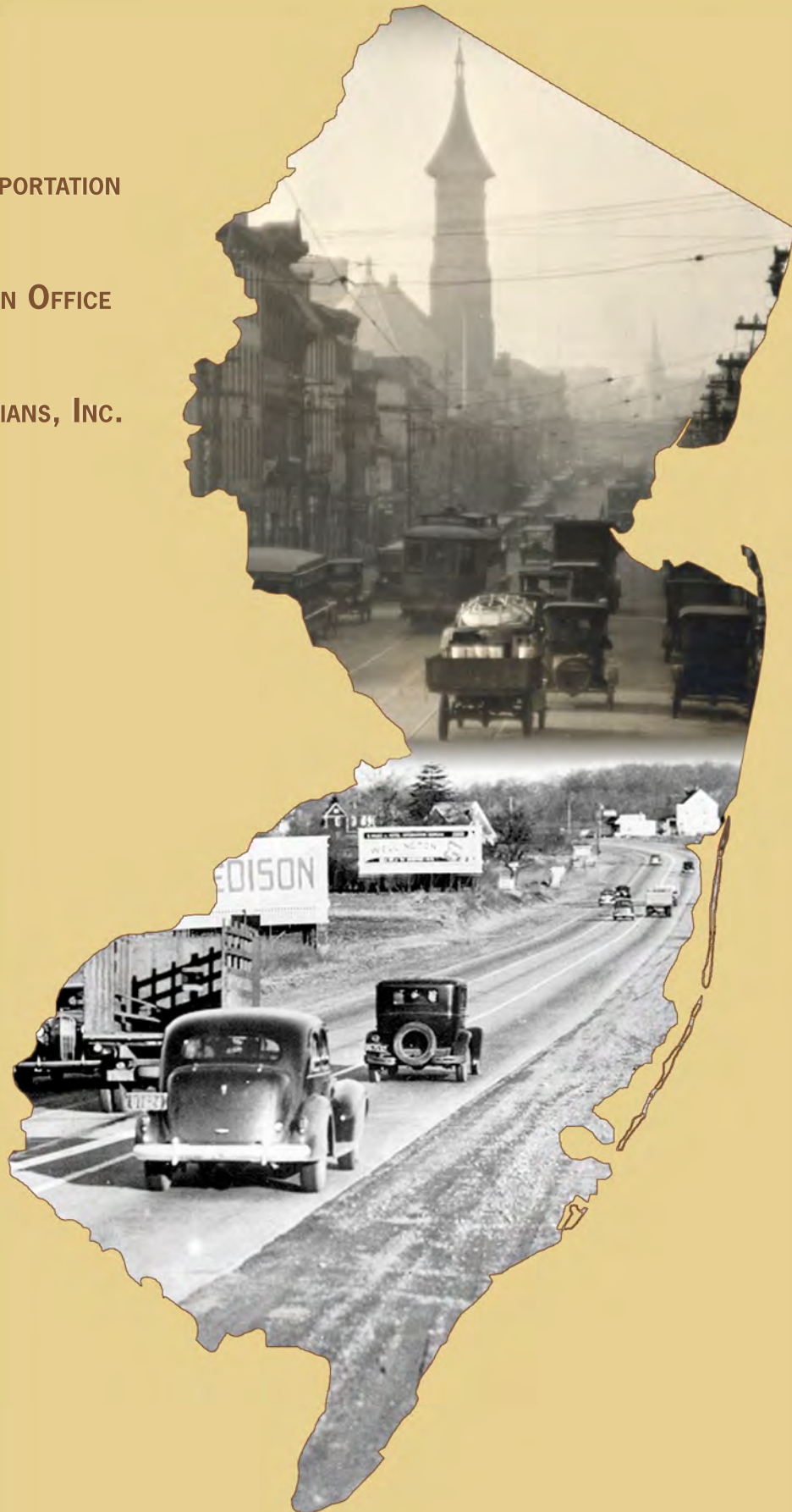


NEW JERSEY HISTORIC ROADWAY STUDY

PREPARED FOR
NEW JERSEY DEPARTMENT OF TRANSPORTATION
AND
FEDERAL HIGHWAY ADMINISTRATION
NEW JERSEY HISTORIC PRESERVATION OFFICE

PREPARED BY
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FINAL
JANUARY 2011
HPO Log #03-1895-6

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ACKNOWLEDGEMENTS

The *New Jersey Historic Roadway Study* was developed as a cooperative initiative among the Federal Highway Administration (FHWA) New Jersey Division Office, the New Jersey Department of Transportation (NJDOT), and the New Jersey Historic Preservation Office (NJHPO). Representatives from each agency served on a Study Team and an Oversight Committee. The Study Team was responsible for the development of the Historic Roadway Study and development of the recommendations contained herein.

The Study Team was augmented by the services of Kise Straw & Kolodner, Inc. (subsequently KSK Architects Planners Historians, Inc.) and their subconsultants, Armand Corporation and Michael Baker Jr., Inc., in the development of this study. The Oversight Committee was responsible for reviewing the results and recommendations developed by the Study Team and their concurrence with the results of the study represents agency endorsement of the report findings.

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PREFACE

In the early 1990s, historic roads emerged as an issue during regulatory consultation between the New Jersey Division Office of the Federal Highway Administration (FHWA), the New Jersey Department of Transportation (NJDOT), and the New Jersey Historic Preservation Office (NJHPO). At the time little written guidance or scholarship existed to aid agencies in navigating this newly acknowledged resource type. Together the agencies agreed that a study was needed to bridge this gap, ensure consistency, and advance transportation projects.

Many people involved in cultural resource work may find the identification of historic roads and associated features challenging because, to date, the majority of education and professional practices have focused on more traditional types of architectural and engineering resources. In reality, the study of a potential historic roadway follows a logical process similar to that of any other historic resource. Establishing the logic took the staffs of the NJDOT, NJHPO, and FHWA some time. These three agencies and our consultant, Kise Straw & Kolodner, Inc. (KSK), which comprised the Historic Roadway Study Team (Study Team), met on a regular basis to develop the parameters of the study. This study, in turn, is to be used by consultants and others in the identification and evaluation of historic roadways in New Jersey. In addition to the study, design guidelines have been developed that meld engineering requisites with preservation tenets. The document can be updated as new preservation and context-sensitive strategies are tested and approved by the American Association of State Highway and Transportation Officials.

At the Study Team's first meeting, it was agreed that it would be impossible to survey every road in the state at an intensive level to determine significance, integrity, and eligibility for listing in the National Register of Historic Places. We agreed that we would focus our efforts on roads that had statewide significance rather than local roads or roads under other jurisdictions. We then adopted the concept of dividing road-building history into four "eras," each with an associated statement of significance. Roadways were then assigned to appropriate eras, and our "significant roads," i.e. roads that warranted study prior to the implementation of an undertaking, were identified based on the research provided by the consultant and members of the Study Team.

The Study Team then considered how one would analyze these significant roads during project planning and development. Using the definition of Area of Potential Effects (APE) provided in the 36 CFR Part 800, the implementing regulations for Section 106 of the National Historic Preservation Act, would not provide sufficient guidance for determining how the APE of a roadway project would be affected by the presence of a potentially eligible road. Typically, an APE for a bridge replacement or an intersection improvement is too small a section to determine the eligibility of an entire roadway. We asked ourselves: could an intersection widening have an effect on a significant, but heretofore, unstudied road? How could one tell? So, we all agreed that a context would need to be established from which the APE could be judged. We also agreed upon the concept of a "Study Area," to supplement an APE for a roadway project.

A Study Area is established in consultation with the NJHPO staff. It may be as simple as five miles on either side of the APE or topographically defined ("up to the crest of the hill and down to the stream"). The easiest method to determine the extent of a Study Area is a field visit with NJHPO, NJDOT, and FHWA staff. During this visit, the extent and level of effort of research and fieldwork to be undertaken in the Study Area is determined. From that point, a thorough history of the Study Area is developed, and the Study Area is surveyed at the reconnaissance level with photographs of the roadway and roadside elements. The roadside elements must be contemporary with and present during the previously defined era for the road; roadway elements, located within the right of way, must also be surveyed. The APE, of course, is surveyed at the intensive level, providing a sufficient basis for consultation.

Through the comprehensive research of the Study Area, the roadway that had been designated as "warranting further study prior to the implementation of an undertaking" begins to tell its story. It must be remembered – and we impress upon consultants – that the existing research in the *New Jersey Historic Roadway Study* is merely baseline data that is to be amplified and built upon in a project specific context. We expect detailed research that fleshes out the character-defining features of the roadway and develops the context of the roadway. Assuming the Study Area has character-defining features and has integrity, we turn our focus

to the APE. The question then is, does the APE contain any of the character-defining features? If so, does the APE have integrity? If it does, then the portion(s) of the roadway within both the APE and the Study Area that retain integrity are recommended to be eligible for inclusion in the National Register of Historic Places, and the project's effects on the historic roadway must be considered. Our intent was never to limit ourselves or the resource to an arbitrary length for consideration.

One of the first projects to implement the principles of the *New Jersey Historic Roadway Study* was a bridge replacement project on the John Davison Rockefeller Memorial Highway (Route 70). (This is described in Chapter VIII.) A cast iron sign offered a clue to the roadway's importance; however, the history and significance of the roadway was not well understood. A draft cultural resources report was submitted for review. While well researched, the draft was missing a strong, complete, detailed statement of significance; a discussion of integrity; a period of significance; and resource boundaries, other than the termini established for the Study Area. The consultant had concluded that the road was the first example of a landscaped parkway in New Jersey and the prototype for future parkway design, as well as a planned, primarily limited access highway associated with Gilmore Clarke, noted landscape architect. Despite these significant facts, what the reviewers saw was a road, once called Route 40, that was built like any other road during the 1920s and 1930s, but in 1937 was given a distinguished name and the extant right-of-way was enlarged by 440'.

Although the consultant had done very good research, the result was a sort of archaeological curiosity: the more information found, the more questions generated. So the consultant was given some suggestions on how to answer our questions. The road was an incipient parkway, designed by a notable landscape architect, with limited access. It went from the congested area along the Delaware River, through a forested area known as the Pine Barrens, to the Atlantic coast. Because the timing was right, was the Works Progress Administration involved? Was it used for recreation? How did it fit into the context of its predecessors, the Sawmill, Merritt, and Bronx parkways? In response, the consultant undertook more research and became very excited about what was being found. But, before anything was committed in writing, the NJHPO and NJDOT staff and the consultant took a field trip to

view the resource. As we drove the entire length of the Highway, it became evident that a portion of the Study Area, which included the APE, had the ability to convey the significance of the John Davison Rockefeller Memorial Highway.

The FHWA, NJDOT, and NJHPO concluded that the Highway was indeed eligible for listing in the National Register as the John Davison Rockefeller Memorial Highway Historic District. The resource was deemed significant under Criterion A as the first example of a parkway in New Jersey with a designed landscape. The Highway was also found significant under Criterion A, and was described in Section 106 consultation correspondence as "a publicly sponsored beautification of civic space, a link between the City Beautiful Movement and Lady Bird Johnson's later efforts toward highway beautification." It is also significant under Criterion C as a planned, primarily limited access highway constructed prior to the 1945 limited access highway legislation, and as a model for the New Jersey Turnpike and the Garden State Parkway. Additionally, the resource was found significant under Criterion C for its associations with Gilmore Clark, a nationally significant landscape architect. Many of Clark's parkway designs have already been listed in the National and State registers. The period of significance of the John Davison Rockefeller Memorial Highway Historic District is 1937-1952.

Although all 70 miles of the road has significance, the boundaries of the eligible portion encompass only the area that retained integrity: milepost 26.25 to 33.4. This section captures a segment of the Study Area, which was 10 miles long (five miles either side of the APE), as well as the APE. Unbeknownst to us during the field trip, we had identified the "sample parkway" presented to the public in 1939. The eligible length coincides with the "sample" developed within Lebanon State Forest (now Brendan Byrne State Forest).

It was determined that the purpose of the study – a bridge replacement and vertical curve alteration project – would not adversely affect the Historic District because the bridge pre-dated the period of significance of the District and was associated with the earlier construction of the road as Route 40. Although the bridge was present during the entire period of significance, Clark had intended to construct bridges of a different design to better complement the landscape. As for the vertical curve, the historic intention was to dualize the roadway with a landscaped median

rather than maintain two adjacent lanes of opposing traffic. The consultant had found renderings for the Highway at the New Jersey State Archives. It was quite clear what Clark had planned for the parkway. To mitigate the visual effect that a new bridge would have on the District, the proposed bridge was designed with a formlined vertical face parapet that evokes the style of bridges in the 1920s through 1930s.

Although the *New Jersey Historic Roadway Study* was developed to understand the significance of New Jersey's interregional roads, and identify related roads requiring further study as part of NJDOT project planning, municipalities, counties, or other transportation agencies can use the document to understand the historical context of other roadways. Using the *Study* premise and defining eras germane to their own road-building history, agencies can begin to create appropriate parameters for identifying significant roadways under their jurisdiction. For agencies in New Jersey, the identified eras can be used and appropriate substitutions of "statewide" and "state" with "local," "countywide," or similar jurisdictional terminology, can be made. The "Integrity Thresholds," based on those of the National Register, will not change, nor should the concepts of "Roadway Elements" and "Roadside Elements." The bibliography will prove very useful for anyone who delves into the history of roadway development.



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Executive Manager
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I. INTRODUCTION

The purpose of the *New Jersey Historic Roadway Study* is to provide guidance on the evaluation of New Jersey's roadways as historic resources within the framework of Section 106 of the National Historic Preservation Act of 1966, as amended, and the amended "Procedures for the Protection of Historic and Cultural Properties" set forth in 36 CFR 800 (January 2001). It is anticipated that this document will be used primarily by cultural resources professionals during Section 106 compliance procedures for federally funded highway projects; however, it is structured to provide guidance and information to a variety of individuals involved in highway projects or interested in roadways as historic resources, such as engineers, planners, review agencies, county and local representatives, local historical groups, and the general public.

An increasing awareness of roadways as potential historic resources, and recognition that little research had been done on the topic of historic roadways in New Jersey, led a consortium of state and federal agencies to undertake this study. A Study Team including the New Jersey Department of Transportation, Federal Highway Administration, New Jersey Historic Preservation Office, and a team of consultants, conducted extensive historical research and limited fieldwork, and assembled this document, which contains a historical context for road building in New Jersey and provides a framework for evaluating the historical significance of roadways throughout the state. Further, the Study identifies

roadways of statewide significance within four historical eras; these roads will undergo additional research, field survey, and analysis during future federally sponsored roadway projects to determine whether roadway segments meet the eligibility criteria for inclusion in the National Register of Historic Places. Pilot Projects exploring this process were undertaken while this document was in draft form; they are summarized in Chapter VIII.

The *New Jersey Historic Roadway Study* focuses on identifying roadways that are significant from a statewide historical perspective. Evaluated within the context of the state's roadway development history, those roadways that were truly important to the overall development of the state were identified as significant. Locally significant roadways will be those within a regional context. It is not the intent of this study to identify roads locally significant within a smaller geographic area, such as a county or municipality.

This document includes a full discussion of the approach and methodology used for this Study, as well as chapters focused on each era of New Jersey's historic road development, and the summary of Pilot Projects already noted. Bibliographic information, historical timelines, and research questions for further study supplement the historical contexts, eligibility criteria, integrity thresholds, and significant roadway identification.



II. APPROACH

The *New Jersey Historic Roadway Study* was advanced in three stages. Stage I served as an overview of New Jersey highway development history, providing a context for understanding the evolution of New Jersey's roadways. Stage II refined the National Register of Historic Places Criteria for Significance to be more specific to New Jersey's roadway development, based on the information gathered in Stage I. These two efforts provided the basis for Stage III, research to support recommendations of roadways of statewide historical significance and development of additional tools for the evaluation of integrity of these roadways.

Although this study was designed to proceed in three phases, the work was not sequential. As each element progressed, the assumptions reached in the previous task were challenged and refined as appropriate. In short, the work was collaborative: initial research was undertaken by the project consultant; recommendations were made to the Study Team; the individual knowledge of team members was incorporated; more research was often requested; and the recommendations of the consultant were refined until consensus by the Study Team was reached.

Prior to initiating work associated with the primary tasks of the project, the Study Team spent a considerable amount of time discussing the goals of the study, taking into consideration the various perspectives and needs of each of the agencies. Specifically, how would each agency perceive and use the results of the study; how would issues that each agency anticipated during the study be addressed; and what theoretical assumptions would need to be made, among others. A primary issue was defining what the study was about—i.e. what comprised a "historic road." The various professional perspectives of the team members (engineers, project managers, historians, historic preservation professionals, GIS specialists, archaeologists, etc.) brought considerable knowledge and a variety of points of view to the discussion. Because of this, one of the first tasks accomplished was the development of a series of definitions for terms that would be used for the study (Chapter V).

The initial discussions also precipitated the development of some general principles that would guide the development of the study. In particular, it was agreed that *the function of a roadway*

is to provide a connection between two places. For a roadway to be considered significant to New Jersey's development and possibly eligible for listing in the National Register of Historic Places, it should meet a greater level of importance than simply connecting two destinations. It was also agreed that innovations in roadway technology are not, in and of themselves, sufficient to confer significance to a roadway. Specific roadway technologies must be evaluated individually, within an appropriate context, to establish significance. For example, design features, such as circles or cloverleaves that implement principles of design within the highway system, would not by themselves make a roadway significant; however, they may be significant as individual structures or they may contribute to the overall significance of a specific roadway.

The results of all three stages of this study are incorporated into this summary report with technical appendices. The format is intended to allow the user easy access to information regarding the historical significance of a particular roadway, its historical context, what types of associated resources can be expected to be found along the roadway, and what design features are consistent with the historical character of the roadway. It should be noted that to conclusively establish the eligibility of either a particular roadway or a section of roadway, additional research, fieldwork, and documentation will be required. This report provides the framework for that work to take place.

The study concludes with general recommendations for the use of this information when evaluating the eligibility of significant roadways or segments of significant roadways during Section 106 compliance procedures for federally funded highway projects. One element of those recommendations is the establishment of Programmatic Agreement(s) describing what will constitute an effect on an eligible roadway by a roadway project. These effect determinations may be based, in part, on the significance associated with the historic roadway and the scope of the roadway project being proposed. It may also take into consideration the treatment implemented as part of the roadway project. It includes agreement on what constitutes a finding of "No Effect," "No Adverse Effect" (with or without recommended treatments), and "Adverse Effect."



III. METHODOLOGY

A. STAGE I: DEVELOP HISTORIC OVERVIEW

The development of the historic overview (Stage I) occurred in two phases. Phase 1 involved the compilation of a general history of the development of New Jersey's transportation system.¹ Research emphasized the evolution of road and highway development in New Jersey in the context of other forms of transportation; the relationship between individual routes and their associated built environment; and the factors that historically influenced the execution of roadway improvements. General transportation histories, professional journals, newspaper accounts, local histories, historic maps, and annual reports of various state agencies were reviewed. In addition, documents pertinent to evolving design and construction technologies, funding sources, and legislative records were also studied. The goal of this stage of the study was to provide a broad framework of major themes in the development of New Jersey's roadways; it was not intended to be a definitive history. An ancillary goal of this stage in the study was to compile a detailed bibliography of sources containing information pertinent to the history of roadways in New Jersey.

Phase 2 of Stage I used the research conducted in Phase 1 to establish four distinct periods that characterize the history of New Jersey's roadway development:

- Early Roads and Turnpikes [1673 – 1889]
- The Good Roads Era [1890 – 1904]
- The Advent of the Automobile [1904 – 1917]
- Towards A Unified Highway System [1918 – 1946]

These themes formed the basis of organization for the next stage in the study – identification of factors that would be evaluated when considering the historical significance of individual roadways in New Jersey.

B. STAGE II: ESTABLISH HISTORICAL SIGNIFICANCE

Stage II of the study was composed of three Phases:

- Phase 1 – the establishment of historic contexts for each of the roadway development periods
- Phase 2 – the definition of factors that should be considered in the evaluation of roadways dating to each period
- Phase 3 – the development of customized criteria for evaluating the significance of historic roadways in New Jersey based on the National Register Criteria for Evaluation

To develop the historic contexts that would be used to evaluate New Jersey's historic roadways, the Study Team reviewed the historic overview developed in Stage I and engaged in detailed discussions of New Jersey's transportation history. These discussions allowed for Study Team members less familiar with the topic to gain a working understanding of available historical information; for individuals on the team to contribute their knowledge and expertise to the collective information base; and for identification of areas where additional research was required. Consideration of all of the information accumulated during this stage of the study resulted in the refinement of the four themes identified in the previous study into four distinct roadway development eras (with approximate and sometimes overlapping dates), and the development of historic contexts. The contexts provide general historical information and identify trends for analysis and consideration of historical significance.

The four roadway building eras refined in Stage II of the study are

- Early Roads [ca. 1621 – ca. 1815]
- Internal Improvements [ca. 1790 – ca. 1889]
- Good Roads [ca. 1870 – ca. 1917]
- Highway [ca. 1891 – ca. 1946]

¹ Kise Franks & Straw, "Overview History of New Jersey Highway Development," prepared for the New Jersey Department of Transportation, Bureau of Environmental Analysis, July 1997.

Consideration was then given to how the significance of historic roadways would be assessed. The existing National Register Criteria for Significance define historical significance as “the importance of a property to the history, architecture, archaeology, engineering, or culture of a community, state, or the nation.” The National Register of Historic Places uses four criteria of evaluation when defining the significance of a property:

- Criterion A – properties that are associated with events that have made a significant contribution to the broad patterns of our history
- Criterion B – properties that are associated with the lives of persons significant in our past
- Criterion C – properties that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction
- Criterion D – properties that have yielded, or may be likely to yield, information important in prehistory or history

After extensive discussion, the Study Team developed some general considerations to supplement the National Register Criteria and guide the assessment of significance for historic roadways in New Jersey. The general considerations are:

- A roadway must be evaluated within a statewide historic context and within a particular era of roadway development in New Jersey.
- A roadway should have contributed to the broad patterns in New Jersey’s history and in doing so have made a significant contribution to the growth and development of the state.
- A significant contribution to an individual town, locale, or area does not constitute a significant contribution to the broad patterns of development within the statewide

historic context.

- A roadway should have more than just local significance – the roadway must have either regional or inter-regional importance.
- The roadway should link major population or political centers, or destination points either within or just outside the borders of New Jersey.
- A roadway may represent a significant type of roadway building technology. This may only be evident as an archaeological resource. Innovations in roadway construction technology are not, however, in and of themselves, sufficient to confer significance to a roadway.
- Specific design features of a roadway must be evaluated individually and within an appropriate context.
- A roadway associated with the lives of person(s) determined significant in the past must establish a clear and specific link, rather than casual association, for a roadway to be considered significant. Being “built under the direction of” would not, in and of itself, be sufficient to confer significance to a roadway.
- If a major bridge (Trans-Hudson or Trans-Delaware) is at one terminus, a specific terminus at the other end of the project is not a requirement. The actual planned facility is the significant feature. The connecting road, however, is not in and of itself significant. The road’s significance must go beyond its association with the bridge.

