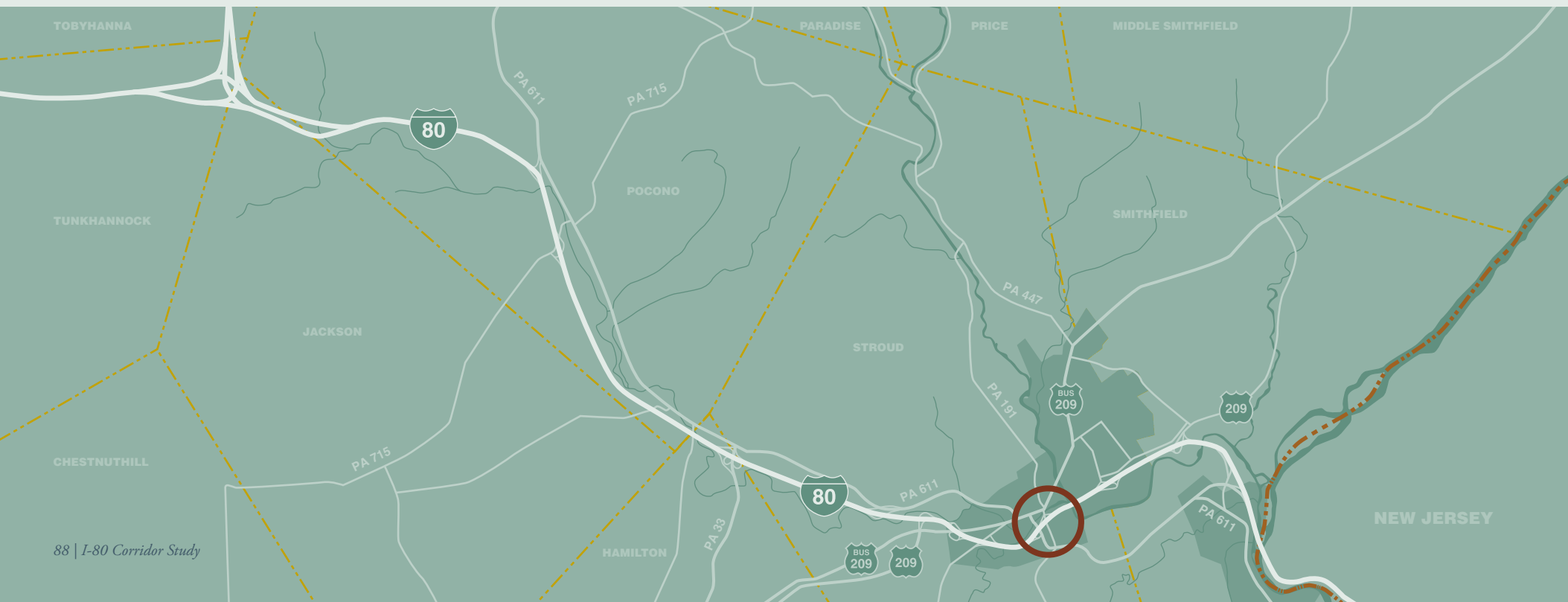
Options 1A and 1B involve constructing a full-movement diamond interchange at Broad Street and removing the partial interchange at Park Avenue. Option 1A is a full-movement single-point urban interchange (SPUI) and Option 1B is a tight diamond, full-movement interchange. Both options create a single interchange. However, both options would require the replacement of three structures: the Park Avenue bridge over I-80, the Broad Street bridge over I-80, and the I-80 bridge over Broadhead Creek.

Option 2 is similar to Option 1A in that it provides a single full-movement diamond interchange at Broad Street. Option 2 also removes the Park Avenue on-ramp to eastbound I-80; however, it includes the realignment of the existing eastbound I-80 off-ramp to Park Avenue and the addition of a one-way connector road between Park Avenue and Broad Street. This configuration maintains direct access to Park Avenue from eastbound I-80 while also providing a direct link to

Broad Street from Park Avenue and eastbound I-80. This option would require the same three structure replacements as in Options 1A and 1B.