More specific significance criteria were subsequently developed for each era of New Jersey’s roadway history. These are included in succeeding chapters of this report.

C. STAGE III: IDENTIFICATION OF SIGNIFICANT ROADWAYS

Stage III of this study used the information developed in the previous two study stages to identify roadways that are historically significant from a statewide perspective. This stage of the study was further broken down into four specific phases; each

intended to address particular issues or concerns of the agencies comprising the Study Team. This stage also employed the services of a cultural resource consultant to assist in collecting additional research, providing analysis, and developing recommendations for subsequent phases of this stage and of the larger study.

Phase 1 Identification of Significant Roadways

Phase 1 of Stage III of the study was comprised of three elements:

- Identification of New Jersey roadways of state-wide significance
- Development of lists of associated resources, which might contribute to the significance of historic New Jersey roadways
- Establishment of thresholds of integrity that must be present for a roadway to be considered eligible for listing in the National Register of Historic Places

Research for Phase 1 focused initially on published state and county histories, government documents, engineering journals, New Jersey Department of Transportation Annual Reports, and general transportation histories. Histories such as Wheaton Lane's *From Indian Trail to Iron Horse*; George Roger Taylor's *The Transportation Revolution*; Peter Wacker's *The Musconetcong Valley of New Jersey and Land and People*; and Joseph Durrenberger's *Turnpikes: A Study of the Toll Road Movement in the Middle Atlantic States and Maryland* proved especially valuable in relation to early road development. Additional sources that were particularly relevant for the later roadway eras included Goldman and Graves *The Organization and Administration of the New Jersey State Highway Department*; Robert Meeker's "History of the New Jersey Highway Department;" and the 1916 Report to Governor Fielder by his Commission on Road Legislation, among others. This information was supplemented by articles

obtained from the New Jersey Historic Preservation Office (NJHPO) files, and from files held by individual members of the Study Team. Information collected in Phase I resulted in the identification of routes that appeared to have had importance within the historic contexts established in the early stages of the study.

Concurrent with the collection of written documentation was the initiation of extensive map research to assist in the identification of historically significant routes. Maps at the New Jersey State Library, New Jersey State Archives, Rutgers University, New Jersey Historical Society, Historical Society of Pennsylvania, Free Library of Philadelphia, and New Jersey Department of Transportation were examined. Slide photographs and photocopies were made of all available maps of statewide scope when permitted. Information from statewide maps was supplemented by information retrieved



Lincoln Highway, west of Rahway, Union County, 1923. (Courtesy of the University of Michigan, Transportation History Collection, Special Collections Library, Lincoln Highway Digital Image Collection.)

from selected regional and county maps, and the Jurisdictional Control maps held by the New Jersey Department of Transportation (NJDOT). NJDOT highway maps and road atlases produced by private companies also proved valuable, especially for later roadway periods. Information derived from map research allowed for the identification of routes that appeared to have some degree of longevity and, therefore, suggested potential significance.

Information obtained from written documentation and map research efforts were integrated to develop a preliminary list of potentially significant roadways for each roadway era. The routes identified as having some importance, as well as a degree of longevity, were mapped using the “best fit” approach. This involved fitting the historic roadway onto extant roads as they appear on current maps through a process of comparison and manually overlapping the two roads.

Review of this initial mapping by the Study Team prompted additional research to address areas of uncertainty and refine existing information about the locations of historic roadways. The potentially significant roads were then mapped on current New Jersey base maps using GIS technology. The research clearly showed that while the routes identified as having historic importance over time may have been in the same general corridor, the specific locations of New Jersey’s roadways over time was not static. Often the alignment of an individual road evolved—curves were straightened, the grades of steep inclines were minimized, awkward intersections were rebuilt, bypasses constructed, etc. It was clear from the research that the documents examined for this study provided merely single points in the history of a particular road. Historic maps, especially, show a snapshot of a particular road for a particular period. Alignment changes over time, however, may be important in defining a road’s period of significance and evaluating the integrity of an extant resource. Understanding the evolution of a roadway is critical to placing it within its proper historic context, evaluating the significance of the roadway, defining a period of significance, and addressing issues of historic integrity, i.e. the ability of the

roadway to convey its significance through its extant physical features.

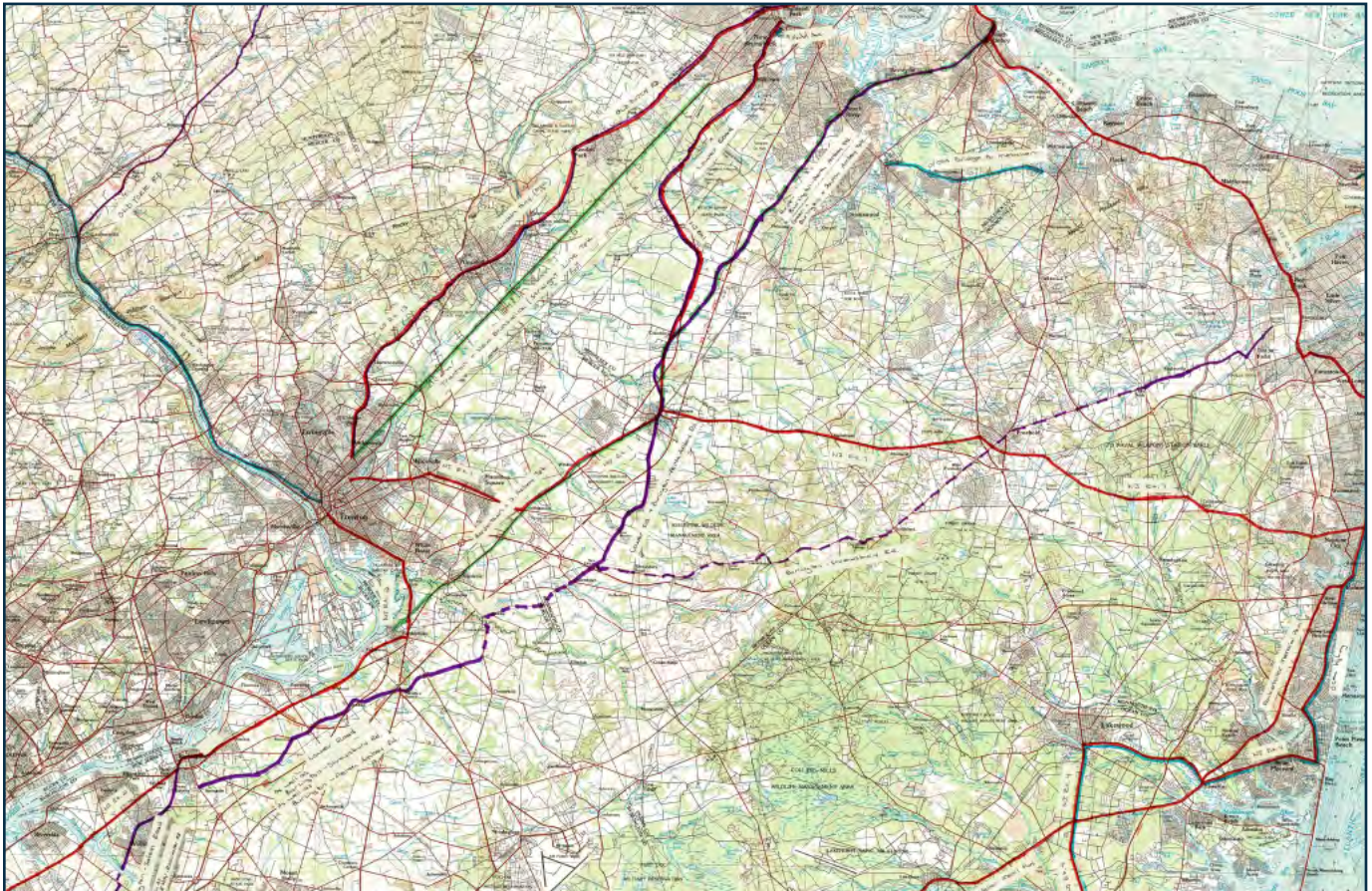
It is important to note that the methodology as originally envisioned proved problematic. Initially, it was thought that it would be possible to scan slides of maps into a computer with the intention of overlaying the digitized versions of the historic maps onto current highway maps. It was hoped that this would both facilitate identification of significant roadways, based on the assumption that such roadways would appear on multiple historic maps, and provide the current location of the significant roadways. It was thought that determining the “precise” location of historic routes would simply entail identifying the current state, county, and local roads that corresponded to the routes depicted on the historic maps. Implementation of this methodology, however, proved more difficult than first imagined.

This became particularly apparent for the two early periods because of the wide variance in the accuracy of eighteenth- and nineteenth-century cartography and the limited detail provided by many historic maps from that period. Trying to register the historic maps onto the current map by means of a series of registration points proved impossible. A revised approach was subsequently adopted. Slides of historic maps were reviewed to determine which roads were repeatedly depicted. Once a road was depicted on multiple maps, the inference was made that the road had some permanence. Information obtained from other research was then used to verify the inference. A list of roadways that existed over a period of time and appeared to be of more than local significance was then generated. These roads were then mapped on a large scale New Jersey road map that was then pinned to a wall. Slides of the historic maps were projected onto the wall immediately adjacent to the road map (with some attempt made to adjust the projected image so that it was at approximately the same scale as the road map). The route of the road as depicted on the historic map was then translated onto a route on the current map. The level of accuracy for this technique increased if the distance between points – villages, stream crossings, major crossroads

– was relatively small. When available, this information was crosschecked with historical narrative documentation describing the location of particular roads.

A series of trials were then conducted to evaluate whether this revised methodology provided the desired level of detail and to determine if further refinements were needed. County atlases (predominantly dating to the mid-nineteenth century) provided more accurate detail on road alignments. Maps prepared by the Highway Department's Jurisdictional Control Office during the period from 1920-1950 were also used. These maps provide a visual depiction of the route described in the county road docket, as well as information on roadway widths. This effort resulted in reasonably accurate information being transferred (after crosschecking and verification) to a series of 1:100,000 USGS topographic maps.

This series of maps provided a suitable level of detail, especially when a historic route no longer aligned with a current state route, but rather followed a county or local road. These maps were then used to prepare GIS base maps of the historic roadways by time period. These large-scale maps allowed the Study Team to pinpoint areas along a specific roadway where there may be alternative alignments. It was thought that bypassed sections might retain a better state of preservation. These areas were then subjected to more detailed research to determine, if possible, exactly where the road was located during its period of significance. For those portions of a roadway that still lacked the detailed information required for precisely overlaying the historic route onto current maps, a dashed line was used to depict the likely route. This mapping allowed for a list of potentially significant roadways being identified for each of the designated roadway building eras. It must be noted, however, that



Sample USGS quadrangle with historic roadways depicted across central New Jersey. The routes were color coded to represent each era: Early Roads (purple), Internal Improvements (green), Good Roads (blue), and Highway (red).

the maps created for each time period show only a snapshot in time of a particular roadway and that a road's alignment, or portion thereof, may have changed within its period of significance.

The second element of the Phase 1, Stage III study was the development of lists of resources that might be associated with and contribute to the significance of historic roadways in New Jersey. The lists function as guides to help identify those elements that might have been part of a historic road during a particular era. Both roadway and roadside elements were considered. The Study Team defined roadway elements as being constructed within the right-of-way and being functionally associated with the roadway system. These elements might include, but would not be limited to, bridges, culverts, curbing, landscaping, tollhouses, milestones, lighting, etc. The Study Team defined roadside elements as those items generally constructed or located outside of the right-of-way. These elements might include features such as taverns, motels, gas stations, auto camps, comfort stations, advertising signage, neighborhoods, etc. Thus, features of interest to those evaluating historic roadways may be either directly or indirectly linked to the roadway itself. The lists represent common examples of elements that may be associated with roadways from each specific era. The presence or absence of these elements should be considered when evaluating the integrity of specific roadways, and those extant elements must also relate to the roadway's period of significance. Not all elements or features would be expected to be represented on all roadways; however, the road must contain a sufficient number of period elements to convey its significance.

The third element of Phase 1, Stage III involved the identification of thresholds of integrity for each roadway era. Team members weighed the importance of the presence of various roadway and roadside elements as identified in the previous effort. A matrix for evaluating integrity based on the presence or absence of associated resources was then developed. This evaluation matrix was viewed as a key tool for determining which significant roadways retain sufficient integrity for eligibility for listing in the National Register of Historic Places.

Phase 2 – Treatment Guidelines

Phase 2 of the study is intended to address the issue of development of future transportation projects on eligible segments of significant roadways by developing guidelines to assist the project designer in making appropriate choices pertinent to the design of a roadway project that involves or is in proximity to a historic roadway. It is intended that the design guidelines be consulted early in the project development process and that they address roadway and roadside elements that might be replaced in the course of the project development process. Using information developed by the NJDOT and its consultants as part of the Department's Context Sensitive Solution initiative, the consultant considered both standard and creative solutions to a range of design problems. The appropriateness of each of the solutions proposed for each of the historic roadway eras was then evaluated. The design guidelines will be published as a stand-alone document and will be available from NJDOT.

Phase 3 – Field Verification

To evaluate the efficacy of the assumptions made and the integrity matrix developed during Phase 1 of the study, the consultant and Study Team conducted field reviews of portions of a number of roadways that had been identified as having the potential to be significant. The goal of the effort was to make a visual inspection of the portion of the roadway under consideration; make an impressionistic evaluation of the National Register eligibility of the roadway segment; use the lists of roadway and roadside features to conduct an inventory of contributing elements; and use the integrity matrix to develop a recommendation about integrity and National Register eligibility. Representative photos demonstrating the types of decisions/recommendations made were also taken. Based on the results of this effort, it was decided that the Study Team should drive the length of at least one roadway proposed as being eligible to observe the constantly changing character of the roadway, and to have sufficient information to address the question of how much of the roadway must retain integrity for the segment to be considered eligible. This question is critical to developing implementation guidelines for the study and evaluating National Register eligibility.

As the result of the field review, it was concluded that, although the results were somewhat disappointing because only short stretches of bypassed roadways seemed to retain integrity for the earliest roadway periods, the inventory lists were appropriate and the integrity matrix was useful. Additional questions relevant



Dave Vanvorst, retired NJ DEP Parks employee, delineating the Old Cape Road route on a USGS quadrangle, 2002.

to implementation guidelines, however, were raised for future consideration. Study Team members have subsequently field-checked portions of roadways identified as being significant and possibly eligible for listing in the National Register of Historic Places as opportunities presented themselves. The results of those efforts are included in Chapter VIII: Preliminary Application of Roadway Study Principles.

Phase 4 – Programmatic Agreements

In Phase 4, Implementation Guidance will be developed to establish general parameters for using the information gathered in this study when evaluating roadways identified as significant during Section 106 and 4(f) consultation. This guidance will provide recommendations for establishing a project's study area, the survey intensity, and the parameters for making decisions concerning significance, integrity, and National Register eligibility for significant roadways. The NJDOT, Federal Highway Administration (FHWA) and NJHPO, through a Programmatic Agreement, will formally adopt this Implementation Guidance.

A second element of this phase will involve the development of other programmatic agreements describing what types of transportation projects or actions will cause an effect on a National Register eligible roadway. The goal of this initiative is to introduce predictability into and streamline both the Section 106 and Section 4(f) compliance processes. It was clearly recognized that these effect determinations should be based in part on the significance of the historic road and the scope of the roadway project being proposed. They should also take into consideration whether treatments developed in accordance with the guidelines contained in this study (or other appropriate treatments) are incorporated into the project. It includes reaching agreement on what constitutes findings of *no historic properties adversely affected*, *no adverse effect with conditions* (recommended treatments), or *adverse effect* and codifying that agreement. The Programmatic Section 4(f) agreement will provide a programmatic solution for demonstrating that there is no feasible and prudent alternative for affecting historic roadways. These agreements will be prepared as a separate document. As the opportunity to study these roads arises, these general agreements may be altered.²

D. INTEGRITY THRESHOLDS

For a roadway to be considered eligible for listing in the National Register, a property must not only be shown to be significant under the National Register criteria, but it also must have integrity. It has been generally agreed upon by the Study Team that sections of a significant roadway that retain integrity must be of a sufficient length to preserve the character of the roadway. No standard minimum length or percentage of a roadway, however, has been assigned to evaluating a road's integrity. While assigning a specific length was considered, it became apparent that too many exceptions existed and each roadway needed to be looked at individually for sufficient length. Variables to be considered when establishing the length of roadway required to retain integrity include the significance of the roadway, the topography of the area, the built environment, and the overall character conveyed by the road and its setting.

²It was determined that no Section 4(f) Programmatic Agreement for historic roadways would be advanced by FHWA, NJDOT, and NJHPO because other applicable agreements have recently been adopted by these agencies. The "*de minimus*" and "Net Benefit" nationwide programmatic agreements are useful for addressing minor uses of 4(f) resources. If 4(f) issues specifically regarding historic roadways are found to be ongoing after the implementation of these recent programmatic agreements, the agencies may consider a historic roadways programmatic agreement in the future.

The National Register recognizes seven aspects or qualities that, in various combinations, define integrity: location, design, setting, materials, workmanship, feeling, and association. These seven aspects were considered for each of the four roadway eras. An integrity matrix was developed that assigns levels of importance for the seven aspects of integrity for each roadway era (see Figure 1). If a “high” level of importance is assigned to a specific aspect of integrity, then that level must be met in order for the road to retain integrity and, therefore, be considered eligible for the National Register. Criteria with “medium” thresholds are important, but not essential for National Register eligibility. Criteria with “low” thresholds are not critical. The integrity threshold for Setting is “medium” for each era. However, it was decided that if a road is significant under Criterion A, then the level of importance of the Setting integrity threshold becomes “high” and the setting must be intact for a road to retain integrity. For roads that have been determined significant for multiple eras, that road can only be considered eligible for the National Register for the period(s) in which it retains integrity. Each roadway era chapter has a discussion of the integrity thresholds that has been established for that particular era. These integrity thresholds are intended as a guide; the relative importance of the integrity thresholds will be verified on a case-by-case basis.

An example of the application of the integrity matrix is explored in a discussion of Ocean Highway/Route 4 (U.S. Route 9) in Chapter VIII: Preliminary Application of Roadway Study Principles. The route was found to be historically significant in two historic roadway eras, Good Roads and Highway, as the first state designated state highway in New Jersey (Ocean Highway) and as one of the initial routes identified as part of the initial State highway system (Route 4). A reconnaissance survey of a two-mile segment of the road identified features in the roadway and along the roadside related to both historic roadway eras. To analyze the integrity of the road, the consultant applied the principles of the integrity thresholds matrix shown in Figure 1. For both the Good Roads and Highway eras, the thresholds for the Association, Location, and Design aspects of integrity are high; the threshold for Setting is high because the road is significant under Criterion A, and the thresholds for Workmanship and Feeling are low. The threshold for Materials for the Good Roads Era is medium, and for the Highway Era the threshold is low. This means that the Association, Location, Setting, and Design integrity must be met; and it is least important that the Feeling, Workmanship, and Materials aspects of integrity are met. The two-mile segment investigated met the important (“high”) thresholds, and it was found to retain integrity for both eras.

	Association	Location	Design	Setting*	Materials	Workmanship	Feeling
Early Roads	High	High	Medium	Medium	Low	Low	Medium
Internal Improvements	High	High	Medium	Medium	Low	Low	Medium
Good Roads	High	High	High	Medium	Medium	Low	Low
Highway	High	High	High	Medium	Low	Low	Low

*In cases where the road is significant under Criterion A, the integrity level for setting changes from medium to high.

Figure 1. Integrity Matrix

IV. TERMS

For the purposes of this study, the following definitions of terms apply:

Banking

Construction technique whereby the outside edge of a road curve is higher than the inside edge of a curve creating a tilted or “banked” roadway.

Channelize

The use of pavement markings, curbs, landscaping, or other features to delineate traffic flow.

Cut and Fill

A construction technique wherein the soil in a section of the work area is removed (“cut”) and the material (“fill”) used elsewhere in roadway construction, such as for embankments or other roadway design features.

Dualize

The separation of opposing directions of traffic, often using design features such as landscaped medians, concrete barriers, or curbs.

Eligibility

Refers to having significance and maintaining integrity, thereby meeting the National Register of Historic Places criteria for evaluation (36 CFR 63).

Historic Context

Those patterns or trends in history by which a specific occurrence, property, or site is understood and its meaning (and ultimately significance) within history or prehistory is made clear. Historic contexts are found at a variety of geographical levels or scales. The geographic scale selected may relate to a pattern of historical development, a political division, or a cultural area.

Local Historic Context – a local historic context represents an aspect of the history of a town, city, county, cultural area, or region, or any portions thereof. A property can be significant to more than one community or local area, however, without having achieved state significance.

State Historic Context – properties are evaluated in a state context when they represent an aspect of the history of the state as a whole. A property that overlaps several state boundaries can possibly be significant to the state or local history of each of the states. Such a property is not necessarily of national significance, nor is it necessarily significant to all the states in which it is located.

National Historic Context – properties are evaluated in a national context when they represent an aspect of the history of the United States and its territories as a whole. These national historic contexts may have associated properties that are locally or statewide significant representations, as well as those of national significance. A property with national significance helps us understand the history of the nation by illustrating the nationwide impact of events or persons associated with the property, its architectural type or style, or information potential. It must be of exceptional value in representing or illustrating an important theme in the history of the nation.

Integrity

The ability of the property to convey its significance through surviving character defining features.

Region

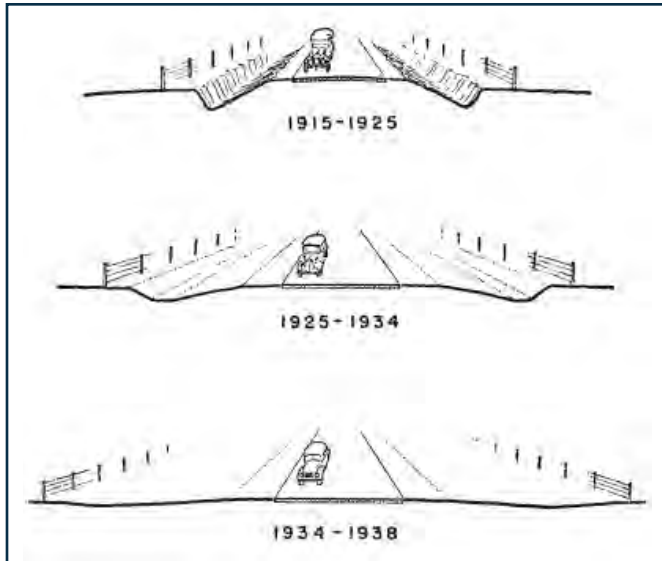
Refers to an area exhibiting similar history, economy, or physiography, which should extend over state/contemporary county boundaries.

Region/Area/Locale

These terms refer to the geographic boundaries of a significant property type. The terms do not indicate level of significance.

Right-of-way

Land acquired for or devoted to transportation purposes.



Right-of-way development, 1915-1938.

Road

A road is a bearing surface for vehicular or pedestrian transportation activity within a roadway.

Roadway

A strip of land physically altered to accommodate road construction and use, i.e. the right-of-way through which a road passes and all that it contains.

Roadway Elements

Buildings or structures constructed as a functional element of the roadway within the right-of-way (e.g. roadway, bridges, culverts, guide rails, viaducts, drainage control, designed landscaping, sidewalks, retaining walls, fencing, toll houses, toll gates, milestones, lighting, roadway signs, picnic areas, weigh stations, scenic overlooks, bus shelters).

Roadside Features

Buildings and structures generally associated with the use of the roadway but constructed or located outside of the right-of-way (e.g. inns/taverns, motels, gas/repair stations, drive-in theaters, diners, auto camps, auto showrooms, recreational facilities, hot-dog/hamburger/produce stands, billboards, strip malls).

Rod

A unit of linear measurement, 5.5 yards or 16.5 feet.

Significance

Significance is the importance of a property to the history, architecture, archaeology, engineering, or culture of a community, region, state, or the nation. Significance is achieved through one or more of the following: 1) association with events, activities, or patterns; 2) association with important persons; 3) distinctive physical characteristics of design, construction, or form; or 4) potential to yield important information. Furthermore, significance is defined by the area of history in which the property made important contributions and by the period of time when these contributions were made.

Transportation

Means of conveyance or travel from one place to another; conveyance of passengers, goods, or materials.

Transportation Corridor

A route along which people or goods move by roadways, waterways (canals or natural bodies of water) or rail between population centers, industrial, commercial, or cultural centers.



Milestones along "Old King's Highway" between Cooper's Ferry (Camden) and Salem.

V. ROADWAYS THAT SPAN MULTIPLE ERAS

Certain roadways may be of historical significance for more than one defined era. If this is the case, then the integrity of the road must be evaluated to take this into consideration. This is important when identifying character defining features as well as identifying associated features such as adjacent buildings. Depending on the roadway's integrity, a road that spans multiple eras may be eligible for both eras or for just one era. For roads that have been determined significant for multiple eras, that road can only be considered eligible for the National Register for the period(s) in which it retains integrity.

Roadways of the Good Roads and Highway eras often incorporated existing roads to create the overall route. Therefore, analysis of roadways – particularly in these eras – must also evaluate the potential significance and integrity of the earlier development era(s). For example, the evaluation of Ocean Highway (now U.S. Route 9) in a case study examined in Chapter VIII, included discussion of the significance and integrity of both of the route's former designations as Ocean Highway and Route 4, from the Good Roads and Highway eras, respectively.

While this document provides substantial historical context, significant themes, and evaluation framework, additional research on individual roadways and specific study segments (as applicable)

should be undertaken for any analysis of a historic roadway. The analysis for roads significant in multiple eras is similar to that for roadways of a single era, except that the evaluation must extend to whether the road reflects multiple eras as defined in this document. For roadways of statewide significance, the roadway should be evaluated to determine whether the segment of road under study reflects the significant historical themes under the eligibility criteria contained in this document for each era of the road's development. For example, in the U.S. Route 130 case discussed in Chapter VIII, the study examined the history of the roadway and evaluated the significance of the route in its incarnation as Route 2, Route 25, and U.S. 130. If the significance of the road is verified in more than one era, the physical integrity of the roadway and roadside elements must be examined for each era of significance. The roadway and roadside element tables for each era should be consulted, as well as the integrity threshold matrix contained in this document.

Further discussion of example roadways that meet the significance criteria and integrity thresholds for multiple eras is included in the case studies found in Chapter IX. Both Ocean Highway/Route 4 and Kings Highway/Lincoln Highway (a segment of which is listed in the National Register) are of statewide significance and retain integrity in two historic roadway eras.



Route 2 between Burlington and Roebling, Burlington County, showing Portland cement paving, circa 1920.

VI. HISTORIC CONTEXTS AND SIGNIFICANT ROADS

A. EARLY ROADS ERA (CA. 1621 - CA. 1815)

1. Introduction

The colonial era in New Jersey history began with sporadic settlements of Dutch, Swedes, and ethnic Finns during the 1620s and 1630s. At that time, English attempts at settlement in New Jersey were also undertaken, but were less successful. England then increased its efforts at colonization, and in 1664 an English naval expedition overthrew Dutch control of New Amsterdam (New York). Additionally, the English took control of other Dutch settlements along the lower Delaware River, centered near New Castle, Delaware and Gloucester, New Jersey.³

Transportation routes were generally restricted to waterways for long distances and the use of trails, which would have been little more than paths, for shorter distances. The landscape, as first encountered by the Europeans in the 1620s, was most likely composed of open forest. During New Jersey's first century of settlement, residents most likely focused much of their energies on improving their property by building homes and clearing land for agriculture, not improving roads. Road construction was not a priority, and many residents during the seventeenth and eighteenth centuries used water routes as their primary means of transportation. Most roads during this period carried local traffic and functioned primarily as a means to get to water transportation for longer trips or to reach local mills.

Each town tended to have its own network of local roads that radiated out from it to surrounding dispersed farmsteads. While connecting roads between towns were common, roads that connected several towns were not. Improvements made to roads during this period were few and isolated. Generally, they consisted of rudimentary improvements focusing on making roads passable. Improvements to roads during subsequent eras frequently consisted not only of reconstruction and widening, but also realignment, as the ability to manipulate the landscape

through the development of and the improvement of construction equipment increased.

2. Early Roads Era Historic Context

a) Background

Initial colonization, ca.1624-1664 (prior to English control), resulted in little more than a thin veneer of probably less than 1,000 total population scattered in two general areas, the Delaware River Valley in the south and the area opposite New Amsterdam in the north. These initial settlements served as the precursor to the bi-directional character of the colony that still exists today, with the focus toward New York in the north, and, similarly, the emphasis toward Philadelphia in the south. The initial wave of Dutch, Swedish, and English colonists in the mid-seventeenth century selected choice properties along navigable waterways where they had ready access to water transportation. Travel by water was the dominant method of transportation in colonial New Jersey. Overland transportation, when undertaken, was accomplished on narrow paths. Paths were commonly between twelve (12) and eighteen (18) inches wide and reflected the most direct and feasible routes between European settlements, watercourses, and landings. Many paths functioned as portages, connecting navigable bodies of water.⁴

Some of the paths used by settlers may have been adapted (in whole or in part) from existing Native American trails or paths.⁵ Native American trails, however, were not formally designed or laid out, and did not function in the same way or necessarily lead to the same destinations desired by early European settlers. Additionally, these Native American paths were generally not meant to handle either animal or wheeled traffic. It is doubtful that a colonial era road corresponded for any appreciable distance to an earlier

³Federal Writer's Project (NJ), *The WPA Guide to 1930s New Jersey* (New Brunswick, NJ: Rutgers University Press, 1986): 35-37; Richard B. Morris (ed.), *Encyclopedia of American History*, (New York: Harper & Brothers Publishers, 1953), 42-45.

⁴J. L. Ringwalt, *Development of Transportation Systems in the United States* (New York, NY: Johnson Reprint Company): 1966, original Philadelphia: J.L. Ringwalt, 1888): 25.

⁵Although prehistoric roads did exist in North America, there is no evidence that one ever existed within New Jersey.

“Indian trail.” Native American origins, destinations, waypoints, and best route would have differed radically from later European concepts, making any adoption of an earlier trail most unlikely. Colonial settlers probably adapted Native American trails only where it coincided with a proposed road. This most likely occurred at fords, passes, or on high ground through swampy areas.

A path by its very nature is much less planned than a road. A path follows a general direction to a general or specific destination, but it tends to be planned along a “line of sight,” that is, the actual course followed tends to be the easiest course to the next visible point, and so on. This immediate or short view may actually end up being longer and more difficult than a course that considered the entire journey. Roads, on the other hand, when taking into consideration the overall journey, attempted to cross short distances reducing the total distance, or minimizing total travel “costs” of time and energy. To a large extent, however, road alignment was dictated by the landscape. Steep inclines,

marshy areas, as well as other natural features, often influenced the location of a route between two points.

Long through routes probably did not exist in New Jersey prior to English settlement. Despite some claims dating the “Old Mine Road” back to the years of Dutch rule, use of that particular road has not been clearly identified prior to the eighteenth century.⁶ The movement of several hundred Dutch troops in 1651 from New Amsterdam down to an area opposite Fort Christina (Wilmington, Delaware), as part of the first invasion of the Swedish colony by the Dutch, occurred as a two pronged effort, with troops marching overland and meeting a small flotilla on the Delaware. Peter Stuyvesant’s route is unrecorded, and it is unclear from the records exactly how long this march took. When Stuyvesant, the Dutch Governor of New Netherland and leader of the expedition, repeated the same invasion during the final takeover of the Swedish colony four years later, he decided to move the entire force by ship, which may reflect upon the difficulty of overland travel or the unsuitability of existing paths.

European settlement increased after the English consolidated rule over New Jersey in 1664. The initial wave of new settlers arrived not from England, but from New England, and attempted to set up the typical New England pattern of small towns with surrounding fields. During the first decade of English settlement, various events in England, and the temporary recapture of the area by the Dutch, resulted in confusion over the ownership of the area and resulted in the division of the colony into two separate entities referred to as East Jersey and West Jersey. By the 1680s, control of the colony had passed from the original grantees to consortiums of religious and ethnic groups who sought to establish a new homeland for their particular groups in East and West Jersey. Dispersed settlement, consisting of a few towns and mostly isolated farmsteads, became the overall pattern of land division. During the period of initial settlement, the prevailing concept was that travel by water was the easiest, if not the preferred, method of transportation. This, among other reasons, resulted in a high valuation of waterfront property. In response to this,



Route of Old Mine Road, Walpack Township, Sussex County, date unknown (copy made 1966).

⁶A chapter devoted to the lore surrounding this road opens Henry Charlton Beck’s *The Roads of Home: Lanes and Legends of New Jersey* (New Brunswick, NJ: Rutgers University Press, 1956): 3-20. The road is described as going through current Sussex and Warren counties, from Kingston, New York through Port Jervis, then to the Pahaquarry copper mines, now in Warren County.

and other factors, a land division pattern of long lots with narrow frontages on waterways was adopted. Although this was the ideal, poor surveys, indifferent enforcement, and individual influence often resulted in the ideal pattern being ignored. The dispersed nature of settlement resulted in the need for roads to connect not only the towns to each other, but also the individual farms to the towns. A general trend of dividing larger land parcels into smaller farm tracts also led to the need for more roads to access the growing numbers of smaller farmsteads. Generally, this resulted in the establishment of many road fragments rather than longer routes.

The early colonial governments (both East and West Jersey had separate governments prior to the partial unification achieved by the transition to a royal colony in 1702) quickly established that for the most part, roads were to be the responsibility of the individual counties. Each county was to appoint several commissioners to oversee the “laying out of public roads.” The exact number of commissioners varied from county to county. Three commissioners had to agree to the alignment of any major road, and two for any smaller road of two rods (33 feet) width or smaller. Later this was changed to an appointment of two surveyors for each town or district. Their primary responsibility was to survey a road’s location. Care was to be taken to limit the inconvenience to adjacent property owners, and roads were often laid out along property boundaries. This tended to increase travel distances, and there was a marked tendency to remove these “kinks” as time progressed. Occasionally roads were laid out to cause direct harm to political foes, which resulted in specific legislation to limit realignment of larger roads (of four or six rods in width, or so-called “Kings Highways”) to the direct action of the colonial assembly.⁷

County road boards had the authority to layout new roads and set rates and taxes to fund construction and maintenance.⁸ There were two major classes of exceptions to the general rule that roads were to be the responsibility of the individual counties. The first class was major roads that connected the more important towns

of the colonies. These roads usually stretched between several counties and required some “centralized” planning. Several laws were passed relating to oversight and upkeep responsibilities for these roads. Examples of such include two roads mandated by the colonial government in the 1680s, the Burlington–Salem Road and the Burlington–Perth Amboy Road. A second class of roads that the colonial assembly sometimes addressed was those roads that, for some reason, were difficult or expensive to build or maintain. Thus, the colonial assembly occasionally dealt with bridges or short stretches of road that went through a swamp, over a mountain, or crossed particularly difficult terrain. Such projects, due to their difficulty, were beyond the assets of a particular county to deal with and often became the focus of the central colonial government. This latter type of involvement would not necessarily confer significance to a roadway. Although most major roads through the state were laid out with a 66 or 99-foot right-of-way (ROW), this width was rarely actually constructed; and the constructed roadways remained narrow, except for those sections that went through a town. Several colonial era laws dealt specifically with the problems of “encroachment,” or the construction of private structures, especially fences, within the laid out road width.

Following the unification of East and West Jersey in 1702, Governor Hunter signed an act requiring towns to select surveyors of highways, a position that held similar responsibilities to the earlier road boards. The appointment of surveyors, however, did little to encourage road construction in the colony. Several decades later, road conditions had not appreciably improved, and the new governor passed a revised law specifying stricter requirements for surveyors and compelling them to inspect all roads in their jurisdiction every two months.⁹ Nevertheless, without funds or labor available for making road improvements, inspection requirements proved meaningless.

As the demand for overland routes increased, pre-existing paths, the existing topography, as well as property lines, often dictated the alignment of early roads. Routes were often unnecessarily

⁷ Bernard Bush, (ed.) *Laws of the Royal Colony of New Jersey, 1703-1745*, New Jersey State Archives, Third Series, Vol. “An Act for laying out, Regulating, Clearing and Preserving Publick Common High-Ways Throughout this Province of New -Jersey,” (1704): 23; “An Act for the Better Laying Out, Regulating, and Preserving Publick Roads and High-Ways Throu-out This Province,” (Jan. 26 1716/17): 196-201 and; “An Act for the Amendment of the Law Relating to Highways and Bridges: For Explaining Certain Clauses in Several Former Acts Concerning the Power of the Justices and Free-Holders therein Mentioned: And for Directing the Method for Raising of Money to Pay for the Bridge Last Built over South River,” (February 10, 1727/28): 381.

⁸Wheaton J. Lane, *From Indian Trail to Iron Horse* (Princeton, NJ: Princeton University Press, 1939): 34-35.

⁹Ibid., 37.

long, winding around large farms rather than passing through them along a direct route. County and town surveyors technically had the right to take land for road building and improvement purposes, and tacit agreements existed for compensation in such circumstances.¹⁰ Few surveyors, however, were interested in angering their neighbors to straighten out a route by laying it through their fields. Historian Caroline MacGill observed that early roads were “built not so much on mathematical as on social principles; that is, instead of being located on the best and shortest routes, they were too much subordinated to local and individual interests, which often resulted in bad locations and in long, indirect, and devious routes.”¹¹ Topography, and the difficulty of manipulating it with existing machinery, also influenced the location and route of roadways.

According to Dunbar’s *A History of Travel in America*, the creation of corduroy roads often represented the first phase of highway improvement. Minor problems in dry, generally stable sections of road could be solved by filling chuckholes and ruts with saplings or cut logs.¹² Swamps, marshes, and areas prone to flooding, however, often required the creation of a full-fledged corduroy road. This construction method involved laying logs, cut in ten to twelve-foot lengths, parallel to one another along the route. Road builders covered the logs with a layer of dirt between two and three inches thick, creating a passable but extremely bumpy road surface.¹³ The construction of corduroy roads was later exploited during the Turnpike Era.

The combination of an accommodating topography and location led to the development of the New York to Trenton route as an important transportation corridor as early as the beginning of the eighteenth century. Benjamin Franklin, as the Postmaster General of the colonies, encouraged the creation of a few good through routes to carry intercolonial traffic (the mail, for example). Intercolony traffic, however, still tended to prefer water routes, even if such trips were of several days duration and resulted in longer distances traveled. The lateness of the general development of the northwestern section of the state is directly

related to that region’s lack of good water routes. In contrast, the direct route between New York and Trenton lies on the northern limits of the Outer Coastal Plain, where the flat, coastal topography transitions to the hilly piedmont. In addition, Trenton is located at the head of navigation of the Delaware River, thus allowing for a connection to water transportation to Philadelphia. The so-called “Falls of the Delaware,” located at Trenton, represents an almost impassible hazard to river navigation. Traffic headed overland toward Philadelphia typically followed the river on roads located on either the New Jersey or Pennsylvania side of the river. The establishment of Trent’s Ferry after 1726 facilitated the river crossing at this location.

With few exceptions, roads were generally of a short distance, connecting a locale with a specific central destination, whether it was town, mill, navigable watercourse, or other road. Longer roads that connected destinations of some distance, especially between counties, were less common. Roads that connected to other colonies, or major population centers, serving mainly “through” traffic, constituted a very small percentage of the planned road system. Each town tended to have its own network of local roads that radiated out from it to the dispersed farmsteads. While connecting roads between towns were common, roads that connected several towns were few. Those farms located on waterways frequently had landings, and such improvements were usually noted in the sale advertisements of the period. Such landings frequently serviced other nearby farms that had no access to water routes, and prosperous farmers invested in small boats to tap the additional business available.

Several longer distance routes appeared across the lower half of the colony from the Delaware River to the coast during the late eighteenth century. Their development may relate to owners attempting to avoid payment of duty/taxes on the transportation of goods across the colony. These roads were probably not planned or laid out by the counties involved nor did they necessarily connect specific towns. Maps of the period, such as Faden 1778, however, show these roads and also indicate that prominent

¹⁰*Ibid.*, 37.

¹¹Caroline E. MacGill, et al., *History of Transportation in the United States Before 1860* (Washington, DC: The Carnegie Institution of Washington, 1917): 53; Lane, *From Indian Trail to Iron Horse*, 37.

¹²Alice Morse Earle, *Stage Coach Days* (New York, NY: Dover Publications, 1969): 227.

¹³Seymore Dunbar, *A History of Travel in America*, Vol. I (Indianapolis, IN: The Bobbs Merrill Company, 1915): 195.

taverns, or halfway stops, occurred along these routes, attesting to their usage.

Other “unofficial” roads were also laid out, some by private groups or companies. Some of the many iron complexes in both the northern and southern parts of the state established roads not only to shipping points or potential markets, but also to access raw materials. These and other travelways occasionally became formalized as roads through county recognition.



Old Salem Road, just east of the junction with the Black Horse Pike, date unknown.

New Jersey colonists concentrated on improving their land during this first century of settlement. Road construction was not a priority, and most residents were content to use water routes or the established paths well into the eighteenth century. According to Durrenberger, “Few roads of more than local significance existed prior to the eighteenth century and conditions improved very slowly during the remainder of the colonial period.”¹⁴

Road conditions remained primitive throughout most of the eighteenth century. New Jersey residents did not often travel, and usually confined their excursions to the winter season. During the warm months of the year, most citizens had agricultural responsibilities that precluded any thoughts of a journey. In addition, spring thaws and summer rains transformed many semi-passable routes into impassable swamps. In northern portions of New Jersey, farmers welcomed winter’s consistently cold

temperatures. During the winter season, local streams froze, creating highways of ice upon which farmers could run their sleighs. Sleighs on frozen streams made much better time than wagons on overland routes and were commonly used as early as 1700.¹⁵ After the harvest, farmers often used the opportunity to take home-produced commodities, such as cider and cheese, to market for sale.¹⁶

A concentration of stagecoach routes developed through the “waist” of New Jersey between New York and Philadelphia in the mid to late eighteenth century. This journey generally involved three legs: first, water passage from Manhattan to a point in northern New Jersey near the Raritan River; second, a stagecoach leg across the colony to Trenton or another port on the Delaware; and third, a trip by boat down river to Philadelphia.¹⁷ Local stage routes radiating from mid-size towns like Cooper’s Ferry (Camden) and Powles Hook (Jersey City) developed considerably more slowly.¹⁸ Many roads led out of major cities like New York and Philadelphia, but less-populous areas remained “dependent on the pole-boat, saddle-horse, and pack-train.”¹⁹

Early stage traffic was typified by sporadic schedules, reliance on intermittent ferry service, and frequent breakdowns or delays caused by the poor conditions of the roads. After the 1760s, a few stage lines billed their faster vehicles as “Flying Machines,” emphasizing rapid transport, although such claims could be considered hyperbole. Travel from Philadelphia to New York still took at least two days to traverse the hundred miles. This, however, constituted a major improvement over the typical three-day trip that travelers had to experience during the first half of the eighteenth century.

Despite the growth of stage traffic, movement of large groups of people or large volumes of goods, including bulk goods traveling between colonies, often remained via water, wherever possible. However, individual travel, as well as the mail, continued to use the expanding road system in ever increasing numbers during the later part of this era. Movement of farm goods to market also took

¹⁴Joseph Durrenberger, *Turnpikes: A Study of the Toll Road Movement in the Middle Atlantic States and Maryland* (Valdosta, GA: Southern Stationary and Printing, 1931): 9.

¹⁵Dunbar, *A History of Travel in America*, Vol. I, 49.

¹⁶*ibid.*, 48.

¹⁷George Rogers Taylor, *The Transportation Revolution 1815-1860*, Vol. 4 in *The Economic History of the United States* (White Plains, NY: M. E. Sharpe, 1951): 58.

¹⁸Lane, *From Indian Trail to Iron Horse*, 91. Powles Hook, also known as Paulus Hook, is located in what is now Jersey City.

¹⁹Dunbar, *A History of Travel in America*, Vol. I, 201.

increasing advantage of the expanding road system, especially over shorter distances, such as to mills or local markets.

In addition to the poor quality of the roadbed, few streams were bridged in the seventeenth and eighteenth centuries. While bridges of short spans were constructed, using stone or wood, longer spans were rarely attempted. If a waterway could not be forded and was too wide to be easily spanned, colonials had to resort to ferries.²⁰ Ferries facilitated movement across the colony's large rivers for which the cost (in terms of materials and expertise) of constructing permanent bridges was prohibitive. By the time of the Revolution, twenty-two ferries operated on the Delaware River north of Trenton and fifteen south of that point.²¹ Ferryman possessed relatively high standards of living. Most owned large tracts of property around their ferry landings, and many ran inns or stage lines to further supplement their income.²²



Stone bridge over the Millstone River in Kingston, built in 1798, adjacent to its 1970 replacement carrying Route 27.

Despite slight improvements in road construction and vehicular design, transportation costs for goods in colonial New Jersey remained extremely high. Shortly after the Revolutionary War,

transportation costs equaled production costs and acted to restrict inland trade.²³ Overland shipment of manufactured or processed goods to New Jersey's interior regions was generally cost-prohibitive. Consequently, many farming families remained self-sufficient. Residents relied on a few short distance roads for passage to and from local saw and gristmills. Essentially, their farms functioned as independent economic entities, with families using local resources to meet their daily needs.²⁴

Moreover, British mercantile policies were developed to discourage colonial manufacture, which placed additional limitations on trade. This policy did not encourage the expansion of road systems between mid-size towns, since goods were generally not to be transported between those locations prior to the Revolution. With the exception of the New York to Philadelphia routes, road systems remained decentralized and local in nature through the eighteenth century.²⁵

The high overland transportation costs noted above provided an incentive for shifting to water transportation as quickly as feasible on any given route.²⁶ In the eighteenth century, this proved advantageous to secondary port towns, like Perth Amboy, Burlington, and Salem, because they were able to effectively compete for freight shipments and develop their own foreign trade. Local systems of overland routes arose to serve these areas. Philadelphia and New York, however, finally overshadowed these mid-size ports by the close of the Revolution.²⁷

Roads constructed primarily to serve military purposes seem not to have been built in New Jersey during this period. After 1700, the general lack of establishment of forts or trading posts within the colony negated the requirement for such a class of road. Roads in New Jersey tended to follow settlement, not to predate and encourage such settlement. During the French and Indian War, a series of five military barracks were constructed within the state to house troops; these barracks were located within existing towns, and new routes were not needed. The Revolutionary War and War

²⁰Ibid., 46.