Option 3 involves creating a single full-movement interchange with Broad Street, and also includes the realignment of Broad Street onto a new alignment perpendicular to I-80. With this configuration, the realigned Broad Street would tie into Lee Avenue to the south at its intersection with Colbert Street. This option would include off-site improvements to Lee Avenue, the Broad Street and Colbert Street intersection, and the five-leg intersection of Broad Street, Main Street and Ann Street in downtown Stroudsburg. The new Broad Street bridge would need to be designed to avoid impacts to the existing and proposed McMichael's Creek hiking trails. This option also requires the replacement of the Park Avenue bridge over I-80 and the I-80 bridge over Broadhead Creek.

Option 4 includes the same realignment of Broad Street as in Option 3, but does not include creating a new single full-movement interchange. The existing westbound I-80 on- and off-ramps would be realigned to tie into the new Broad Street alignment, but the existing



Broad Street Bridge over I-80 at Exit 307

eastbound I-80 on- and off-ramps with Park Avenue would remain. The acceleration and deceleration lanes of these two ramps would be improved. This option also includes off-site improvements to the same intersections as in Option 3. However, also like Option 3, the new bridge design would need to avoid impacts to the McMichael’s Creek hiking trails. Also, Option 4 would require the same two other bridge replacements as Option 3.

The study team also brainstormed two other smaller-scale improvement ideas to address the deficient acceleration lanes on I-80 under the Park Avenue bridge. One idea involves narrowing the existing median area to provide an acceleration lane for the eastbound



South Fifth Street (Broad Street) at Five Points Intersection

I-80 on-ramp from Park Avenue. This improvement can be accomplished without replacing the Park Avenue Bridge or impacting McMichael Creek on the westbound side of I-80. Should the Park Avenue Bridge be programmed for replacement in the future, the second idea involves incorporating acceleration lanes on I-80 for the eastbound on-ramp from Park Avenue and the westbound on-ramp from Broad Street into the bridge replacement project.

Exit 307 – Preliminary Environmental Assessment

In viewing the five design options for this interchange improvement, two options are considerably more

detrimental to natural resources than the other three. Options 1(A&B) and 2 both have more significant impacts on the area’s EV wetlands and high quality, natural trout production streams. They also have greater potential hazardous waste site involvement, floodplain involvement and would utilize land from a local park. While the full property acquisitions associated with Options 1(A&B) and 2 will only be slightly higher than those for Options 3 and 4, the partial acquisitions would be considerably greater.

While it seems apparent the impacts associated with Options 1 and 2 would favor a decision from a natural resource end for pursuing either Option 3 or 4, there is one potential impact the latter options will have that the first two options won’t. Options 3 and 4 call for the construction of a new bridge across McMichael Creek which would alter the current viewshed and require construction within the Stroudsburg Historic District, a listed eligible National Register of Historic Places resource. This potential impact could be enough to prevent the early dismissal of Options 1 and 2 from consideration as the best alternative available for addressing the interchange improvements despite

the higher impact they would have on almost all other resources.

Regardless of the option to be pursued for improving this interchange, it is advisable that early coordination with the natural resource agencies and PHMC be initiated early in the project’s design process. Consensus from these agencies regarding which impacts will affect design decisions the most will be needed as soon as possible to avoid progressing the project in the wrong direction, thereby reducing the potential for delays and increased costs associated with design changes required by the agencies.

Some of the environmental studies and design considerations that will likely be necessary for all of the options presented here include:

- Avoidance and minimization of impacts to the area’s high quality, natural trout production streams and EV wetlands (including alternatives analysis).
- Design of appropriate control measures to prevent a change in water quality and volume within the area’s streams.
- Environmental Justice evaluations and noise impact analysis in affected residential and community service locations.

- Cultural resource evaluations (historic and archaeology) associated with potential impacts to the former Wilkes-Barre and Eastern (WB&E) Railroad, the Stroudsburg Historic District, and areas adjacent to the area’s streams.
- Threatened/endangered species evaluations, particularly in areas supporting woodlands and wetlands.
- Hazardous/residual waste investigations.
- Floodplain impact analysis.
- Section 4(f) Evaluations for: Options 1 & 2 park impacts; Options 3 & 4 historic district impacts.