²¹Lane, *From Indian Trail to Iron Horse*, 44.

²²Ibid., 45.

²³New Jersey State Highway Department Bureau of Public Information, *Development of the New Jersey Highway System* (Trenton, NJ: Bureau of Public Information, 1966): 4.

²⁴Cornelius C. Vermeule, "Early Transportation In and About New Jersey," *Proceedings of the New Jersey Historical Society* 9, no. 2 (April 1924): 111.

²⁵Kise Franks & Straw, "Overview History of New Jersey Highway Development," 6. On file with the New Jersey Department of Transportation, Bureau of Environmental Analysis, Trenton, New Jersey.

²⁶H. Jerome Cranmer, *New Jersey in the Automobile Age: A History of Transportation*, Vol. 23 in *The New Jersey Historical Series* (New York: D. Van Nostrand, 1964): 14.

²⁷Lane, *From Indian Trail to Iron Horse*, 50.

of 1812 also saw the utilization of the existing road system and included little improvements made to the roads themselves.

After the Revolution, federal attitudes about transportation followed the lead established during the colonial era. Decentralization and a laissez-faire approach characterized road improvement policy at the state and national levels. In 1807, Albert Gallatin, then Secretary of the Treasury, lobbied the federal government to sponsor a comprehensive national transportation system.²⁸ The constitutionality of providing federal funding for an internal improvement was seriously questioned, however, and eventually Gallatin's plan was dropped entirely. With the exception of the National Road (also referred to as the Cumberland Road and the National Pike among others), which connected the Ohio Valley (Wheeling, West Virginia) with the eastern seaboard (Cumberland, Maryland) and was authorized in 1806, the federal government did not put money into roads throughout the nineteenth century.²⁹

Road conditions, however, became a major national concern during the War of 1812. British coastal blockades obliged American forces to rely on existing overland travel routes during the conflict. The generally poor quality and decentralized character of these roadways severely hampered troop and supply movement.³⁰ The poor condition of these roads worsened due to their extensive use during the war.

b) Nature of Early Roads Era Traffic

Much of the colonial era traffic consisted of either foot travel or horseback. Wagons and stages for long distance travel were less common than boats and other shallow draft vessels. Wheeled traffic tended to be either passenger or light loads. Freight wagons, although available, were fairly uncommon due to costs associated with overland travel. Stagecoaches, emphasizing speed, and freight wagons, emphasizing capacity, became more common towards the end of the era. However, the design of wagon wheels helped to exacerbate the poor conditions of the roads, as the narrow wheels tended to rut up even the best of roads in a

short period of time. During this era, stage traffic increased its frequency from bi-weekly to almost daily scheduling.

c) Early Roads Era Road Technology

The early colonial concept of a road centered on the travelway, either planned or adopted, that could be used by the general public or a specific group. Colonial practice in New Jersey was to designate a route, surveyed out as a centerline. This centerline, following a specified direction for a set distance, comprised a single leg. Most roads consisted of a series of many such legs. Each road was thus legally described; and the description consisted of the basic centerline route and a specified width, measured in rods



The path of Old Cape Road among the trees of Belleplain State Forest, Cumberland County, 2002.

(1 rod = 16.5 feet). The actual travelway usually consisted of a much narrower course within the formal road. Winding between the two edges, the narrow course developed as travelers tended to shift to "better ground." Such travelways had to accommodate

²⁸Charles L. Dearing, *American Highway Policy* (Washington, DC: Brookings Institution, 1941): 32.

²⁹The National Road initially connected Cumberland, Maryland with Wheeling (currently West Virginia). Construction began in 1811, and the 113-mile road was complete to Wheeling in 1818. Construction of the National Road continued to Vandalia, Illinois. This final section was completed in 1852. Timothy Crumrin, "Road Through the Wilderness: The Making of the National Road," as found at www.connerprairie.org/historyonline/ntroad.html, previously published in the *Magazine of the Midwest Open-Air Museum Coordinating Council*, 1994; W. Stull Holt, *The Bureau of Public Roads: Its History, Activities, and Organization* (Baltimore, MD: Johns Hopkins Press, 1923), 3. Federal appropriations for road construction were deemed unconstitutional in 1804.

³⁰Lane, "The Turnpike Movement in New Jersey," *Proceedings of the New Jersey Historical Society* 54, no. 1 (January 1936): 36.

pedestrian, animal, and wheeled traffic, each with its own special design requirements. An important consideration in designating a historic route as a road is contemporary description, i.e., if a route was referred to as a road during this period, it probably was a road. Trails and paths are mentioned in early accounts but are never legally described.

Actual road construction was almost non-existent at the early part of this period, with the layout (a system of blazing and marking) being accomplished by the county commissioners, and locals being drafted to perform whatever construction was needed. The construction usually consisted of little more than felling of trees and cutting of underbrush to allow passage of a wagon. Tree stump removal would have been one of the more laborious efforts attempted. In many cases, one would suspect that the actual travelway would wind around such obstacles for years until the problem rotted away.

By the latter half of the eighteenth century, the increased use of wheeled vehicles spurred the improvement of trails into roads that were at least passable in good weather. Clearing routes through the East Coast's densely forested regions proved an arduous task. Widening trails required the removal of stumps, boulders, and other impediments from the roadway, which was then laboriously smoothed using hand-held rakes or horse-drawn scrapers.³¹

Road building technology during this period generally lagged behind contemporary practices in Europe. The National Road was an exception. The original construction specifications called for a 66-foot cleared right-of-way with a 20-foot-wide roadway covered with stone, earth, or gravel. It is not clear how closely these specifications were followed during its initial construction. The National Road soon incorporated the road building techniques of Scottish engineer John Macadam. His technique incorporated multiple layers of stone. The lowest layer consisted of a 12- to 18-inch base of larger stones. Upper layers used smaller stones and the top was mixed with soil and graded to increase drainage.³² This technique was not commonly followed in New Jersey during

this era. Lack of capital, manpower, and skill restricted most road construction efforts to little more than clearing away trees to form a trail that could be followed by, at most, a small wagon. In many cases, stump removal was only sporadically attempted. Roadbed preparation or improvement was not commonplace except for a few attempts to construct corduroy or log roads through local swamps. Anything other than a timber bridge, often constructed upon stone abutments or piers, was usually beyond the willingness of the individual counties or towns to construct. During the colonial era, roads were still very constrained by natural features, especially topography. Grade and drainage improvements in general did not occur, except in the rarest of instances. Roads tended to follow the valley floors, rather than cross over ridges, but the latter did occur. Roads, when they did cross elevations, tended to wind or crisscross excessively to control the steepness of the incline. Road cuts and fills were unusual. Improvements to roads during subsequent periods, such as the Internal Improvement Era, frequently consisted not only of roadbed reconstruction and widening, but also realignment, as local ability to manipulate the landscape increased.

d) Early Roads Era Administrative Innovation

The responsibility for establishment of new roads in early colonial governments shifted over the course of the first century of settlement in New Jersey. County governments were initially responsible, and they appointed commissioners to oversee the layout of public roads; a greater consensus among commissioners was needed for establishing major roads than for smaller roads (two rods wide or smaller). Later, two surveyors were appointed for each town or district, and they surveyed the road's location, often following property boundaries to limit impacts to adjacent property owners. The colonial assembly reserved authority to establish the alignment of "Kings Highways" (roads of four or six rods in width) to minimize the use of road alignments for political or other similar harm.

There were two major classes of exceptions to the general rule that roads were to be the responsibility of the individual counties:

³¹Donald C. Jackson, "Roads Most Traveled: Turnpikes in Southeastern Pennsylvania," in *Early American Technology: Making and Doing Things From the Colonial Era to 1850*, edited by Judith A. McGaw (Chapel Hill, NC: University of North Carolina Press, 1994): 203.

³²Timothy Crumrin, "Road Through the Wilderness: The Making of the National Road."

1) major roads that connected the more important colonial towns, and 2) roads that were especially difficult to build or maintain. Major connecting roadways often crossed county boundaries, requiring centralized planning by the colonial government. Specific legislation was passed to accommodate the colonial oversight and maintenance responsibilities for these roads. Examples of such roads are the Burlington-Salem Road authorized in 1681 and the Burlington-Perth Amboy Road (AKA "Lawries Road") authorized in 1683. The colonial assembly's involvement with those roads that were particularly difficult to build or maintain often included oversight and maintenance of routes that went over mountains, included bridges or stretches of road through swamps, or other difficult terrain. Several colonial era laws related specifically to the problems of "encroachment" of private structures into the ROW, particularly fences.

Actual construction and maintenance of roads was the responsibility of local overseers, which were appointed by the local Justice of the Peace. Two overseers were appointed for each town or district. Labor was conscripted from the local populace with an expected equalization among all males. Specific legislation was passed to direct overseers to keep account of who supplied less labor in any one year, and to first use those same people the following year. Funds for equipment and materials were to be taken from the general tax revenues. Much later, at the very end of this period, the practice of substituting road labor for all or part of real estate taxes began to be adopted.

In general, the philosophy adopted was that the cost of a road was to be borne by those who were to benefit by it. It was expected that a higher level of effort would be expended upon road construction if it came from the same group that would use it. The colonial assembly rarely addressed the question of specific roads. For example, in the ensuing 38 years between 1664 and the 1702 transfer of government, the colonial assemblies addressed legislation concerning roads only 10 times. During the later royal colonial period (1702-1776), the assembly addressed the issue of roads 19 times in 74 years, and only enacted important laws

concerning roads in 1760 and 1774. Bridges, on the other hand, became the subject of laws a total of 58 times during the same period.

e) Conclusion

Overall, the colonial era road system in New Jersey was set up by the government, either local or county, and constructed with minimal effort expended. Shortages of money, manpower, and equipment ensured that little actual construction was accomplished, except in the rarest of circumstances. For much of this period, the numerous waterways in the colony were the preferred route for the shipment of freight. Passenger traffic faced the choice of overland discomfort and a slightly shorter journey or a more comfortable, but lengthy, water route. The decision of the British army to move their troops by sea between New York and Philadelphia in 1777 may have been influenced by the road conditions in the colony. The slow improvement of the road system, especially across the waist of New Jersey between Philadelphia and New York, slowly shifted intercolony traffic patterns to the road system.

Construction and maintenance of the road system occurred primarily through local levy, while bridges were usually contracted out to specialists. Road surfaces were rarely prepared, and were usually of local soil. Some roads, especially those through swampy areas, did have some log or corduroy surface treatment. By the end of the eighteenth century, emphasis on speed in overland travel began to be seen, but the cost in time and effort meant that the movement of freight or heavy loads remained expensive, if not cost prohibitive.

At the end of this period, there began to be some pressure to develop alternate means of transportation to the ship born traffic that existed. The concept of public or group funding of transportation projects began to be considered.

Summary of Elements Influencing Roadway Development

- Waterways were the primary means of transportation in

the state.

- Roads were generally fragmentary in nature (i.e. farm to water source or farm to mill).
- Roads were a local, not state, concern.
- Those that would profit from the construction or improvement of a road bore the burden of the cost.
- Centralized planning of a road system was unnecessary.

3. Early Roads Era Significant Routes

a) Criteria for Significance

The Criteria for Significance established by the Study Team is based, and adapted, on National Register Criteria (see Chapter II). These criteria are intended to identify roadways significant from a statewide historical perspective and truly important to the overall development of the state. Criteria for significant roadways dating from the Early Roads Era are outlined below.

In applying Criterion A, a roadway having one or more of the following attributes may have contributed to the broad patterns of New Jersey's history and, therefore, might be considered a roadway of statewide significance:

- Demonstrated regional or interregional importance; local importance does not connote significance
- Mandated by the colonial government
- Built primarily for military purposes
- Linked major population centers either within or just outside the state's borders, including colonial capitals

In applying Criterion B, a roadway associated with the lives of person(s) determined significant in the past might be considered a roadway of statewide significance if a clear, rather than casual, link can be established between the person(s) and the roadway (i.e. "George Washington traveled over this route" is not enough).

In applying Criterion C, a roadway that embodies a distinctive characteristic of a type, period, or method of construction, or that

represents a work of a master, might be considered a roadway of statewide significance if a) a roadway and its distinctive design features are evaluated within the context of its particular roadway era, or b) the work of the master designer is evaluated within the context of other work by that designer.

In applying Criterion D, a roadway that has yielded or may be likely to yield archaeological information important in prehistory or history might be considered a roadway of statewide significance if such a roadway represents an important type of roadway building technology that cannot be documented using existing documentary source material.

b) Significant Routes

Application of the significance criteria to roadways of the Early Roads Era yielded eight historically significant roadways:

- Old Dutch Road/Upper Road
- Lower Road
- Burlington-Salem Road
- Burlington-Perth Amboy Road/Lawrie's Road
- Cape May-Burlington Road/Old Cape Road
- Old York Road
- Philadelphia-Egg Harbor Road
- Burlington-Shrewsbury Road

All of these roadways satisfy the significance criteria in that they possess either regional or interregional importance. A number of these roads either linked major population or political centers, or were mandated by the colonial government. Therefore, all of the roads are considered significant under Criterion A. The roads linked the colonial capitals of Burlington (West Jersey) and Perth Amboy (East Jersey), as well as early settlements, such as Salem, Shrewsbury, and Cape May. A number of the roads traversed the central part of the state and ultimately connected Philadelphia with New York. No roads were identified that were built primarily for military purposes. Inland troop movements generally followed existing roads. Merely their use

by the military does not satisfy the established significance criteria.

These eight roads appear to have been the most important to the early development of New Jersey. Old Dutch Road, Lower Road, and Old York Road appear to be inherently significant as these roads remain identified with the early history of New Jersey settlement. The Burlington-Salem Road, Burlington-Perth Amboy Road, and Cape May-Burlington Road were mandated by the colonial government and, therefore, appear to be significant. The Philadelphia-Egg Harbor Road is considered significant because of its prominence as a trade route during the Revolutionary War. In addition, the Burlington-Shrewsbury Road appears significant because it connected the West Jersey capital with early settlements around Shrewsbury.

Other roads that were considered, but not found to be significant, include the Middletown-Piscataway Road, Cape May-Salem Road, Cape May Road north along the coast, and the Raritan Road. It was concluded that these roads, while often mentioned in the literature of early New Jersey or depicted on early maps, did not meet the significance criteria, either by not linking population centers or not being of regional or interregional importance.

The roadways of the start of the Early Roads Era were often trails, occasionally widened to accommodate wagons, and only experienced sporadic improvement starting in the mid-eighteenth century. The trails varied from a foot to two feet in width to permit the passage of a person on horseback or a packhorse. They were cleared of trees and other obstructions, but there was very little preparation with regard to roadbed. As settlement increased, and people and goods began to move about, some of the roadways were widened to accommodate carts and wagons.

The Old Dutch Road/Upper Road connects Trenton and Bergen/Elizabeth via Princeton, Kingston, New Brunswick, Piscataway, and Woodbridge; current roadways constituting this road include U.S. 206 and NJ Route 27.³³ This road is significant as the only road

in the colony/state prior to 1675; this road became the major connection between Philadelphia and New York during the colonial era. This road forded the Raritan at Inian's Ferry (present-day New Brunswick) and crossed into Pennsylvania at the falls of the Delaware (present-day Trenton). The road was used and noted by early travelers such as William Edmundson (1675), who got lost, and the Swedish traveler Kalm (1748), suggesting its early use and importance.³⁴

The Lower Road connects Burlington and New Brunswick via Cranbury; currently this route follows U.S. 130. This road was an early alternative to the Old Dutch Road/Upper Road and dates from the seventeenth century. The road branched off from the Old Dutch Road/Upper Road five or six miles south of Inian's Ferry (New Brunswick). It also connected the capital of West Jersey (Burlington) with Inian's Ferry. The road was promoted by the proprietors in the hope of drawing people and trade to the capital of West Jersey.

The Old York Road connects Lambertville and New York City via Mount Airy, Ringoes, Reaville, Somerville-Bound Brook, New Brunswick, Elizabeth, and Newark. Currently, the route follows portions of routes 179, 514, 567 and 28. It was established circa 1720, and served as a major connection between Philadelphia and New York City, via Lambertville. This was the most prominent colonial roadway in the Hunterdon County and Somerset County area.



Mt. Airy Village Road (original Old York Road) and Mt. Airy-Harbourton Road, Mt. Airy, Hunterdon County, 2002.

³³All information regarding the current path of historic roadways includes only *confirmed* portions of the route, and notes only those routes that are state and federal roads and county roads through the 500 series. Other county and local roads are excluded.

³⁴Lane, *From Indian Trail to Iron Horse*, 55, 99.

The Burlington-Salem Road connected Burlington and Salem via Ellisburg, Haddonfield, Chew’s Landing, Woodbury, Clarksboro, and Swedesboro. The route currently follows county Routes 561 and 551. It was mandated by the West Jersey Assembly in 1681 to connect the only towns in West Jersey at that time. Its primary goal was to connect the capital of West Jersey (Burlington) with the distant settlement of Salem.

The Burlington-Perth Amboy Road/Lawrie’s Road connects Burlington and Perth Amboy via Cranbury. It was mandated by the West Jersey Assembly in 1683. The road was sponsored by Deputy Governor Lawrie and envisioned as a link, via a ferry from Perth Amboy, with New York. Although it still exists today, it never became the highway it was supposed to, and is still classified as a rural country route along much of its length. The road currently corresponds to portions of the current county Routes 539 and 535.

The Burlington-Shrewsbury Road connects Burlington and Shrewsbury via Bordentown, Crosswicks, and Middletown. It was established in the 1680s, though not through mandate, and connected the West Jersey capital with early settlements around Shrewsbury, near the Atlantic coast in present-day Monmouth County. A portion of the route currently follows a segment of county Route 537.

The Cape May-Burlington Road/Old Cape Road connects Cape May and Burlington via Bridgeton. It was mandated by the West Jersey Assembly in 1697 and connected the village of Cape May with its distant capital. Segments of the route followed portions of present-day routes 49, 550, 41, and 537.

The Philadelphia-Egg Harbor Road connects Philadelphia and Somers Point via Camden, Berlin, and Blue Anchor. It was established circa 1720 and served as the principal connection between Camden and shore points. The road used various routes through the Pine Barrens with many being short-lived and mysterious. The road was favored as an overland trade route during the Revolutionary War

because privateers who could not access the main ports could unload goods along the unpopulated Jersey coast. One author defined the route as Coopers Ferry–Atmores Dam–Berlin–Blue Anchor–Somers Point.³⁵ Current roadways corresponding to this route are portions of county routes 559 and Alternate 559.

4. Early Roads Era Associated Resources

The following roadway elements would be expected to be found within the ROW; whereas, the roadside elements are located outside the right-of-way. Additional elements may be identified through further research or identified as being specific to an individual road.

Roadway Elements	bridges dams retaining walls milestones road surface (dirt, gravel, “corduroy”) adjacent drainage ditches culverts boat landing/dock driveway/driveway cut
Roadside Elements	hotels, inns, taverns residences farmhouses farm buildings cluster/cross road communities neighborhoods (urban locations) blacksmith shop wheelwright shop way stations stagecoach stops ferry houses warehouse (at ferry/road connection) mills mill ponds farm fields ferry landings fencing field walls water troughs hitching posts

³⁵George R. Prowell, *History of Camden County, New Jersey* (Philadelphia, PA: L. J. Richards & Co., 1886): 341.

5. Early Roads Era Integrity Thresholds

a) Location

Integrity of location means that a roadway remains in its original location for its period of significance. This aspect of integrity relates directly to the roadway's position or placement. Properties that have been moved (realigned) are generally not considered eligible for listing in the National Register, unless the roadway was realigned during its period of significance. During this era, topography, natural resources, and property lines dictated roadway locations, often resulting in indirect, winding roadways. Some roads from this era may have evolved from portions of pre-existing trails. Integrity of location is an important (High) quality for assessing a roadway's integrity for this era. (See Figure 1 to review all integrity thresholds.)

b) Design

Design integrity refers to the retention of those characteristics that were purposely included in the planning and construction of the roadway. However, most roads from the early years of this era were not the result of conscious design and may have simply followed local topography, property lines, and "line of sight" routes to link nearby destinations, and eventually connect to cover longer distances. Any overlap with Native American paths was likely limited. Designed roads became more established in the late-eighteenth-century with the introduction of wheeled vehicles. Design features common to roadways from this later part of the era include average roadway widths between 16 and 20 feet, packed earth surfaces, and steep grades. Design characteristics common to corduroy roads include average roadway widths between 10 and 12 feet, and a surface of logs and packed earth. Due to the rudimentary nature of the roads of this era, integrity of design is generally not critical (Medium) for a roadway to retain integrity.

c) Materials

Integrity of materials refers to the physical elements that were combined or deposited during a particular period of time and in a



A typical example of a roadside feature: Fleming's Tavern, Flemington, Hunterdon County, date unknown.

particular pattern or configuration to form the roadway. Materials common to roadways of this era include road surfacing of packed earth, gravel, wood blocks, and logs (corduroy); stone bridges, milestones and retaining walls. Highway surfacing, especially from this era, is inherently fragile and routinely replaced, and is not required (Low) for a roadway to have integrity.

d) Workmanship

Integrity of workmanship refers to the physical evidence of the labor, skill, and craft expressed within the roadway or its component parts. Common examples of workmanship associated with roadways during this era include corduroy roads and stone elements, such as bridges and milestones. Integrity of workmanship is not critical (Low) for a roadway to retain integrity, but its presence strengthens the roadway's overall integrity.

e) Setting

Integrity of setting refers to the physical environment of the roadway. The setting(s) of the roadway or a segment of the roadway should reflect the same general character, with minimal intrusions, present during the roadway's period of significance (Medium). A majority of associated roadside elements dating from the period of significance should be present and retain integrity. Settings associated with roadways from this era were generally rural with some crossroad communities.

f) Feeling

Integrity of feeling is closely related to integrity of setting and refers to the expression of an aesthetic or historic sense of a particular period of time. Integrity of feeling usually results from the presence of physical features that convey the property’s historic character. Retention of feeling alone is not sufficient to support eligibility of a property for the National Register (Medium).

g) Association

Integrity of association is the direct link between an important historic event or person and the historic property. A roadway should contain the physical features and associated elements that convey the property’s historic character. These features should date from the roadway’s period of significance (High). Retention of association alone is not sufficient to support eligibility of a property for the National Register.