Exit 307 – Constructability, System Continuity and Traffic Operations

The constructability, system continuity and traffic operations of all options were rated qualitatively. There will be significant geometric challenges in this area with any option. Broad Street has an undesirable 11 percent grade crossing I-80 and the previously mentioned deficient 14’6” clearance of the bridge would need to be raised to 16’6” as part of any reconfiguration. Any improvement option will also present significant constructability issues because of the proximity of

McMichael Creek. Widening I-80 would likely require retaining walls to minimize impacts to the creek and the Borough has constructed jogging paths along the creek that will need to be maintained. For these reasons, it is likely that I-80 will have to be widened mostly to the south in this location, instead of symmetrical widening to the south and north.

The constructability of Options 1A, 1B and 2 is rated as “Poor/Fair”. In addition to the previously mentioned constructability issues related to McMichaels Creek, replacement of the two bridges, Park Avenue over I-80 and Broad Street over I-80, will present constructability and maintenance of traffic challenges. Partial detours of Park Avenue or Broad Street traffic may be required during construction.

The constructability of Options 3 and 4 is rated as “Fair/Good”. Both of these options facilitate construction of the new Broad Street Bridge over I-80 by building it off the existing alignment.

The system continuity of each option varies as well. Options 1A, 1B and 2 are rated as “Good” with respect to system continuity. All options create a single interchange and eliminate the confusing nature of the existing access into and out of downtown Stroudsburg.

In all of these options, the existing “Five Points” intersection of Broad Street, Main Street and Ann Street remains unchanged.

The system continuity of Option 3 is rated as “Good”. This option, similar to Options 1A, 1B and 2, creates a single interchange and eliminates the confusing nature of the existing access into/out of downtown Stroudsburg. The additional benefit of this option is that it may provide an opportunity to improve the traffic operations of the “Five Points” intersection by realigning Broad Street. However, the new alignment of Broad Street will tie into Lee Avenue south of I-80, not Broad Street, and traffic will have to turn onto one of the side streets to get back onto Broad Street.

The system continuity of Option 4 is rated as “Fair”. Option 4 includes the realignment of Broad Street as in Option 3, but does not include the relocation of the Park Avenue ramps to form a single interchange. Therefore, this option retains the existing confusing nature of the access in and out of downtown Stroudsburg. This option may provide an opportunity to improve the traffic operations of the “Five Points” intersection by realigning Broad Street as in Option 3. However, like Option 3, the new alignment of

Broad Street will tie into Lee Avenue south of I-80, not Broad Street, which will require traffic to turn onto a side street to get back onto Broad Street.

The traffic operations of all options are rated as “Fair.” In all options, the westbound I-80 off-ramp junction with Broad Street is expected to operate at LOS F, while the Broad Street on-ramp junction with westbound I-80 is expected to operate at LOS C or D. All of the ramp intersections with Broad Street, including the SPUI option, are expected to operate acceptably (LOS D or better) in the design year with signalization. The “Five Points” intersection is expected to operate at LOS F in all options. 🐼



Westbound I-80 on-ramp from Broad Street

Exit 307
--Option 1A

OVERVIEW

- Eliminates existing partial interchange at Park Avenue by constructing a full-movement Single Point Urban Interchange (SPUI) at Broad Street
- Requires replacement of two bridges over I-80 and the I-80 bridge over Broadhead Creek

ESTIMATED COST (X 1,000) *

Engineering Design	\$ 5,414
Construction	\$ 54,131
Total	\$ 59,545

* Excludes mainline widening, right-of-way, utility relocation and environmental mitigation costs.

- I-80 Proposed Mainline

I-80 Proposed Ramp

Existing Road

Proposed Ramp Elimination

Municipalities Boundary
- Bridge

Proposed Retaining Wall

Field Wetlands

NWI Wetlands

FEMA 100 Year Floodplain
- Waterways

Historic Roadway

Historic Railroad

Listed Individual Resources

Eligible Individual Resources



Exit 307
--Option 1B

OVERVIEW

- Eliminates existing partial interchange at Park Avenue by constructing a full-movement diamond interchange at Broad Street
- Requires replacement of two bridges over I-80 and I-80 bridge over Broadhead Creek

ESTIMATED COST (X 1,000) *

Engineering Design	\$ 5,316
Construction	\$ 53,152
Total	\$ 58,468

* Excludes mainline widening, right-of-way, utility relocation and environmental mitigation costs.