6. Early Roads Era Timeline

NATIONALLY	NEW JERSEY	
Raleigh's expedition established Roanoke Colony in what is now North Carolina	1585	
Virginia Dare was the first European born in North America at the Roanoke Colony	1587	
Jamestown established by Captain John Smith	1607	
	1609	Henry Hudson on Half Moon sailed up the Hudson
Mayflower landed at Plymouth Rock	1620	
The Ordinance of Virginia authorized the convening of the first legislative assembly in America	1621	
Dutch built Fort Orange in Albany, New York	1624	
Dutch established New Amsterdam on Manhattan Island	1625	
Peter Minuit bought Manhattan Island from the Indians	1626	
	1638	New Sweden settled by Peter Minuit along Delaware River
	1629	First Dutch land grant for west bank of Hudson River (Jersey City)
	1644	Dutch surrendered New Netherlands to England
	1647	Peter Stuyvesant became Director General of New Netherlands

NATIONALLY

NEW JERSEY

	1655	Dutch forced Swedes to give up forts in southern New Jersey
Filippo di Chiese built first long distance coach in Berlin, Germany	1660	
	1664	English consolidated rule over New Jersey
	1673	First Public Roads Act in New Jersey
	1676	Second Public Roads Act in New Jersey
	1681	Burlington-Salem Road authorized
William Penn founded Philadelphia	1682	Third Public Roads Act in New Jersey
	1683	Burlington-Perth Amboy ("Lawries" Road) authorized
First steam engine patented by Thomas Savery in England	1698	
	1702	East and West proprietorships end and New Jersey became a royal colony under a common governor with New York
Guillame Delisle drew first accurate map of Europe	1725	
	1738	New Jersey became a separate royal colony with its own governor – Lewis Morris
France opened Engineer School of Bridges and Highways	1747	
Pennsylvania's Conestoga wagon introduced by Dutch settlers	1760	
Three tiered road marking invented by Pierre Tresaguet in France	1764	
Steam engine condenser patented by James Watt	1769	
Declaration of Independence signed First commercial steam engine produced by James Watt	1776	

NATIONALLY	1777	NEW JERSEY
World's first iron bridge built in Shropshire, England	1781	State seal established
Inventor John Fitch developed the steamboat and operated a service in the Delaware Valley	1785	
First steam boat launched on the Delaware River by John Fitch	1787	
Federal Constitution ratified; took effect 1789	1787-1789	
Federal government established	1789	
First horse-drawn railroad in England	1795	

7. Research Questions

- Further explore the relationship between Native American trails/routes/paths and early colonial roads.
- Identify routes significant for an association with Revolutionary War troop movements and supply routes.

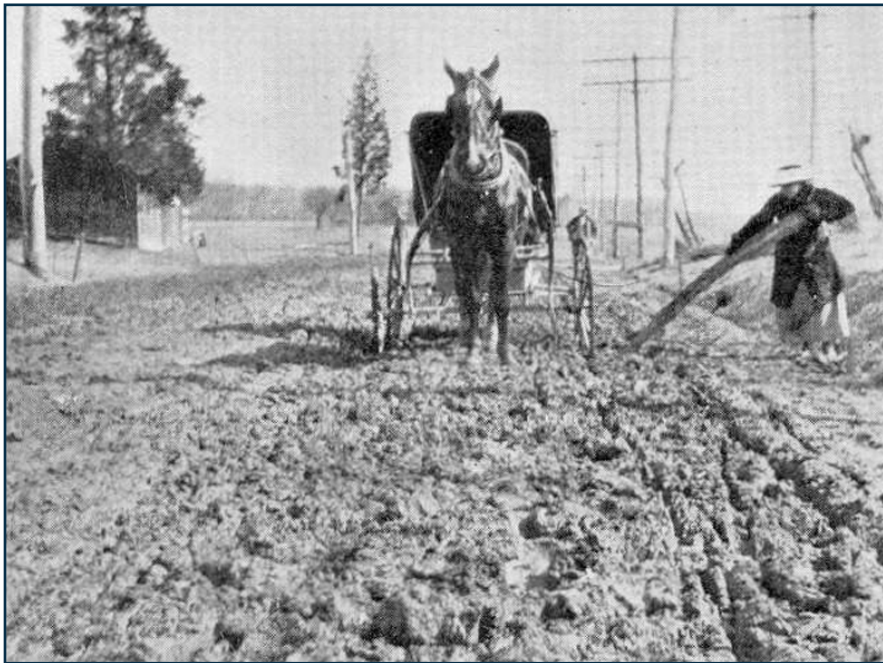
B. INTERNAL IMPROVEMENTS ERA (CA. 1790 - CA. 1889)

1. Introduction

Overland travel at the end of the eighteenth century and throughout much of the nineteenth century was considerably improved over the colonial era, but remained rigorous and unreliable nonetheless. The building of roads in the United States in the late eighteenth century and the beginning of the nineteenth century has been commonly referred to as the Turnpike Era. It was initiated by the construction of the Philadelphia and Lancaster Turnpike in 1792.³⁶ This historic period of building toll roads has generated considerable attention and research, but the focus is too narrow for a comprehensive assessment of road building in New Jersey. Generally, private companies or state and local governments financed most of the roads built during this era. Efforts by the fledgling U.S. government to finance the construction of roads were largely unsuccessful. The National Road from Cumberland, Maryland to present day Wheeling, West Virginia was built with federal funds; however, subsequent proposals were defeated.³⁷

The attempts by the federal government to build roads were ineffective primarily because of the challenge to federal authority; suggested Constitutional amendments to address the issue were never passed, leaving road building and improvements to the states.³⁸ In turn, many states found it more practical to grant charters to private companies who constructed straight roads in return for the right to collect tolls – the toll being used, among other things, to provide dividends to investors. Consequently, the primary roads of the state were commonly those of the well-financed turnpike corporations.

New Jersey's first turnpike company, the New Jersey Turnpike Company, was chartered in 1795. New Jersey's first turnpike – the Morris Turnpike – was not built, however, until 1801. Governor Mahlon Dickerson's annual address to the state in 1816 announced to New Jerseyans that, "The rapid improvements in artificial roads...exceed the most original expectations. Those improvements have greatly facilitated the means of conveying the produce of the country to market and have added much to the value of landed estates." Dickerson concluded that further state action was not needed and that road building should be left "to the enterprise of our wealthy citizens" and made it clear that it should not be the responsibility of the state.³⁹



Yardville-Newtown-Windsor Road, Mercer County, date unknown.

At the same time, public roads continued to be financed and built under the aegis of the local and county road overseers (not unlike during the colonial era). Private authority, however, continued to affect public roads, which were the responsibility of the local

³⁶H. H. Kelly, US Bureau of Public Roads, "Toll Roads: A Study of the History and Present Status of Toll Roads in the US and Other Countries," *Public Roads* 12 (March 1931): 1-2.

³⁷The National Road initially connected Cumberland, Maryland with Wheeling (currently West Virginia). Construction began in 1811, and the 113-mile road was complete to Wheeling in 1818. Construction of the National Road continued to Vandalia, Illinois. This final section was completed in 1852.

³⁸Lane, *From Indian Trail to Iron Horse*, 145. The U.S. Supreme court case *Wilson v. Shaw*, decided in 1907, eventually affirmed the federal government's ability to fund road projects. *Wilson v. Shaw*, 204 U.S. 24, 27 S. Ct. 233, (1907).

³⁹"Message of the Governor," *Votes and Proceedings of the Fourteenth General Assembly of the State of New Jersey* (Newark: John Tuttle & Company, 1816): 90.

road overseers, in that their alignments were often determined by well-to-do, influential property owners. The county surveyors of highways continued to record public roads and coordinate building efforts.

By 1855, another New Jersey governor – Rodman M. Price – openly acknowledged “that our system of making our county and township roads wants reforming.”⁴⁰ This statement was made almost a decade after the passage of the New Jersey Road Act of 1846. Although this law appears to have established some uniformity on the construction of local roads built in New Jersey and who was responsible for them, it was inadequate and did not provide state funds for public roads.

Financing of public roads through a state road tax did not gain popular support until after the Civil War. Not until the passage of the New Jersey State-Aid Highway Act of 1891 did the state provide funding for New Jersey’s public roads. In lieu of state support, the financing of roads stemmed from private company investment (turnpike corporations), local revenue (public/township roads), and private investment (property access roads).

By 1890, state aid was provided to assist counties in eliminating toll roads, effectively ending the Internal Improvements Era. New Jersey’s transportation systems through the nineteenth century centered on waterways and canals, and later, railroads as the primary means of transporting goods. This was driven by the continued economic advantages of water and rail transportation over road travel. Roadway travel continued to function as a means of accessing rail or water transportation systems during this era. While roads served a particular function, these other modes of travel were much more significant within this and the prior era.

2. Internal Improvements Era Historic Context

a) Background

Many of the turnpike/straight roads built during this era were short local roads, that fed into a transportation center or hub.

These hubs were united by “trunk lines” (i.e. existing modes of transportation) to distribution points, which in turn supplied major population centers. This system enabled the more efficient transport of goods from their origin to a major distribution point. Farmers, merchants, store keepers, and, to some extent, stage owners/drivers invested in these local roads because improved roads increased their business profits by allowing the goods and people to get to their destination points faster and at less cost overall. Once the goods got to the distribution point, they went by water because it still had the cheapest freight cost. Though a toll was charged, use of these improved local roads reduced the overall cost for the movement of bulk goods. Straight roads generated new, non-agricultural employment opportunities, such as those derived from overland freighting, road construction (now dedicated construction crews rather than local inhabitants built and repaired turnpike roads), and operation (toll collectors were hired to collect the established users fee).⁴¹

The Morris Turnpike, New Jersey’s first completed turnpike, was chartered in 1801. By that date, New York had thirteen turnpikes, and Pennsylvania had eight.⁴² One of the reasons that Pennsylvania and New York leaped to the front of the turnpike movement was each state’s interest in securing a reliable route west. New Jersey’s geographical confinement removed the state from this competition. According to Durrenberger, “probably the most important cause leading to the construction of turnpikes in New Jersey was the desire to facilitate communications between New York and Philadelphia, then the nation’s principal centers of population and commerce.”⁴³ In addition, New York investors put considerable capital into the construction of turnpikes in northwestern New Jersey, where a great deal of freight was hauled between New York and the Upper Delaware Valley.⁴⁴ These were among the longest turnpike routes in the state.

The Morris Turnpike was built in three sections: Elizabeth to Morristown, Morristown to Stanhope, and Stanhope to Newton.⁴⁵ Other major turnpikes that opened during this period include the Union Turnpike (1804) from Morristown to Milford; the Washington

⁴⁰*Appendix to the Senate Journal for 1855*, “Legislative Pamphlets,” Governor’s Message (Rahway, NJ: Joseph Shann, 1855): 23.

⁴¹*Ibid.*, 156 and 168.

⁴²*Ibid.*, 144.

⁴³Durrenberger, *Turnpikes*, 71.

⁴⁴Lane, *From Indian Trail to Iron Horse*, 157.

⁴⁵Lane, “The Turnpike Movement in New Jersey,” 24.

Turnpike (1806) from Morristown to Phillipsburg; the New Jersey Turnpike (1806) from New Brunswick to Phillipsburg; and the Paterson & Hamburg Turnpike (1806) from Passaic to Sussex.⁴⁶ Two major turnpike routes connected Philadelphia and New York during the first quarter of the nineteenth century: the Trenton & New Brunswick Straight Line Turnpike and the Bordentown & South Amboy Turnpike. In the three decades after chartering the Morris Turnpike, the New Jersey legislature incorporated 51 turnpike companies. Only half that number, however, actually succeeded in constructing toll roads. By 1830, 550 miles of improved toll roads crossed the state; but only one route, a toll road in Burlington County, extended into southern New Jersey.⁴⁷ A number of factors may have contributed to the lack of activity in southern New Jersey,



Morris Turnpike, Lopatcong Township, Warren County, before improvements, date unknown.



Morris Turnpike, Lopatcong Township, Warren County, after improvements, date unknown.

including a smaller population base and poor soil conditions (soft and sandy) for constructing and maintaining turnpikes. Turnpike activity increased in southern New Jersey later in the century but never attained the numbers experienced further north.

New Jersey legislation fostered the creation of turnpike companies. Individual charters were created for each turnpike company. These usually authorized a long operating life (between 50 and 99 years), set high maximum tolls, and often allowed companies to actually take over and improve existing public roads as part of the toll road.⁴⁸ After the governor approved a charter, three commissioners laid out the route and created an accurate map of the survey.⁴⁹ The state required turnpike corporations to keep their roads in good repair, but in reality “inspection machinery was cumbersome in its organization and ineffective in its operation. Cognizance of defects was taken only upon complaint of some aggrieved person, moreover if the committee of inspection returned a report in favor of the company, the fees paid to the inspectors were charged against the complainant.”⁵⁰

Municipalities were generally supportive of turnpike companies because they relieved local overseers from their responsibility for maintaining local roads.⁵¹ Most public roads were very poorly maintained. Residents elected road supervisors at town meetings, and almost none had experience or knowledge of road building techniques. Most were simply local farmers, as were the laborers executing the improvements. State labor legislation compelled residents to put in workdays on road maintenance and construction or pay a road tax fine. Very often these workdays turned into social events, and few improvements were actually realized.⁵² The supervisor’s job paid only a token wage, so there was little incentive for initiative, except for the fact that supervisors had the power to direct improvement efforts towards roads in which they had a personal interest during their term in office.⁵³

The majority of New Jersey’s turnpikes were short-line routes with small capitalization. The state supported turnpike construction through the generosity of its charters, but it avoided actually

⁴⁶Lane, From *Indian Trail to Iron Horse*, 147.

⁴⁷*Ibid.*, 151.

⁴⁸*Ibid.*, 152.

⁴⁹Durrenberger, *Turnpikes*, 88.

⁵⁰*Ibid.*, 93.

⁵¹*Ibid.*, 79.

subsidizing their construction, as was done in Pennsylvania and Virginia.⁵⁴ The success of the Pennsylvania and Lancaster Turnpike encouraged investors in surrounding states to undertake similar projects. Turnpikes, however, ordinarily did not prove highly profitable for investors. According to Klein, the few successful turnpikes possessed significant advantages including, “low cost in land acquisition, good condition of the pre-existing road bed, minimal bridge building, and substantial traffic volume.”⁵⁵ Once constructed, toll companies’ charters often imposed restrictions that made it difficult to increase revenues. These restrictions included granting concessions to local travelers, limiting the number and position of tollgates, and putting ceilings on toll charges.⁵⁶ The use of “shun-pikes,” free parallel routes that circumvented tollgates, was widespread because the companies could not legally increase their number of gates or reposition them.⁵⁷

Even unprofitable routes did, however, provide important indirect benefits to the communities through which they passed by raising farm values and lowering transportation costs for local manufacturers and farmers. Daniel B. Klein hypothesizes that most investors realized this fact but were still willing to purchase stock to gain the benefits of improved roads, “Since unprofitability was usually foreseen, stock subscription – necessary to construct the road – was essentially a means of indirectly paying for road benefits.”⁵⁸ Those who stood to benefit from improved roads in the long term were not disturbed by the possibility of absorbing a short-term loss on stock investments. New York investors supported New Jersey’s lengthy northern turnpikes to draw Upper Delaware Valley trade away from Philadelphia. Whereas farmers, merchants, and stage drivers supported shorter, local routes in anticipation of population increases and commercial development.⁵⁹

Following the financial panic after the War of 1812, investments continued to be made in canals and railroads. Both canals and railroads carried freight more cheaply than any means before.⁶⁰ Passengers adopted the train coach quickly; it was a time saver. These transportation modes emanated from many of the previously established transportation hubs, and thus provided people with a

choice of travel – stage, train, steamer, and, in some cases, canal boat. The railroads would not service every city; many former hubs lost regional status and only retained local importance. The Philadelphia to New York corridor continued to be a powerful influence on all of New Jersey’s transportation modes having been linked by road, canal, railroad, and steamer.

The period between 1830 and 1840 was the high point for toll road operations. After that date, revenues declined and companies found it difficult to maintain and operate their routes while still paying dividends. Upon the opening of the Morris Canal in 1831 and the Delaware & Raritan Canal in 1834, major turnpikes, enjoying independence as trunk lines, were relegated to the position of



Former New Jersey Turnpike (now Route 173), looking west at West Portal, Hunterdon County, circa 2000.



Toll gate and toll house on Haddon Avenue below Euclid Avenue on the Haddonfield and Camden Turnpike, Camden, date unknown.

⁵²Ringwalt, *Development of Transportation in the United States*, 26.

⁵³ibid.

⁵⁴Lane, *From Indian Trail to Iron Horse*, 155; Ringwalt, *Development of Transportation Systems in the United States*, 29.

⁵⁵Daniel B. Klein, “The Voluntary Provision of Public Goods? The Turnpike Companies of Early America,” *Economic Inquiry* 28 (October 1990): 788-812, 794.

⁵⁶ibid., 791.

⁵⁷Ringwalt, *Development of Transportation Systems in the United States*, 32.

⁵⁸Klein, *Economic Inquiry*, 789.

⁵⁹Lane, *From Indian Trail to Iron Horse*, 156.

⁶⁰ibid., 161-162.



Delaware and Raritan Canal, Trenton, 1955.

feeder routes. The construction of the Camden & Amboy Railroad in 1834 rendered another blow to the turnpike era. Lane noted that “almost as soon as train service was established, stage companies ceased operating between New York and Philadelphia, and those turnpikes which paralleled the new lines lost their main source of revenue.”⁶¹ Turnpikes that had managed to survive competition from canals by shifting from freight transportation to passenger service rapidly succumbed to the railroad industry.⁶² In addition, the financial panic of 1837 bankrupted many toll roads, which then reverted to public control.⁶³ Between 1829 and 1849, the state of New Jersey chartered only five new turnpike companies.⁶⁴

Investing in straight roads was a gamble. Many speculated on turnpikes that were never completed due to depletion of funds or, as was the case in northern New Jersey, never carried the anticipated traffic.⁶⁵ Although heavily traveled, most turnpikes did not amass enough money for paying both dividends and maintaining the infrastructure.⁶⁶ Many converted to public roads: the Parsippany and Rockaway Turnpike being the earliest conversion (1822).⁶⁷ In southern New Jersey, turnpikes were present but the locals’ continued reliance on the free rivers and creeks for access to the

transportation hubs or to ports did little to contribute to the roads’ financial success. In the long run, poor financial management contributed to the lack of monetary success for most turnpike companies.

The development of transportation routes in southern New Jersey lagged behind northern and central New Jersey by about 50 years; however, once underway, the events in southern New Jersey mimicked those of northern and central New Jersey. As the interior of southern New Jersey opened, short turnpikes fed into towns, transforming those towns into hubs that connected to established hubs, which, in turn, connected to the ports. These very local turnpikes were successful, being easy to build and maintain.

But just as had happened in central and northern New Jersey, railroads, albeit short lines, came in and competed for the trade running on the turnpikes.

During the second half of the nineteenth century, conditions were even more unfavorable for investors in turnpike companies. Most found themselves saddled with worthless stocks and an obligation to maintain routes that had been previously established.⁶⁸ Quickly, many state legislatures passed acts providing these individuals with a way out of this situation. New Jersey modeled their legislation after New York’s, which provided that if two-thirds of the stockholders filed a declaration to abandon a route, the property would then revert to public control.⁶⁹ The legislature also passed an act authorizing counties to purchase toll roads and bridges on behalf of towns and create additional public routes. The New Jersey legislature developed a state aid plan in 1897 to assist counties in their efforts to eliminate the state’s few remaining toll roads. The state agreed to pay one-third of the purchase price of a toll road, the remainder being paid for by adjacent landowners (10%) and the county (56.6%). Still, many of these turnpikes persisted into the twentieth century: in 1920 an act was passed allowing acquisition by the state of specified toll roads and bridges. These facilities, as expected due to the aforementioned lag time, were

⁶¹Ibid., 162.

⁶²Taylor, *The Transportation Revolution 1815-1860*, Vol. 4, 155.

⁶³Harmer E. Davis, Ralph A. Moyer, Norman Kennedy, and Howard S. Lapin, *Toll Road Developments and Their Significance in the Provision of Expressways* (Berkeley, CA: Institute of Transportation and Traffic Engineering, University of California, 1953): 7.

⁶⁴Lane, *From Indian Trail to Iron Horse*, 152.

⁶⁵Ibid., 161

⁶⁶Ibid.

⁶⁷Ibid.

⁶⁸Klein, “The Voluntary Provision of Public Goods?,” 792.

⁶⁹Durrenberger, *Turnpikes*, 157.

located in southern New Jersey. New Jersey's last turnpike of this era was converted to public use in 1921.⁷⁰

b) Nature of Internal Improvements Era Traffic

There was continuity in the major destination points for the roadways in the state during this era; no new major destination points appeared. The Philadelphia-New York connection through New Jersey continued its importance for the transporting of goods and communication.⁷¹ This connection was improved upon by the linking of short turnpikes, created from existing roads; however, investors saw a need and a market for an entirely new alignment connecting Philadelphia-Trenton-New Brunswick-Elizabeth Town-Newark to New York (Trenton and New Brunswick Straight Line Turnpike). It by-passed Princeton and Kingston; in response, these towns became locally linked by a turnpike that met up with this major throughway. This Philadelphia to New York throughway bypassed Burlington, thus supplanting the earlier connection created in the colonial era to Perth Amboy and even Salem.

The turnpikes were one means (local rivers and creeks another) of getting goods and people to ports for shipment and passage. Water shipment was still cheaper and more comfortable than overland transport. During the War of 1812 and the British blockades of the coastal waters, overland transport was no longer a choice – it was a necessity. The merchant's shipping option included turnpikes and previously established yet unimproved roads. The turnpikes with prepared, or improved, surfaces were faster than the public roads. In lieu of watercraft, merchants from major East Coast cities sent "land vessels" (wagons) to New York, Philadelphia, and Baltimore via the convenient and direct New York to Philadelphia link. Years earlier, the New Jersey legislators recognized that improvements to the New York-Trenton-Philadelphia link⁷² would facilitate and encourage exchange with other states but did little to ameliorate the conditions.

Local farmers and merchants who had personal interest in good roads commonly provided the capital for many of these turnpikes. Transportation companies, such as stagecoach companies and

ferry companies, subsidized a number of the more substantial routes. With much to gain by westward connections, New York, in its quest to dominate western trade, invested in the early northern New Jersey east-west links. Conversely, New Jersey's government did not typically invest in roadway improvements during this period; the only example known at this time is the Newark Turnpike.⁷³

c) Technology

Roadway building technology in America was still fairly limited during this period, and this was reflected in the generally poor condition of roadways. Experimentation with construction techniques and materials was occurring predominantly in Europe. The ideal turnpike road was to be 16 to 28 feet wide (flanked by earthen shoulders) and gravel or stone surfaced with a convex roadbed of well-drained fill. Turnpike-era roads generally had 66 to 99 foot historic right-of-way widths. Many New Jersey roads from this era never used these specifications.⁷⁴

Wide shoulders flanking roadways, called summer roads, were often used for passing traffic or as spare lanes during road construction. Most roads were composed of graded earth and gravel with a few paved with crushed stone or other local materials. Paving materials commonly included fieldstones, gravel, logs, oyster shells, slag, and bog iron. Turnpike pavements were susceptible to damage by heavy storms because of their low quality.