- I-80 Proposed Mainline

I-80 Proposed Ramp

Existing Road

Proposed Ramp Elimination

Municipalities Boundary
- Bridge

Proposed Retaining Wall

Field Wetlands

NWI Wetlands

FEMA 100 Year Floodplain
- Waterways

Historic Roadway

Historic Railroad

Listed Individual Resources

Eligible Individual Resources



Removal of Existing Eastbound I-80 On- and Off-Ramps

Bridge Replacement to Accommodate New Ramps
Proposed Eastbound I-80 Off-Ramp

Proposed Cul-De-Sac Colbert Street

Proposed Retaining Wall
Proposed Eastbound I-80 On-Ramp

Bridge Replacement to Accommodate New Ramps

Exit 307
--Option 2

OVERVIEW

- Provides a full-movement diamond interchange at Broad Street
- Realigns existing eastbound I-80 off-ramp to Park Avenue
- Improves access between eastbound I-80 off-ramp to Park Avenue and Broad Street by constructing eastbound connector road
- Requires replacement of two bridges over I-80 and I-80 bridge over Broadhead Creek

ESTIMATED COST (X 1,000) *

Engineering Design	\$ 5,316
Construction	\$ 53,160
Total	\$ 58,476

* Excludes mainline widening, right-of-way, utility relocation and environmental mitigation costs.

- I-80 Proposed Mainline

I-80 Proposed Ramp

Existing Road

Proposed Ramp Elimination

Municipalities Boundary
- Bridge

Proposed Retaining Wall

Field Wetlands

NWI Wetlands

FEMA 100 Year Floodplain
- Waterways

Historic Roadway

Historic Railroad

Listed Individual Resources

Eligible Individual Resources



Exit 307
--Option 3

OVERVIEW

- Eliminates existing partial interchanges at Park Avenue and Broad Street and provides a single-movement interchange on a new alignment
- Requires replacement of two bridges over I-80 and I-80 bridge over Broadhead Creek
- Improves alignment of Five Points Intersection (Broad Street, Main Street and Ann Street)

ESTIMATED COST (X 1,000) *

Engineering Design	\$ 6,280
Construction	\$ 62,796
Total	\$ 69,076

* Excludes mainline widening, right-of-way, utility relocation and environmental mitigation costs.

- I-80 Proposed Mainline

I-80 Proposed Ramp

Existing Road

Proposed Ramp Elimination

Municipalities Boundary
- Bridge

Proposed Retaining Wall

Field Wetlands

NWI Wetlands

FEMA 100 Year Floodplain
- Waterways

Historic Roadway

Historic Railroad

Listed Individual Resources

Eligible Individual Resources



Removal of Existing Eastbound I-80 On- and Off-Ramps

Bridge Replacement to Accommodate New Ramps
Proposed Eastbound I-80 Off-Ramp

Proposed Intersection Work
Proposed Retaining Wall

Proposed Eastbound I-80 On-Ramp

Bridge Replacement to Accommodate New Ramps

Exit 307
--Option 4

OVERVIEW

- Replaces existing partial interchange at Broad Street with a new partial interchange on new alignment
- Maintains existing partial interchange configuration at Park Avenue
- Requires replacement of two bridges over I-80 and I-80 bridge over Broadhead Creek on new alignment
- Improves alignment of Five Points Intersection (Broad Street, Main Street and Ann Street)

ESTIMATED COST (X 1,000) *

Engineering Design	\$ 5,483
Construction	\$ 54,828
Total	\$ 60,311

* Excludes mainline widening, right-of-way, utility relocation and environmental mitigation costs.

- I-80 Proposed Mainline

I-80 Proposed Ramp

Existing Road

Proposed Ramp Elimination

Municipalities Boundary
- Bridge

Proposed Retaining Wall

Field Wetlands

NWI Wetlands

FEMA 100 Year Floodplain
- Waterways

Historic Roadway

Historic Railroad

Listed Individual Resources

Eligible Individual Resources



- Bridge Replacement as part of Mainline Widening
- Proposed Retaining Wall
- Proposed Westbound I-80 On-Ramp
- Removal of Existing Broad Street and Bridge
- Realignment of Broad Street and Construction of New Bridge
- Proposed Retaining Wall
- Proposed Westbound I-80 Off-Ramp
- Bridge Replacement as part of Mainline Widening
- Extension of Existing Eastbound I-80 Off-Ramp Deceleration Lane
- Existing Ramps to Remain
- Extension of Existing Eastbound I-80 On-Ramp Acceleration Lane
- Bridge Replacement to Accommodate Extension of Acceleration Lane
- Proposed Intersection Work
- Bridge Replacement to Accommodate New Ramps