Broken stone roads were the highest quality, but also the most expensive type of road to build during the nineteenth century. Systems for laying broken stone roads were developed by Pierre-Marie-Jérôme Trésaguet in 1775, Thomas Telford in 1805, and John Loudon McAdam (MacAdam) in 1815. The Macadam system, which used only small, angular pieces of stone, was the most popular method of stone road construction by the 1830s. The expense of stone road construction resulted from the difficult and time-consuming process of quarrying, breaking, placing, and replacing rocks in roadways. This process was partially mechanized between 1858 and 1904. Additionally, the local availability of stone limited road construction techniques. Generally roads were

⁷⁰Lane, "The Turnpike Movement in New Jersey," 51.

⁷¹Lane, *From Indian Trail to Iron Horse*, 90, 150, and 157.

⁷²*Ibid.*, 158.

⁷³*Ibid.*, 146, 155-156, and 162. The Newark Turnpike ran from Newark to Jersey City (then Powles, or Paulus, Hook) (p. 150).

⁷⁴*Ibid.*, 152-154.



A section of corduroy road logs remaining on Genoa Peak Road in Nevada. (HAER NEV.3-SPU.V.1B-13. National Park Service. Photography by Larry Kingsbury, 1995.)

constructed with local materials because of the expense and difficulty in transporting stone over long distance.

An example of the application of local materials towards road construction was the corduroy road. Most commonly used in swampy or marshy areas, corduroy roads often used trees cleared either from the new route or from adjacent areas. The trunks were usually split, but sometimes left whole and placed over a base of cleared brush. The logs were placed transversely, flat side down. Often mud or dirt was placed on top of the logs. While these roads provided a cartway in otherwise impassable areas, they tended to be rough and hazardous to the animals pulling the cart as well as to the cart itself.

By 1850 an interest had developed in resurrecting overland travel through the use of plank roads.⁷⁵ These roads differed from turnpikes only in the higher toll charged and the surface material – wood. Their surface was more resilient to the user but prone to decay. (The concept was not new having been used in Europe and, in New Jersey, by many individuals caring for their own access roads, for example, at saw mills and in the coastal marsh regions.)

Plank roads were introduced as an improvement to stone roads in the 1840s. They became important as feeder routes during the 1850s because of their smooth surfaces. Plank roads consisted of one or two tracks of wooden stringers embedded in earth and topped by planks. Many were laid atop existing roads, reducing the need for grading and excavation. The disadvantage of this road type is that the wood planks only lasted about three years. Turnpike companies tended to overestimate the life span of planks, and many companies went bankrupt when they could not afford to replace them as necessary.

In locales by-passed by railroads, plank-surfaced roads were an alternative to stone-surfaced turnpike roads. This technique first appeared in New York

State where it had been introduced from Canada. The New Jersey legislature passed 10 plank toll road charters in 1849.⁷⁶ The majority of plank roads were located in the southern part of the state (possibly because of the sandy conditions and lack of other local materials) and primarily served as feeder roads. Through traffic on plank roads was limited, and local freighting and rail line receipts accounted for the largest percentage of revenues.⁷⁷ The Paterson Plank Road in northern New Jersey was built because railroad companies failed to provide adequate service between Paterson and Jersey City.⁷⁸ The Monmouth County Plank Road Company constructed the state's longest plank road turnpike, which ran from Freehold to Keyport. A second road in central New Jersey, the Florence and Keyport plank turnpike, was planned to compete with another cross-state route – the Camden & Amboy Railroad – but was not completed. Eventually, networks of railroad lines filtered down into southern New Jersey, and maintenance and financial problems drove most plank road turnpikes out of business by the 1860s.⁷⁹

d) Internal Improvements Era Administrative Innovation

Prior to this era, the location of roadways usually minimized the impacts or inconveniences on the private property owner, but,

⁷⁵Ibid., 162-163.

⁷⁶Durrenberger, Turnpikes, 74.

⁷⁷Lane, From *Indian Trail to Iron Horse*, 167.

⁷⁸Ibid., 165.

⁷⁹Ibid.

at the same time, roads were conveniently routed through or by property owned by influential individuals.⁸⁰ During the Internal Improvements Era, however, the concept of “eminent domain” was formalized, enabling roads to be laid out along more direct routes and built along these routes regardless of ownership. Eminent domain provided a means for the state or a municipality to take private land, provided the owners were justly compensated, for the construction of roads “in the public good.”⁸¹ This, and the construction technique of cutting and filling, allowed for leveling of the topography.⁸² The charters allowed the companies to “take over and repair existing roads” and eliminate curves and lessen grades in their quest to construct a straight road. Except for the Trenton and New Brunswick Straight Line Turnpike, which was constructed on new alignment, the turnpike commonly reconstructed existing public roads. These roads, in passing from public to private domain, assured reduced competition to the company as well as granting them full maintenance responsibility.

e) Conclusion

The Internal Improvements Era in New Jersey began in the late eighteenth century with the charter of the first state turnpike company in 1795 and the construction of the Morris Turnpike in 1801. This signaled the beginning of state-endorsed road building which heretofore was quite primitive and locally controlled. Turnpike roads began their decline before the Civil War. By 1889, the turnpike component of this era had clearly ended. Although a few roads still operated as private turnpikes into the twentieth century, most turnpike companies had been disbanded by then, and New Jersey laws were subsequently enacted making these roads and others the government’s responsibility.

Summary of Elements Influencing Roadway Development

- Waterways, and later railroads, were still the primary means of transportation in the state.
- The primary focus of the state government was in investing in the construction of canals and railroads.

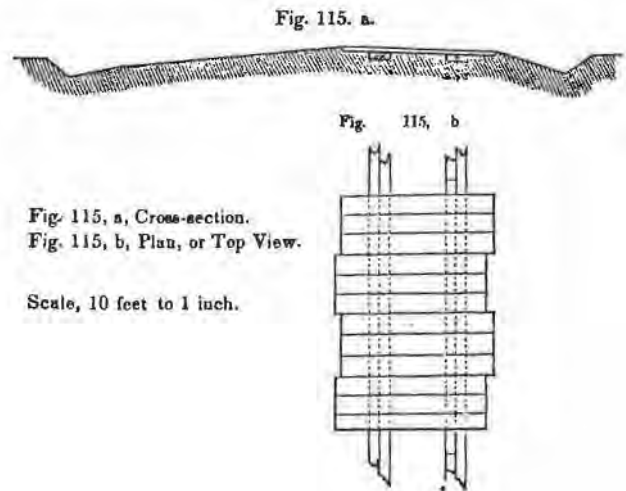


Fig. 115, a, Cross-section.
Fig. 115, b, Plan, or Top View.

Scale, 10 feet to 1 inch.

“Plan and Cross Section of a Plank Road,” as depicted in W. M. Gillespie’s *A Manual of the Principles and Practice of Road-Making*. (Source: Daniel B. Klein and John Majewski, “Plank Road Fever in Antebellum America: New York State Origins,” *Quarterly Journal of the New York State Historical Association* 75 (January 1994).)

- State government was still not ready to take financial responsibility for developing a roadway system.
 - a. Roads were still predominantly under the control of local and county government.
 - b. Following the examples of other states, New Jersey endorsed the creation of private enterprises known as turnpike companies.
 - (1) The impetus for roadway improvements was to reduce transportation costs for overland movement of goods.
 - (2) Turnpike companies funded and constructed new roadways or took over, improved, and maintained existing roadways, with the goal of providing an improved transportation system for the movement of bulk goods and people (for which they could charge a toll).
 - c. The majority of turnpikes were of local significance built to serve local needs and to reduce cost of transportation of bringing goods to market.

⁸⁰Lane, *From Indian Trail to Iron Horse*, 40; Jeffery M. Dorwart, *Cape May County New Jersey: The Making of an American Resort Community* (New Brunswick, NJ: Rutgers University Press, 1992): 35.

⁸¹Henry Campbell Black, M.A., *Black’s Law Dictionary*, Abridged Sixth Edition (St. Paul, MN: West Publishing Co., 1991): 362. State legislatures used the right of eminent domain to facilitate the construction of turnpikes, canals, and railroads by private companies. The legislature’s rationale was that by providing numerous transportation alternatives, the public was being served, and therefore, it fell within the public good. Eminent domain was not just employed for the construction of roads; the government used it for various other public purposes as well.

⁸²Lane, *From Indian Trail to Iron Horse*, 152 and 154.

3. Internal Improvements Era Significant Routes

a) Criteria for Significance

The established Criteria for Significance is based on National Register Criteria (see Chapter II), which have been adapted to suit the resource type and potential areas of significance. These criteria are intended to identify roadways significant from a statewide historical perspective and truly important to the overall development of the state. Criteria for significant roadways dating from the Internal Improvements Era are outlined below.

Criterion A, a roadway having one or more of the following attributes may have contributed to the broad patterns of New Jersey's history and, therefore, might be considered a roadway of statewide significance:

- Demonstrated regional or interregional importance; local importance does not connote significance
- Received investments from the state government
- Linked major population centers either within or just outside the state's borders

Criterion B, a roadway associated with the lives of person(s) determined significant in the past might be considered a roadway of statewide significance if a clear, rather than casual, link can be established between the person(s) and the roadway.

Criterion C, a roadway that embodies a distinctive characteristic of a type, period, or method of construction, or that represents a work of a master, might be considered a roadway of statewide significance if a) a roadway and its distinctive design features are evaluated within the context of its particular roadway era, or b) the work of the master designer is evaluated and deemed significant within the context of other work by that designer.

Note that this era saw the development of two particular types of roadway construction: the corduroy road and the plank road. However, a particular type of roadway technology does not confer

significance to the route itself. Where they may still exist, plank or corduroy roads may be considered individually eligible as an archaeological resource for the technological information that they may yield.

Criterion D, a roadway that has yielded or may be likely to yield archaeological information important in prehistory or history might be considered a roadway of statewide significance if such a roadway represents an important type of roadway building technology that cannot be documented using existing documentary source material.⁸³

b) Significant Routes

Application of the significance criteria to roadways of the Internal Improvements Era yielded eight historically significant roadways:

- New Jersey turnpikes established by New York investors
 - Morris Turnpike
 - Union Turnpike
 - Washington Turnpike
 - New Jersey Turnpike (original)
 - Paterson & Hamburg Turnpike
- New Jersey turnpikes facilitating communications between New York and Philadelphia
 - Trenton & New Brunswick Straight Line Turnpike
 - Bordentown & South Amboy Turnpike
- New Jersey turnpike with State government investment
 - Newark Turnpike

All of these roadways, except the Newark Turnpike, satisfy the significance criteria by having been interregional (more than of local significance) and a connection between major population centers. Therefore, all of the roads are considered significant under Criterion A. There were no roadways from this era in New Jersey, other than turnpikes, that satisfied the significance criteria. These significant turnpikes fall into two categories: turnpikes that extended between northeastern Pennsylvania and

⁸³An example of this type of resource is the c. 1849 Fayetteville Plank Road, foundation logs for which were uncovered during archaeological investigations prior to the construction of a street transit mall in downtown Fayetteville, North Carolina. Because the area was the Road's terminus, the plank road had been built to cover the entire downtown street. ("North Carolina Archaeology: Fayetteville Plank Road," <http://www.arch.dcr.state.nc.us/amonth/plankrd.htm>.) Similarly, parallel logs found about four feet below Fleet Street in Annapolis, Maryland may date to the late 17th century, consistent with a 1684 town survey. The location of this road offers clues to the historic layout and development of Annapolis. (Raymond McCaffrey, "Log Road Might Offer Path Back to 1680s," *The Washington Post*, Saturday, April 26, 2008.)



Map of the Internal Improvements Era's Significant Roads.

regional manufacturing cities such as Morristown and Paterson; and turnpikes that traversed the “waist” of New Jersey and served as a connection between Philadelphia and New York. The Newark Turnpike satisfies significance Criterion A as a turnpike invested in by the state government.

The turnpikes found significant in this study represent the most prominent roadways from this era. Prominence was generally afforded to those turnpikes that covered long distances or connected primary cities. These turnpikes generally date from the first decade of the nineteenth century and represent the first wave of turnpike construction. Not surprisingly, the significant turnpikes are located in northern and central New Jersey; southern New Jersey lagged behind the other regions in turnpike and road development. The general lack of development and dominance of water travel delayed the introduction of turnpikes to southern New Jersey until the late 1840s. Upon introduction, the southern turnpikes primarily handled local traffic and were quickly eclipsed by railroads. Therefore, these roads were concluded to not be of statewide significance. In addition, plank roads were found to be not significant because they were generally short-lived and their routes were primarily local.

The significance of so-called “short line” turnpikes was considered. “Short line” turnpikes served as links between tidewater ports and inland manufacturing towns, where the longer turnpikes originated and extended into the hinterlands. The relationship between the short lines and the significant longer turnpikes is important in determining the potential significance of the shorter lines. There was no clear indication that the shorter lines had a direct one-to-one relationship with the significant longer routes. In other words, there is no clear indication that the transport of goods continued from the significant longer turnpikes to ports via shortline turnpikes. Future studies may lead to more definitive answers as to their use and significance; but it was determined, at this time, that there was insufficient information to base a determination of statewide significance for “short line” turnpikes.

A number of New Jersey turnpikes were established by New York investors who sought improved connections with the farms and mines of the outlying rural areas of New Jersey and Pennsylvania. These turnpikes include the following:

- *Morris Turnpike* (Elizabeth-Springfield-Chatham-Morristown/Succasunna-Stanhope/Newton): Established in 1801 and known as the first turnpike in New Jersey, some segments follow current NJ Routes 10, 46, and 124.
- *Union Turnpike* (Morristown-Dover-Mt. Pleasant-Berkshire Valley-Hurdtown-Woodport-Sparta/extended through Culver’s Gap/Milford): Established in 1804 and currently includes portions of U.S. Routes 206 and 202 and NJ Routes 181 and 15).
- *Washington Turnpike* (Morristown-Mendham-Schooley’s-Mt. Phillipsburg): Established in 1806 and includes portions of current NJ routes 57, 24/510, and County Route 513.
- *New Jersey Turnpike* (original) (New Brunswick-Somerville White House-Clinton-Phillipsburg): Established in 1806 and currently runs via U.S. Route 22, NJ Routes 173 and 28, and County Routes 553 and 527).
- *Paterson & Hamburg Turnpike* (Passaic-Paterson-Pompton-Hamburg-Sussex): Established in 1806 and later extended west to Milford and east to the Hackensack River in 1815, portions follow current U.S. Route 202, NJ Route 23, and County Routes 504 and 515.

Although some of these turnpikes served the same general purpose, they were all considered to be prominent roadways during the era.

A second set of turnpikes facilitated communications between New York and Philadelphia: the *Trenton & New Brunswick Straight Line Turnpike* (Trenton-New Brunswick; current U.S. Route 1), established in 1804; and the *Bordentown & South Amboy Turnpike* (Bordentown-South Amboy; portion of current U.S. Route 130), established in 1816. The Trenton & New Brunswick, now essentially

the alignment of U.S. 1, has added significance for having been the only New Jersey turnpike that traversed new ground, as opposed to assuming the path of a prior road or trail.

Lastly, the *Newark Turnpike* (Newark-Jersey City) was established in 1804, linking Newark to Powles Hook (now Jersey City); a connection could be made here to New York via ferry. The Newark Turnpike is the sole example of a turnpike that received state government investment.

4. Internal Improvements Era Associated Resources

The following roadway elements would be expected to be found within the right-of-way; whereas, the roadside elements are located outside the right-of-way. Additional elements may be identified through further research.

Roadway Elements	bridges culverts dams retaining walls embankments milestones toll gates road signs road surface (dirt, gravel, plank, corduroy) raised road bed adjacent drainage ditches driveway/driveway cut
Roadside Elements	hotels, inns, taverns residences farmhouses farm buildings cluster/cross road communities neighborhoods (urban locations) blacksmith shop wheelwright shop way stations stagecoach stops ferry houses toll houses mills farm fields ferry landings mill ponds fencing field walls water troughs hitching posts

5. Internal Improvements Era Integrity Thresholds

a) Location

Integrity of location means that a roadway remains in its original location for its period of significance. This aspect of integrity relates directly to the roadway’s position or placement. Properties that have been moved (realigned) are generally not considered eligible for listing in the National Register unless the roadway was realigned during its period of significance. During this era, roadway stretches were generally indirect, although some routes were straightened and shortened by eliminating unnecessary windings. Integrity of location is an important quality (High) for assessing a roadway’s integrity from this era. (See Figure 1 for a summary of all integrity thresholds.)

b) Design

Design integrity refers to the retention of those characteristics that were purposely included in the planning and construction of the roadway. Basic features associated with roadways are alignment (cross section, plan, and profile) and pertinent associated roadway features. Design features common to roadways of this era include average roadway widths between 16 and 28 feet; grades between three and six degrees; raised road beds with adjacent drainage ditches; and packed earth or gravel surfaces. For a roadway to retain integrity of design, it should retain some of these characteristics. Integrity of design is generally not critical (Medium) for a roadway of this era to retain integrity.

c) Materials

Integrity of materials refers to the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form the roadway. Materials common to roadways of this era include road surfacing of packed earth, gravel, and wood planks, and less commonly oyster shells, slag, and bog iron; stone bridges, culverts, milestones, and retaining walls; and wooden elements such as toll gates and road signs. Highway surfacing is inherently fragile and routinely replaced and is not required for a roadway to have integrity (Low). However, the retention of original materials of associated roadway and roadside elements is important when assessing the integrity of roadways.

d) Workmanship

Integrity of workmanship refers to the physical evidence of the labor, skill, and craft expressed within the roadway or its component parts. Common examples of workmanship from this era include stone bridges and milestones. Integrity of workmanship is not critical (Low) for a roadway to retain integrity, but its presence strengthens the roadway’s overall integrity.

e) Setting

Integrity of setting refers to the physical environment of the roadway. The setting(s) of the roadway or a segment of the roadway should reflect the same general character, with minimal intrusions, present during the roadway’s period of significance (Medium). A majority of associated roadside elements dating from the period of significance should be present and retain integrity. Settings associated with roadways from this era were generally rural with some crossroad communities and town clusters.

f) Feeling

Integrity of feeling is closely related to integrity of setting and refers to the expression of an aesthetic or historic sense of a particular period of time. Integrity of feeling usually results from the presence of physical features that convey the property’s historic character. Retention of feeling alone is not sufficient to support eligibility of a property for the National Register (Medium).

g) Association

Integrity of association is the direct link between an important historic event or person and the historic property. A roadway should contain the physical features and associated elements that convey the property’s historic character (High). These features should date from the roadway’s period of significance. Retention of association alone is not sufficient to support eligibility of a property for the National Register.

6. Internal Improvements Era Timeline

NATIONALLY		NEW JERSEY
Pierre Tresaguet the “Father of Modern Road” developed a new kind of road – using broken stone	1775	
Inventor John Fitch developed the steamboat and operated a service in the Delaware Valley	1785	Steam boat operated between Philadelphia and Trenton
Federal Constitution ratified; took affect 1789	1787 -1789	
Federal government established	1789	New Jersey first state to ratify the Bill of Rights
Alexander Hamilton’s Report on Manufactures advocates advantages of a more industrialized nation; inadequate transportation facilities an obstacle	1791	Society for Useful Manufactures granted charter by New Jersey
Philadelphia and Lancaster Turnpike opened; settlement of the Northwest Territory (now the states of Ohio and Indiana) increased	1794	
	1795	First turnpike company chartered in New Jersey (New Jersey Turnpike Company)

NATIONALLY

NEW JERSEY

	1801	Morris Turnpike chartered, the New Jersey Turnpike to be built
Thomas Jefferson signed the Louisiana Purchase	1803	
	1804	Newark Turnpike, the only publicly funded turnpike constructed during this era in New Jersey
National Road/Cumberland Road connecting the Ohio Valley with eastern seaboard authorized by Congress	1806	
Robert Fulton's steamboat <i>Clermont</i> began New York-Albany route	1807	Colonel John Stevens of Hoboken launched a commercial steamboat system
Albert Gallatin, Secretary of the U.S. Treasury, presented to Congress an extensive plan for internal improvements, particularly highways and canals	1808	
War of 1812; British ransacked Washington, DC and blockaded coastal waters	1812-1814	
Erie Canal authorized; opened in 1825	1817	
National Road completed; portion of Lancaster Turnpike extended	1818	
U.S. Supreme Court, in <i>Gibbons v. Ogden</i> , established federal government jurisdiction over interstate commerce	1824	
Baltimore and Ohio Railroad construction began	1828	
	1830s-1840s	Peak period of Turnpike Era in New Jersey: by the 1830s, 51 turnpike companies were created, although only half built roads
	1831	Morris Canal opened
	1834	Delaware and Raritan Canal opened; Camden & Amboy Railroad service began
	1835	Morris and Essex Railroad incorporated
Economic Panic of 1837	1837	
	1839	First all-rail route between Camden and Jersey City began service

NATIONALLY		NEW JERSEY
Mexican War	1846-1848	
California Gold Rush	1849	Central Railroad of New Jersey (CNJ) created, combining Elizabeth & Somerville Railroad and Somerville & Easton Railroad Company; eventually, CNJ combined over 50 predecessor railroads
	1853	Delaware Lackawanna & Western Railroad incorporated, merging two small railroads
First transatlantic telegraph cable completed	1858	
Civil War	1861-1865	
National banking system established	1863	
Transcontinental railroad completed	1869	
	1870	First asphalt pavement laid in U.S. in Newark by Belgian chemist Edmund J. Desmedt. John A. Roebling & Sons Company founded – a nationally renowned bridge builder
	1871	Pennsylvania Railroad entered New Jersey with the long-term lease of the United New Jersey Railways and Canal Company properties
Panic of 1873; nationwide economic depression	1873	
Brooklyn Bridge opened; a product of Roebling Co.	1883	
	1891	New Jersey passed law to provide money to build and maintain roads throughout the state
	1897	New Jersey established a plan to eliminate existing toll roads in the state
	1921	New Jersey's last turnpike road of this era converted to public use (Camden County)

7. Research Questions

- During this era, what is occurring with the management, construction, and maintenance of other roads, i.e. public roads? [Suggestion: sample jurisdictions (a county and a local unit) from each region].
- Who is providing the money? Is there a connection between the public overseers and the private companies?

- Where are the railroad companies getting their money? Were the same investors and companies financing various modes of overland travel? [Justification: charters are being issued to the combined travel interests – Delaware & Jobstown Rail or McAdamized Road Co.]
- How was the crossing of rivers and creeks handled? Who determined crossing locations and specifications (bridge vs. ferry)? Who financed the facility?
- What were road overseers responsible for and did they all operate under a uniform set of procedures?
- How did “An Act Concerning Roads, 1846” and its amendments and permutations affect the role of the road overseer and the implementation of internal improvements?
- What is the history/chronology of the changing authority and the enabling of such authority (i.e. legislation during the Internal Improvements Era)?
- Were New Jersey’s public roads similar in material, construction, and quality of the presumably better financed turnpike roads?
- How did “An Act Concerning Roads, 1846” change the method in which roads were built in New Jersey? Were the subsequent amendments indicative of a flawed law or a work in progress?
- When did the idea of state funding for public roads first arise? Where did the opposition come from?
- What is the difference between the New Jersey Road Act versus the Constitution of 1844 in terms of transportation, and what are their current impact on roadways and roadway development?

C. GOOD ROADS ERA (CA. 1870 - CA. 1917)

1. Introduction

The Good Roads Era was characterized by several related technological and administrative innovations in overland transportation; the most tangible of which was the improvement of existing roads, especially their wearing surface and durability. The period, however, also saw the emergence of the professional highway engineer and consequent increased uniformity in construction techniques, the implementation of public funding for road building, and the use of roads for recreation. The need for these improvements responded to the increasing use of the automobile. The Duryea Brothers introduced the first automobile with a gasoline powered combustion engine in 1893, and by 1910 there were over 450,000 cars registered across the country.



County road between Byron and Frenchtown, Hunterdon County, to be taken over as part of Route 29, date unknown.

Several new and ongoing trends (or historical themes) contributed to these changes. Social reformers, recreational bicyclists, and farmers were all lobbying for road improvements, each for their own reasons. They were successful. In his 1896 annual report, the New Jersey Commissioner of Public Roads recognized the following beneficial impacts of improved roads: “Good Roads – Decreased taxation; Decrease living expenses; Increase property

values; Increase farmer’s incomes; Increase railroad business; Promote prosperity; Promote Civilization.”⁸⁴

The social reformers, most of whom adhered to the tenets of the Progressive Movement, promoted better roads as an end to the numbing isolation of rural life, and sought better access for rural dwellers to a variety of social opportunities available in towns and cities. Other means to achieve this goal included Rural Free Delivery and reliable access to schools. Reformers also pursued better urban living conditions through improved street sanitation, which translated into paved streets for easier cleaning. Finally, the reformers believed that exposure to aesthetics and nature was beneficial. This belief was expressed in the City Beautiful Movement and its associated urban parks and monumental bridges, as well as in better roads, which lead outward from urban centers and allowed the city dwellers to “get out into the country” where they could enjoy exercise, fresh air, and sunshine with all their resultant benefits. Getting out of the city for recreation often meant travel by automobile, an increasingly popular form of transportation and recreation in itself. For all three goals, Progressive reformers advocated that decisions affecting road improvement be made by trained professionals according to scientific methods.

The farmers’ interest in better road transportation was partly economic, as the quality of local roads directly affected their standard of living, but also social because road travel was necessary for virtually all their off-farm interactions. Midway through the Good Roads Era, thanks to the introduction of the motor truck circa 1904, the farmers’ interest in good roads expanded to include economic motivations. Farmers developed a strong penchant for using trucks for hauling produce. Even farmers who could not afford to purchase their own truck used delivery services that operated at cheaper rates than railroad freight fees. A chief benefit

⁸⁴New Jersey Commissioner of Public Roads, *Third Annual Report of the Commissioner of Public Roads* (Trenton, NJ: MacCrellish and Quigley, 1896): 9. Shifting control and the financial burden from local governments to the state reduced the local tax burden for roadway improvements.

trucking offered farmers was the elimination of early morning trips to the depot, as transportation came right to their door.

That bicycle enthusiasts favored good hard-surfaced roads is self-evident. As the number of cyclists grew, the clamor for better roads increased, and, not coincidentally, road use expanded to include recreational pursuits rather than strictly economic transportation.

The result of these trends or themes is that by the time the United States entered World War I, its streets and roads were being rebuilt, often under the direction of a trained professional, using carefully selected materials and standardized methods of application, all paid for using funds largely provided by the counties and state (with only limited federal involvement).

2. Good Roads Era Historic Context

a) Background

At the advent of the Good Roads Era, only a small number of turnpikes remained in operation. Some routes became public after the Panic of 1837 bankrupted many New Jersey turnpike companies. Others returned to the public domain in the 1860s after the collapse of the plank road boom. “In 1870, only a handful of turnpikes remained, and most of these no longer operated on major through routes, but on short sections near cities and towns.”⁸⁵ New Jersey congressmen spent considerable time in 1896 debating a proposal requiring counties to purchase remaining toll roads and maintain them as free roads if two-thirds of the abutting property owners signed a petition. Residents along these routes resented having to pay both tolls and local taxes to support public road construction. At that time, Camden County still retained 40 miles of toll roads, the most of any county in the state.⁸⁶ By 1902, only three counties possessed active toll roads: Atlantic, Burlington, and Camden.⁸⁷

As the nineteenth century progressed, no one anticipated an entire transportation system based on cars and roads. Railroad

remained king. “The railroads’ impact on the everyday patterns of life in New Jersey was all encompassing. Tracks extended into every important city, and small towns like Bridgeton in Cumberland County and Somerville in Somerset County grew and prospered. More than any other factor, the rail lines stimulated the renowned industrial development of the state. The lines provided economical and efficient movement of raw materials and finished products, and the number of lines in the state offered ready access to the markets to the east and west as well as access to the major ports of New York and Philadelphia.”⁸⁸ The seeds of change, however, were being sown as the twentieth century dawned.

b) Nature of Good Roads Era Traffic

Patterns of road use changed significantly during this period. Roads were used recreationally for the first time due, in large part, to the popularity of the bicycle and the increased leisure



Proposed park for tourist camps between John Fitch Way and Assunpink Creek, Trenton, date unknown. (Courtesy of the University of Michigan, Transportation History Collection, Special Collections Library, Lincoln Highway Digital Image Collection.)

time to enjoy it. Social reformers were able to publicize the plight of farmers long isolated by the muddy quagmires that were rural roads, the condition of which often prevented participation in basic social interactions such as church and school attendance. Of course the impact of the automobile and commercial trucking cannot be underestimated. Additionally, the pressures exerted on

⁸⁵A.G. Lichtenstein & Associates, Inc., “The New Jersey Historic Bridge Survey,” 30. Prepared for the New Jersey Department of Transportation, Bureau of Environmental Analysis and the Federal Highway Administration, NJ Division, 1994.

⁸⁶New Jersey Commissioner of Public Roads, *Second Annual Report of the Commissioner of Public Roads* (Trenton, NJ: MacCrellish and Quigley, 1896): 18.

⁸⁷New Jersey Commissioner of Public Roads, *The Ninth Annual Report of the Commissioner of Public Roads* (Trenton, NJ: John L. Murphy Publishing, 1902): 69.

⁸⁸Lichtenstein, 35.

New Jersey's road system by the mobilization effort associated with World War I cannot be overlooked.

For the first time in history, roads became appreciated for their recreational value, both because they could deliver people to recreational destinations and for their own intrinsic recreational value. This change is largely attributable to the introduction of labor laws, which created leisure time for the working classes for the first time, as well as the introduction of the bicycle and the introduction of the automobile (both are discussed in greater detail below). The emerging discipline of landscape architecture, the fashion for public parks, and the creation of the National Forest and National Park systems also impacted road development.

With the introduction of the "ordinary" bicycle in the late 1870s, followed by the safety bicycle (whose wheels were of equal size) in the late 1880s, and a reliable pneumatic tire in 1889, Americans took to the roads by bicycle by the thousands, only to find muddy, rutted byways. The bicylists quickly organized into a powerful lobby, the League of American Wheelmen, founded in 1880. By 1883 there were 35,000 members nationwide, and in 1897 there were 7,000 members in New Jersey alone. This group had several goals, all focused on road improvement: they wanted a road system that was not financed by tolls; professionalism in road construction and maintenance; and funding that distinguished

between different levels of road use. "The Wheelmen quickly realized that success rested on enlightenment about the general benefits of improved roads, and they initiated an educational program which served as the basis for the Good Roads Movement for the next 25 years."⁸⁹ "They demonstrated that wagon teams from any number of counties used other counties' township and municipal roads as through routes. It was thus argued that, in fairness, the county and the state should shoulder the burden of building them, not the localities."⁹⁰ In late 1892, the Wheelmen formed the National League for Good Roads. By 1897 the efforts of the League warranted the following discussion in the *Annual Report* of the New Jersey Commissioner of Public Roads:

The bicycle riders of New Jersey are well organized, their association being known as the New Jersey Division of the League of American Wheelmen. They...are active in all matters, which pertain to the welfare of wheel riders.

One of the chief objects of this league is the improvement of roads. It is preparing and circulating a great deal of literature on this subject. Its official organ is the "L. A. W. Bulletin and Good Roads," which is sent to each member each week.

The League of American Wheelmen tries to keep in touch with state, county and municipal officers who have charge of streets and roads, and is ever ready to do what it can to help in the work of good roads, either in the matter of educating the people or of promoting the plans of this department. *The wheelmen so outnumber the drivers of horses in many sections of the state that it is but fair that the demands of this class should be considered* [emphasis added].

...The more progressive States of the Union are responding to their call, and soon, if their ends are



Rutting typical of undrained roadways, date unknown.

⁸⁹Ibid., 38.

⁹⁰Ibid., 39.

accomplished, they can ride over improved highways from the Atlantic to the Pacific and through and from the Dominion of Canada to the Gulf of Mexico.⁹¹

An important aspect of the bicycle rage was that, for perhaps the first time, Americans were using their roads for non-economic purposes. Roads became more than a tool to be used in transacting business; roads were now being used in recreational pursuits, and the pleasure trip was born. Travel for pleasure would emerge even more sharply as automobile ownership became more universal early in the twentieth century.

Many Americans owed the leisure time to enjoy resorts and bicycles to the efforts of the Progressives. These reformers sought to alleviate the intolerable and inhumane conditions under which many, both urban and rural, lived. These conditions, and the ability of some citizens to perceive them as unacceptable, were a result of the rapid pace of change that characterizes this period. Industrialization, urbanization, and immigration were among the primary forces of change within American culture during this period. Progressive reformers sought the centralization of urban functions and politics; the protection of property and property values; and the exercise of class and social control over the (to them) dangerous urban masses. Intellectuals of the period believed "...that governmental and social reforms could resolve the social,

economic, and political ills created by the country's unsteady movements toward an urban, industrial culture."⁹² Between 1850 and 1900, the number of wage earners employed in manufacturing increased from 7.7% of the state's population to 12.8%. By 1920 that number had increased to 16.1%. During the Progressive era, reformers sought to bring the benefits of nature to urban dwellers and the advantages of civilized society to farmers. Both of these missions dovetailed well with and impacted road construction.

The societal changes precipitated by Progressive reformers did more than create leisure time. The Progressive movement also came to the farmers' aid. An important part of the social justification for improving road conditions was that "... mudbound farmers deserved the same social, political, religious, and educational opportunities available to urban residents...."⁹⁴ One program established to provide these opportunities was Rural Free Delivery of mail, established experimentally in 1896. Mail routes had to be passable in all weather. Rural Free Delivery improved rural education by improving the distribution of quality newspapers and magazines.⁹⁵

The first decades of the twentieth century witnessed the adoption of the automobile as a significant mode of transportation. In 1901 there were 14,000 automobiles registered in the United States. In nine short years, however, there were 458,000 registered



Touring car on Greenwood Avenue, Trenton, 1911.



An example of the difficult conditions facing vehicles on unimproved roads, date unknown.

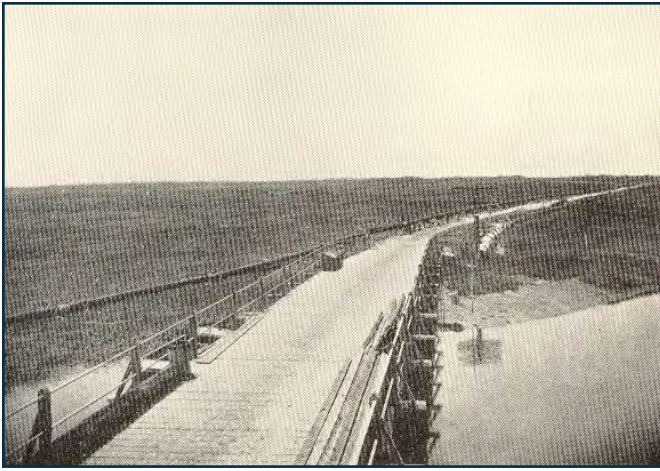
⁹¹New Jersey Commissioner of Public Roads, *Third Annual Report of the Commissioner of Public Roads*, 54.

⁹²Bruce Seely, *Building the American Highway System: Engineers As Policy Makers* (Philadelphia: Temple University Press, 1987): 25.

⁹³Kise Franks & Straw, "Immigration and Agricultural, Industrial, Commercial, and Urban Expansion 1850-1920," *New Jersey Historic Preservation Office Context #10*, 1989.

⁹⁴Seely, 1987, 35.

⁹⁵Jan Jennings, ed., *Roadside America: The Automobile in Design and Culture* (Ames, IA: Iowa University Press, 1990): 70.



Before (top) and after (bottom) images of improvements to the Holly Beach Turnpike, Cape May County, date unknown.

automobiles. Automobile companies inundated the public with advertisements promoting automobile ownership. By 1910 automobile companies purchased one eighth of advertisements in popular magazines and by 1917 this figure rose to one quarter of all advertisements. The phenomenal growth of the automobile industry after 1900 resulted in a shift in good roads leadership from bicycle owners to automobile owners.⁹⁶

Weekend trips and country drives gave many middle class Americans an opportunity for leisure travel that they could not have experienced without a car. During much of the nineteenth century, the majority of tourists were members of the upper class with

resources and time to spend an entire season in a resort location. The arrival of affordable automobiles, however, placed tourism within the realm of the middle class through the introduction of weekend travel.

This development gave an added boost to resorts along the New Jersey shore. Ocean-side communities drew on the populous metropolitan regions surrounding New York and Philadelphia to expand their visitor base. During the late 1890s, the state endeavored to create a limited number of “continuous lines” – cross-state, east-west, and north-south routes. One of the first major north-south routes linked Jersey City with Atlantic City.⁹⁷ Other shore-related road construction projects included smaller “meadow roads.” Shore counties built these causeways over tidal marshes to connect resort towns on barrier islands, like Ocean City, with mainland travel routes.⁹⁸ “Meadow roads” often used oyster-shells as a paving material because it was locally available and possessed natural cementing qualities.⁹⁹ The New Jersey state legislature, recognizing the tremendous economic potential of shore-related tourism, appointed a special commission in 1909 to determine the feasibility of constructing an “ocean boulevard” between Cape May and the Atlantic Highlands.¹⁰⁰ The chambers of commerce for a large group of sea-shore cities devised a plan in 1915 to raise \$800,000 to build a series of bridges to link New Jersey’s coastal islands, creating a 40-mile route from Cape May to Atlantic City.¹⁰¹ While New Jersey had begun applying state funds to bridge projects as early as 1913, the funding was allocated in very limited ways forcing local municipalities to find alternative funding sources independent of related roadway improvements.¹⁰² Eventually, the state took responsibility for bridge construction on state highways.

The state deemed the plan for the Ocean Boulevard very promising. It, along with the Delaware River Drive, formed the cornerstone of New Jersey’s 1912 proposed plan for a 1,500-mile statewide system of roads connecting county seats and other “thoroughfares of state-wide importance.”¹⁰³ The shore, however,

⁹⁶Tom Kuennen, “ARTBA’s Founder Charts Early Interstate System, Grant Program (1902-1909),” 12. As found at www.artba.org.

⁹⁷New Jersey Commissioner of Public Roads, *Fifth Annual Report of the Commissioner of Public Roads* (Trenton, NJ: The J. L. Murphy Publishing Co., 1898): 40.

⁹⁸New Jersey Commissioner of Public Roads, *Eleventh Annual Report of the Commissioner of Public Roads* (Paterson, NJ: News Printing, 1905): 49.

⁹⁹New Jersey Commissioner of Public Roads, *Thirteenth Annual Report of the Commissioner of Public Roads* (Trenton, NJ: MacCrellish and Quigley, 1907): 57.

¹⁰⁰“Extension of the New Jersey Road System,” *Good Roads* 11 (January 1910): 34.

¹⁰¹“System of Bridges Planned to Connect New Jersey Resorts,” *Good Roads* 10, no. 17 (October 30, 1915): 239.

¹⁰²New Jersey Commission on Road Legislation, “Report to Governor James Fielder by His Commission on Road Legislation,” *New Jersey* 4 (New Jersey State Chamber of Commerce, 1916): 23.

¹⁰³“Highway Legislation in New Jersey,” *Good Roads* 3 (February 17, 1912): 101; “New State Laws Proposed for New Jersey,” *Good Roads* 3 (January 6, 1912): 17; Commission of Road Legislation, “Report to Governor James Fielder by His Commission on Road Legislation,” *New Jersey* 4, 23.

was not the motorist's only destination. Those on a limited schedule or budget could escape the city for a short country jaunt. On a national scale, the Lincoln Highway probably best exemplifies a road promoted for automobile touring. In 1913, New Jersey's Commissioner of Public Roads observed that "since the advent

outbreaks of diseases occurred in the cities, including cholera, malaria, and smallpox in addition to typhoid fever."¹⁰⁶ One prolific source of pollution was horses, which, at the turn of the century, were still vital for transportation and hauling freight. In New York City, horses dropped 2.5 million pounds of manure and 60,000

gallons of urine onto city streets daily.¹⁰⁷ This resulted in a public health problem, the scale of which is almost unimaginable today in western countries. "One of the most lasting and least celebrated Progressive era reforms in American history came in the area of public health..."¹⁰⁸ Reformers saw great advantage to streets that could be easily cleaned, by either hosing down or scraping. Consequently, during this period many types of experimental surfaces were tried.



In the early 20th century, a variety of vehicles shared the road, including automobiles, trolleys, and horse-drawn carriages. This photo was taken near the Newark Court House in 1912.

of the railroad, our highways have never been so generally and continuously used as they are today. One of the most noticeable evidences of this is that the old inns and taverns that had fallen into disuse are being remodeled and once more are centers of activity."¹⁰⁴ The adventure of motoring in an open touring car was then considered a valuable form of exercise: "The outdoor life of the present day, brought about largely by the automobile, has had a more wholesome effect on the people than perhaps any other measure."¹⁰⁵

One of the greatest urban issues of the period was health and sanitation. "As the environment became increasingly polluted, as water and sanitation systems remained inadequate, and as the working class lived in congested, rundown tenements, major

It is also important to note that these "unsteady movements" were paired with mass immigration, compounding the perceived threat to the nation's identity as an Anglo-Saxon agrarian society. Prior to 1890, immigrants were primarily from either Germany or the British Isles – both primarily Protestant and fair colored, and the people assimilated relatively easily.¹⁰⁹ From 1850 to

1900, the population of New Jersey nearly quadrupled, growing from 490,000 to 1.9 million people. At the turn of the twentieth century, 50% of the state's population was either born abroad or had one or more foreign-born parents. Only New York, Pennsylvania, Massachusetts, and Illinois had more immigrant residents than New Jersey during this period. By 1920, the state's population had increased to nearly 3.2 million.¹¹⁰

Contemporary wisdom, greatly influenced by the scientific contributions of Charles Darwin, held that exposure to nature benefited the soul and resulted in citizens that are more law-abiding. According to Charles Robinson, "Social problems are to a large degree problems of environment."¹¹¹ Beautiful surroundings were thought to enhance worker productivity and urban economics

¹⁰⁴New Jersey Commissioner of Public Roads, *Nineteenth Annual Report of the Commissioner of Public Roads* (Trenton, NJ: State Gazette Publishing, 1913): 65.

¹⁰⁵George R. Chatburn, *Highways and Highway Transportation* (New York: Thomas Y. Crowell Company, 1923): 211.

¹⁰⁶*Ibid.*

¹⁰⁷Mark S. Foster, *From Streetcar to Superhighway: American City Planners and Urban Transportation, 1900-1940* (Philadelphia: Temple University Press, 1981): 10.

¹⁰⁸Ella Handen, "Social Service Stations: New Jersey Settlement Houses Founded in the Progressive Era," *New Jersey History* (Spring/Summer, 1990): 21.

¹⁰⁹Rudolph J. Vecoli, *The People of New Jersey* (Princeton: D. Van Nostrand Co., Inc., 1965), 69.

¹¹⁰Kise Franks & Straw, "Immigration and Agricultural, Industrial, Commercial, and Urban Expansion, 1850-1920," 7.

¹¹¹William H. Wilson, *The City Beautiful Movement* (Baltimore, MD: The Johns Hopkins University Press, 1989): 73.

as well as imbue civic patriotism. Beauty was thought to create a positive environment capable of influencing human thought and behavior.¹¹² Public parks and public park systems flourished, often embellished with attractive landscaped drives and handsome bridges. In 1892, the nation's first county park system was founded in Essex County, New Jersey. The preservation of shade trees became a concern of practicing highway engineers. The 1911 *Annual Report* expresses this sentiment eloquently: for trees are "most desirable for reasons of comfort and beauty." Many took advantage of the beauty of nature around them from the seat of a bicycle.¹¹³

Trends (and specific events) early in the twentieth century shaped the future of the state's roads. The trends included the increasing affordability of the automobile, as evidenced by skyrocketing auto registrations, and the associated mobility of individuals. Destinations were no longer limited to places where the trolley or the railroad ran; for the first time, anyone with a car could go virtually anywhere served by a decent road. Pleasure trips (as opposed to business travel) became much more common, and demand increased for roads serving appropriate destinations. At the same time, trucks came into more widespread use, particularly during World War I, with resulting negative consequences for all drivers.

Rail shipping to and from the port of New York during World War I overtaxed the railroad network to a point of near-collapse. As a result, shippers turned to trucks for their land transportation needs. Two important consequences resulted: first, heavy truck traffic damaged the roads, which had been constructed to accommodate bicycles, carriages, horse-drawn wagons, and early cars; second, the essentially local nature of the road system meant that long-haul truckers were sharing city streets and farm roads with local drivers, to the detriment of both groups.

c) Good Roads Era Road Technology

Gravel pavements dominated road improvement practice until the widespread introduction of the automobile in 1904.¹¹⁴ According to road historian Spencer Miller, before 1904 "improved roads of a higher type than water-bound macadam were so few that they were in effect only experimental."¹¹⁵ This pavement type proved satisfactory for the relatively light wagon and carriage traffic that had been characteristic of the first half of the nineteenth century. As traffic volume increased and growing numbers of people began touring the countryside, a significant problem appeared. Passing



"New Jersey Road Exhibit," illustrating research on various road surfaces and construction types, date unknown.

traffic continually stirred up the dust that served as the binder between stones in the roadbed. These dust clouds not only created a nuisance for travelers and adjacent property owners, but also resulted in structural destabilization of the road's surface. In 1898, Los Angeles began an experimental program involving the application of a thin layer of crude oil to the road surface to inhibit the creation of dust.¹¹⁶ New Jersey adopted this program shortly thereafter. Other applications used in dust prevention included the application of salt water, a mixture of water and calcium chloride, as well as other diluted coal-tar products.¹¹⁷

Although researchers conducted numerous experiments with paving surfaces during the Good Roads Era, new approaches to structural composition or alignment garnered little attention.

¹¹²Ibid., 29.