Exit 307 (Broad Street/Park Avenue)

	OPTIONS 1A/1B Broad Street Interchange	OPTION 2 Broad Street Interchange with C-D Road	OPTION 3 Relocated S.R. 191 Interchange	OPTION 4 Relocated S.R. 191 Half-Interchange
Construction Cost ¹	Option 1A: \$ 59,545,000 Option 1B: \$ 58,468,000	\$ 58,476,000	\$ 69,076,000	\$ 60,311,000
Constructability/ MPT	Poor/Fair	Poor/Fair	Fair/Good	Fair/Good
System Continuity	Option 1A – Good Option 1B – Good	Good	Good	Fair
Traffic Operations	Option 1A – Fair Option 1B – Fair	Fair	Fair	Fair
Notable Engineering Issues for Consideration	Will likely require noise walls and retaining walls	Will likely require noise walls and retaining walls	Will likely require noise walls and retaining walls. Impacts to existing/ proposed McMichael Creek hiking trails must be avoided.	Will likely require noise walls and retaining walls. Impacts to existing/ proposed McMichael Creek hiking trails must be avoided.
Waterway Encroachment ²	72 linear ft. of Broadhead Ck. (TSF-MF) 550 linear ft. of McMichael Ck. (HQ-CWF) Both – Natural Trout Production	72 linear ft. of Broadhead Ck. (TSF-MF) 550 linear ft. of McMichael Ck. (HQ-CWF) Both – Natural Trout Production	72 linear ft. of Broadhead Ck. (TSF-MF) 50 linear ft. of McMichael Ck. (HQ-CWF with Natural Trout Production)	72 linear ft. of Broadhead Ck. (TSF-MF) 50 linear ft. of McMichael Ck. (HQ-CWF with Natural Trout Production)
Wetlands Impacts ³	0.28 acre of exceptional value	0.36 acre of exceptional value	0.07 acre of exceptional value	0.02 acre of exceptional value
100-Year Floodplains Encroachments	1.22 acre	2.09 acre	1.05 acre	1.13 acre
T & E Species Involvement	Potential – Wetland & Forested Area	Potential – Wetland & Forested Area	Potential – Wetland & Forested Area	Potential – Wetland & Forested Area

¹ Excludes mainline widening costs

² Placement of SWM Facilities was not evaluated in the Aquatic Resources Impacts

³ NWI and Cursory Field Investigation
Identified

	OPTIONS 1A/1B Broad Street Interchange	OPTION 2 Broad Street Interchange with C-D Road	OPTION 3 Relocated S.R. 191 Interchange	OPTION 4 Relocated S.R. 191 Half-Interchange
Natural/Wild Areas & Natural Landmarks Encroachments	None	None	None	None
Potential Hazardous & Residual Waste Sites Involvement	6 known sites	6 known sites	2 known sites	2 known sites
Other Land Resources	1 encroachment of local park	1 encroachment of local park	None	None
Historic Structures Directly Affected	None	None	Stroudsburg Historic District (listed/ eligible historic site)	Stroudsburg Historic District (listed/ eligible historic site)
Archaeological Resources Encroachments	Moderately high/high potential = 2.3 acres Moderate potential = 0.5 acres	Moderately high/high potential = 2.7 acres Moderate potential = 0.6 acres	Moderately high/high potential = 2.0 acres Moderate potential = 0.5 acres	Moderately high/high potential = 1.7 acres Moderate potential = 0.2 acres
Property Acquisitions	Option 1A: 7 full acquisitions (4 residential, 3 vacant) and 24 partial acquisitions Option 1B: one less full acquisition (vacant) than Option 1A	9 full acquisitions (4 residential, 1 services, 4 vacant) and 21 partial acquisitions (10 residential, 5 services, 1 park, 5 vacant)	6 full acquisitions (2 residential, 1 services, 1 commercial, 2 vacant) and 12 partial acquisitions (6 residential, 2 services, 1 commercial, 3 vacant)	5 full acquisitions (1 residential, 1 services, 1 commercial, 2 vacant) and 7 partial acquisitions (2 residential, 1 services, 1 commercial, 3 vacant)
Environmental Justice Populations Involvement	Potential	Potential	Potential	Potential