¹¹³New Jersey Commissioner of Public Roads, *Eleventh Annual Report of the Commissioner of Public Roads*, 61.

¹¹⁴Charles M. Upham, "The Last Two Decades in Highway Design, Construction, and Maintenance," *The American City* 43 (September 1930): 90.

¹¹⁵Spencer Miller, Jr., "History of the Modern Highway System in the United States," in *Highways in Our National Life: A Symposium*, edited by Jean Labatut and Wheaton J. Lane (Princeton, NJ: Princeton University Press, 1950): 101.

¹¹⁶Charles E. Morrison, *Highway Engineering* (New York, NY: Wiley & Co., 1908): 144.

¹¹⁷Harwood Frost, *The Art of Roadmaking: Treating of the Various Problems And Operations In the Construction And Maintenance of Roads and Pavements* (New York: Engineering News Publishing, 1910): 225.

Through the first decade of the twentieth century, road improvement projects rarely called for altering an existing, horizontal alignment. The initial investment in clearing and grading a roadway was too great to dismiss casually, so existing routes, despite their somewhat circuitous nature, remained intact.¹¹⁸ While large-scale realignments were uncommon, occasionally small improvements were made as part of specific projects.

Two general construction methods were used at this date: surface construction, in which workers applied a surface

Two project descriptions from the 1897 *Annual Report* illustrate the extent to which the state's efforts were aimed at mollifying various constituent groups, as well as describing typical roadway configuration and construction:

Hammonton and Absecon Road, Twenty-two miles long.

This road is constructed of gravel, and passes over a sandy region, covered with pines and scrub-oaks, through Pomona, Egg Harbor City, Elwood, DeCosta, and Hammonton.



Cyclists on the Hammonton & Absecon Road, Atlantic County, after improvements, date unknown.

material on an untreated roadbed, and trench construction, which involved properly excavating the roadbed before applying the paving material.¹¹⁹ Obviously the latter option, while necessitating a larger initial investment in preparation, outlasted the former.

The roadbeds constructed during this era had high crowns and were similar in profile to the old turnpike roads, which were high in the center and tapered gradually down to the shoulders.¹²⁰ Most rural roads consisted of only one lane with an eight-foot wide gravel or stone surface. Vehicles had to pull over onto the shoulders to pass. Engineers recommended that in certain cases, where traffic volume required vehicles to pass frequently, a 16-foot roadway width could be used.¹²¹

It forms part of a continuous line from Camden to Atlantic City [the White Horse Pike]; was completed early in the season, and is now one of the most popular roads in the state. Over it thousands of bicycles are moving each day to and from Camden and Atlantic City. The number of travelers has so increased that the old wayside inns are not capable of feeding the people passing along its route, therefore necessitating the building of many new resorts where the numerous bands of bicycle-riders can easily regale themselves. It is a striking instance of how a good road will start into life

and activity a barren section. The state has never made a better investment for the development of its unimproved resources.

The maximum grade is about two per cent.

The cost was about \$1,300 per mile, or a total of \$31,750.²³

Twelve miles of this road was built and paid for last year, costing \$16,204.^{77,122}

Columbus and Bordentown Stone Road, Five Miles Long.

This, the main road from Columbus to Bordentown [now

¹¹⁸Henry B. Drowne, "The Relation Between Modern Traffic and the Alignment and Profile in Highway Design," *Good Roads* 1 (1911): 115.

¹¹⁹Morrison, *Highway Engineering*, 50.

¹²⁰Joseph Austin Durrenberger, "Turnpikes: A Study of the Toll Road Movement in the Middle Atlantic States and Maryland," 86.

¹²¹New Jersey Commissioner of Public Roads, *Fifth Annual Report of the Commissioner of Public Roads*, 39.

¹²²New Jersey Commissioner of Public Roads, *Fourth Annual Report of the Commissioner of Public Roads*.

part of Route 206], runs through Mansfield Square to the thriving village of Columbus, the center of a rich farming country, over a well-cultivated, alluvial, sandy-loam country, covered with some of the finest farms of the state. The old bed was a gravel turnpike, which had become so sandy it was difficult to carry the products of the farms to the markets of Columbus, Bordentown, and Trenton.

Its construction commenced in the early spring, and was finished in October of the same year. It is built ten feet wide, of eight-inch macadam, four inches of two and one-half and three and one-half inch Byram rock in the bottom. This, after being thoroughly rolled, was covered with four inches ten-inch trap-rock and brought to a finish with three-quarter inch stone and screenings. It affords a very fine driveway for pleasure carriages and bicycles, and also a

firm roadway for heavy draft wagons. A great deal of produce is carted over it to the manufacturing city of Trenton. Columbus being one of the largest milk-stations in the state, this road gives a large number of farmers an easy every-day passage to this shipping depot. [The questions of wagon tire width and axle length were also subjects of discussion at about this time. Since narrow wheels would cut into gravel surfaces and create ruts, four-inch tires were advocated. If these were mounted on axles of unequal lengths, a heavily loaded wagon would act as a roller, and users of the road would actually be contributing to its maintenance rather than to its deterioration].

The maximum grade, one hill only, is about three feet to the hundred.

The cost of construction is \$15,822.64 1/9.¹²³



The first concrete highway, near New Village, Warren County, date unknown.

¹²³New Jersey Commissioner of Public Roads, *Fourth Annual Report of the Commissioner of Public Roads*.

The “macadam” construction described in the second example is typical of the improvements constructed in the early years of the state aid act. Unlike the common usage of the term today, it does not imply asphalt paving; rather, it was the construction of a road using well-compacted crushed stone of decreasing size from base course to surface.

Macadam is one example of applied scientific analysis to road building technology. Wearing surfaces, maintenance techniques, and subsurface types were particular areas of concern and attention. New paving and experimental paving materials were abundant. In 1870, America saw its first brick road laid in Charleston, West Virginia and its first asphalt road laid in Newark, New Jersey.¹²⁴ Concrete paving was used experimentally in Bellefontaine, Ohio in 1892; New Jersey first used reinforced concrete pavement in 1912 near New Village, Warren County. In 1911, the New Jersey state legislature made a special appropriation to fund research on road materials.

The technological innovations that affected road construction during this period included the vehicles that traveled along the state’s roads. It cannot be said whether good roads and the propagation of the automobile were a coincidence of history, but the symbiotic nature of the relationship is now clear. Obviously, cars would not be sold widely if there were few passable roads on which to drive; and equally obvious, the growing number of drivers would add to the demand for more road improvements.

George Selden patented the gas-driven automobile in 1879, and in 1895 the Duryea brothers introduced the first automobile using a gas-driven combustion engine to the United States. Due to high cost, automobile use was limited at first to the upper classes, but autos were nonetheless discussed in the 1898 *Annual Report of the Commissioner of Public Roads* (just three years later):

Horseless Carriages. Inventor Edison believes that before long there will be a horseless carriage on the

market that can be sold for \$100 at the most. That there would be a tremendous demand for such a vehicle goes without saying. Much as wheelmen pretend to like the exercise, there is not a bicycle rider in the world who would not trade off his machine for one that would go without leg-power, if the thing were possible.

...One of the American manufacturers has brought out a motor carrier as a rival to the large wagon. These will cost about \$500 and will carry 500 pounds, and can be run at a cost of half a cent a mile...

...One significant fact that shows how times are changing is the announcement of a dealer in both bicycles and automobiles. He has for several years carried on a bicycle “riding academy.” The present outlook has made him decide to discontinue the riding school entirely and use the entire floor space for an exhibit of horseless carriages.¹²⁵

Henry Ford began mass production of cars in 1903. The Model T was introduced in 1909. Car payments were introduced in 1912. The result of these three related occurrences was that the average working family could afford to buy a car, and the number of cars on the roads grew quickly in the years before World War I.

d) Good Roads Era Administrative Innovation

Many changes during this period impacted the construction and use of roads. While some of these changes may seem insignificant at first, all profoundly impacted the built environment in some way.

During earlier periods, monies expended on roads were either private (individual or corporation) or local government (municipal or county). At the twilight of the nineteenth century, people began to recognize that larger more formalized road building was in the public’s best interest. New Jersey was at the front of this movement. In 1891, New Jersey passed the State Aid Highway Act, the nation’s first act authorizing the expenditure of

¹²⁴Edmund DeSmedt, a Belgian chemist, installed the country’s first asphalt road in front of City Hall in Newark.

¹²⁵*Ibid.*, 85-86.

state funds on road building. Farmers, initially leery of proposed improvements because no funding base, other than local taxes, existed for these projects, preferred to stay with the status quo rather than increase their taxes until New Jersey initiated state aid funding in 1891.¹²⁶ Farmers then realized that the burden of improved roads would be spread throughout the state and not rely strictly on higher local taxes; consequently, they embraced the movement wholeheartedly. Bridges, however, were not included as eligible for funding until 1913. Other states, particularly in the northeast and other populous areas, quickly followed suit and passed highway acts modeled on New Jersey's precedent. Soon even state funds were inadequate to address the nation's roadway needs. Lobbyists were successful in the passage of a federal act. On June 11, 1916, President (and former New Jersey



The use of convict labor for the state-sponsored construction of Bolmer's Corner Road, Princeton, Mercer County, date unknown.

governor) Woodrow Wilson signed the Federal Aid Highway Act, which authorized the expenditure of federal funds on our nation's roads. Perhaps not coincidentally, this act was also based, in part, on New Jersey's 1891 act.

Control over road projects moved towards centralization in 1889 when New Jersey took the lead in national highway legislation by authorizing its counties to issue bonds for the construction of broken-stone roads. This legislation also empowered counties to assess abutting property owners for one-third the cost of those

improvements.¹²⁷ Although statute labor policies prevailed across much of the nation through the turn of the century, there was a concerted effort to secure cash payments rather than labor after 1890.¹²⁸ In most rural areas, "Working out the road tax came to be viewed more as the occasion for neighborhood social gatherings and the exchange of the latest accumulation of stories than as a tax contribution."¹²⁹ This is not very surprising because poor road conditions generally kept most rural neighbors from visiting socially. Nevertheless, the use of statute-labor did little to advance the cause of good roads.

Union County began a major road improvement program in 1889, joining Passaic and Essex counties, which had already established Good Roads policies during the preceding decade.¹³⁰ The success of these programs encouraged the New Jersey state legislature to continue their progressive course of action with regard to road construction. In New Jersey, a Good Roads Convention was held in 1891; significantly, it was convened in conjunction with the annual meeting of the State Board of Agriculture. One speaker after another bemoaned the adverse consequences of poor roads to society in general and to farmers in particular. The point was that the effects of bad roads rippled throughout society, and their improvement would be in the interest of all. The Progressive overtones of this convention are clear. Some excerpts (emphasis added) follow:

The roads are worse when prices are best. The farmer has produce to sell, timber to haul, purchases to make, bills to collect and to pay, grain to grind, obligations to meet; but all must wait for the road to freeze, harden or dry out...[Quoting a news item:] "For two weeks country roads...have been hub-deep in mud, and the farming communities have been virtually padlocked on the farm. As a result, merchants depending on country trade have suffered immense financial losses...while the farmers and shippers have lost by inability to market their products. *It is feared many failures among country merchants may result.*"

¹²⁶New Jersey Commissioner of Public Roads, *Fifth Annual Report of the Commissioner of Public Roads*, 41.

¹²⁷Miller, "History of the Modern Highway in the United States," 90.

¹²⁸Thomas H. MacDonald, "How Highway Financing Has Evolved," *Engineering News Record* 104, no. 1 (January 2, 1930): 4.

¹²⁹Dearing, *American Highway Policy*, 43.

¹³⁰E. C. Hutchinson, "The Good Roads Movement in New Jersey," *Good Roads* 8 (April 1907): 109.

...At every general election in this country a half a million of the best farmers of the land are practically disfranchised because mud-bound at home...We are all deeply interested in ballot reform, but *surely the beginning of this reform should be to see that the way is open for every man to cast his vote...* It is just as important to get the ballots into the box as to get them fairly out of it."

...The United States is paying \$140,000,000 a year to support our common schools. Of this sum it is estimated that \$45,000,000 a year are wasted because *30 per centum of the pupils are kept out of school, chiefly because of bad roads.*¹³¹

Good roads were promoted as a civilizing influence, allowing country folk to travel to town for lectures, musicals, social events, and the like. Good roads uplifted society by inviting rural dwellers to participate in all the social functions that were readily available to urban dwellers. Ultimately, "The common highway, this very dirt road, is ... the property of the whole people. To a fair minded man the country road that passes his door is only a part of the great thoroughfare between Maine and Georgia, between Massachusetts and California."¹³²

In 1891, New Jersey passed the landmark State Aid Act and became the first state to officially recognize its responsibility for road improvements. Regionally, New York and Maryland instituted similar policies in 1898, followed by Pennsylvania and Delaware in 1903.¹³³ With the passage of the State Aid Act, township residents could petition their county Board of Chosen Freeholders for road funds. If the county board and the commissioner of public roads both approved the petition, the state agreed to pay one-third the cost of the requested improvements.¹³⁴ Abutting property owners, and later the local municipality, agreed to pay 10% of the total cost and the county paid the remaining amount.¹³⁵ This allayed the farmers' concern that they alone would bear the cost of road improvements by sharing the cost

with their fellow citizens. The county was also required to hire a professional engineer to monitor and supervise maintenance of the route, thereby assuring a basic level of quality control for roads throughout the state.¹³⁶

The state aid program shifted the financial burden for major road improvements from municipalities to the county and state levels of government. Townships had found it extremely difficult to pull together financing for major road projects, but an infusion of funding from county and state sources triggered a wave of activity at the local level. The first roads in the United States to be constructed under a state aid program were in Middlesex County, New Jersey.¹³⁷ The three projects using the State Aid funds included a 4.85-mile section from Highland Park to Metuchen; a 1.7-mile



Installing under-draining system under Old York Road, Mercer County, date unknown.

section from Metuchen toward Plainfield; and a 4-mile section from Old Bridge to Matawan. Although Mercer and Camden counties both built projects at the same time, the first payment by the state to a county under the 1891 Act was to Middlesex County. The Plainfield project was completed the following year, connecting with the Union County road system. During the first decade after the legislation was passed, a large number of municipalities in the northern and coastal regions of the state took advantage of the program. Their goal was the connection of major cities like Paterson, Morristown, the Oranges, Elizabeth, the Amboys,

¹³¹New Jersey Board of Agriculture, *State of New Jersey 19th Annual Report State Board of Agriculture, 1891-1892* (Trenton, NJ: John L. Murphy, 1892): 548.

¹³²*Ibid.*, 549.

¹³³Norman Hebden and Wilbur S. Smith, *State-City Relationships in Highway Affairs* (New Haven, CT: Yale University Press, 1950): 26.

¹³⁴"The Highway System of New Jersey," *Good Roads* 11 (April 1910): 122.

¹³⁵Hutchinson, 110; Frost, *The Art of Roadmaking*, 257 and 267.

¹³⁶John B. Rae, *The Road and Car in American Life* (Cambridge, Massachusetts: The MIT Press, 1971): 32.

¹³⁷"The Highway System of New Jersey," *Good Roads* 11 (April 1910): 122.

and Trenton, as well as the provision of a clear route to summer resorts like Atlantic City, Lakewood, and Cape May.¹³⁸

It is important to note that the new state aid was for new construction only, and that the maintenance of state aid roads rested, often unsatisfactorily, with local governments to fund and execute. “This was a source of constant frustration to the state agency because the counties often lacked the professional personnel to do the work properly or in a timely manner. As late as 1916, Commissioner Edwin A. Stevens was reporting to the governor that because all maintenance responsibility rested with



“Before” and “After” images of improvements to Chestnut Street, south of Clay Avenue, in Roselle Park, Union County, date unknown.

local authorities, “the powers of the [state] road department to protect the state’s investment [in state aid roads] are limited and ineffective....” Stevens stated that “the county was too small a unit to provide satisfactory service, and that the same was even more true of townships and municipalities.”¹³⁹

Hired labor completed most of the roadwork after 1891. New Jersey gradually eliminated statute labor and provided funding to hire professional road workers. The roads at that time were better maintained than those earlier in the century because the state required counties to keep their improved roads at a certain standard in order to qualify for additional funds. In spite of the state’s apparent generosity, counties submitted more requests than could be met by the appropriation. Instead of rejecting many of these requests to allocate a large block of funding for a project of statewide merit, the government divided the money into numerous small portions. Consequently, many counties participated in the state aid program, but their projects were very small, sometimes only one mile in length. There was no effort to use the funds to develop a centralized state road system at that time.

Exceptions to this were improvements made to the White Horse Pike (presently U.S. Route 30). Improvements to this road formed a continuous chain from Camden to Atlantic City. At the time (1897), the White Horse Pike formed the longest line of improved roads in the state (60 miles). An 1896 report by the New Jersey Commission of Public Roads stated that the improved road “will form a fine boulevard for bicycles and pleasure teams from Philadelphia to Atlantic City and also allow for the delivery of farm products” (see previous discussion of Hammonton and Absecon Road).

In this period, the *Annual Reports* included sample contracts and specifications for road projects, guides to assist county engineers in estimating costs, lists of suitable quarries, and discussions of the relative merits of various types of road materials. The early reports also proudly printed “Before and After” photographs of several projects. Because the political value of these photos

¹³⁸New Jersey Commissioner of Public Roads, *Ninth Annual Report of the Commissioner of Public Roads*, 92.

¹³⁹*Ibid.*, 40.

increased according to the degree of improvement which could be demonstrated, the “Before” photos frequently showed hub-deep ruts, rocky outcrops, and sometimes a disabled vehicle, whereas “After” photos seem to have been shot on clear, sunny spring days, often with a group of bicyclists or a farm wagon rolling easily along.

The federal government did not provide general assistance for road construction during this era; however, it did support peripheral programs related to the Good Roads movement. The federal government established the Office of Road Inquiry (ORI) in the Department of Agriculture in 1893 to disseminate educational information about road improvement.¹⁴⁰ The cross-constituency nature of this small beginning is evident in the fact that the first head of the ORI, Roy Stone, was a Wheelman, and according to one source, had probably drafted the New Jersey act.¹⁴¹ The ORI provided little more than technical assistance; however, one of its most successful programs involved the construction of “object-lesson roads” in locations throughout the country. The intent was to demonstrate exactly how a good road should be built. The organization worked cooperatively with the nation’s agricultural colleges to develop and implement the program. Municipalities provided the required materials and labor; the ORI contributed professional road-building expertise; and the result was a model road that would guide future construction projects in the area.

The first of these roads was constructed at the New Jersey Agricultural College and Experiment Station in 1897 (now the School of Environmental and Biological Sciences).¹⁴² The road was Nichol Avenue from George Street to the entrance to the farm gate, a distance of 660 feet. This short stretch of roadway, therefore, would be an extremely important artifact of this era if it survives. The ORI, later known as the Office of Public Roads, also conducted research on road building materials in the United States to determine their various strengths and weaknesses. The scope of this research later broadened to include analysis and development of road preservatives.¹⁴³

The state funding program was a tremendous success and “stimulated the property-holders of many counties in New Jersey to spend hundreds of thousands of dollars upon their roads to meet the state appropriation.”¹⁴⁴ Its popularity was due, in large part, to the fact that the county only initiated improvements upon the petition of those who stood to benefit directly from their execution. The sole obligation of the petitioners was to pay 10% of the cost, a relatively small amount when compared with the long-term economic benefits.¹⁴⁵ Five years after its adoption, as more counties decided to take advantage of the program, requests for state aid funds exceeded the available appropriation.¹⁴⁶ Nevertheless, between 1891 and 1900, counties throughout New Jersey constructed a total 1,500 miles of improved roadways. Under the state-aid act, New Jersey contributed \$2,859,735.90 through December 1909. During this same period, counties contributed \$4,861,551.03 and municipalities paid \$857,920.77.¹⁴⁷ Even after other states began similar programs, the level of New Jersey’s appropriations continued to dwarf others. In 1904, New Jersey, Massachusetts, New York, and Connecticut administered \$2,000,000 in road funds, while the combined appropriations of nine other states with similar state-aid programs totaled merely \$607,000.¹⁴⁸

The landmark State Aid Act of 1891 was followed in 1894 by the establishment of the Commission of Public Roads, the predecessor to the New Jersey Department of Transportation, to administer the state aid program. (In the intervening years, the Agriculture Department administered the program.)¹⁴⁹ New Jersey’s state aid highway acts (1891 and 1917) both resulted from the coalescence of the diverse interests of professional engineers, Progressive reformers, bicyclists, and farmers.¹⁵⁰

Thus, by the end of the nineteenth century, several constituencies with little else in common were all promoting road improvements: bicyclists, primarily urban dwellers with sufficient disposable time and money to engage in recreational road use; farmers, to whom poor roads were an economic impediment; and social reformers, who saw improved roads as part of the solution to electoral,

¹⁴⁰Holt, *The Bureau of Public Roads*, 1.

¹⁴¹Seely, 1987, 12.

¹⁴²Holt, 8.

¹⁴³*Ibid.*, 11.

¹⁴⁴New Jersey Commissioner of Public Roads, *Third Annual Report of the Commissioner of Public Roads*, 8.

¹⁴⁵New Jersey Commissioner of Public Roads, *Fourth Annual Report of the Commissioner of Public Roads*, 47.

¹⁴⁶New Jersey Commissioner of Public Roads, *Third Annual Report of the Commissioner of Public Roads*, 9.

¹⁴⁷“The Highway System of New Jersey,” *Good Roads* 11 (April 1910): 122.

¹⁴⁸Thomas H. MacDonald, “How Highway Financing Has Evolved,” 104:5.

¹⁴⁹A.G. Lichtenstein, 39.

¹⁵⁰Seely, 1987, 18.

educational, and social problems that beset rural residents. In this environment, an astute politician could ill afford to be against good roads; even the railroad interests realized that better roads would allow shippers to move more goods to and from the railroad stations, thereby increasing their business. Until 1916, the railroad companies were the largest corporate backers of the Good Roads Movement.

This period also witnessed the emergence of roadway engineering as a distinct profession, separated for the first time from general civil engineering and railroad engineering. In 1894 Harvard University, under the direction of Professor Nathaniel Shaler, started the nation's first road engineering curriculum. In 1909, New Jersey established the State Highway Commission to provide professional oversight to the construction of roads constructed with state funds. Increasing professionalization of the roadway engineer resulted in a long-lived trend of measurable concerns (such as traffic speeds, volumes, etc.) being given more weight in the decision making process than less tangible concerns, such as societal or environmental impacts.

The administration of Democratic Governor Woodrow Wilson "ushered in an era of reform that reflected the Progressives' objective of using apolitical specialists, or experts, and the scientific approach to solving social and technical problems. In theory, the learned replaced the political cronies as the setters of policy, with inefficiency and corruption replaced by honest, efficient administration."¹⁵¹

Wilson's Commissioner of Public Roads was Edwin A. Stevens, a civil engineer and Progressive Democrat. This choice of leadership illustrated the Progressives' philosophy of the expert as policy maker. During Stevens' tenure from 1911 to 1918, he transformed the department into a place of studied innovation in highway construction. Increases in staff and funding allowed Stevens to approach the state's roadwork needs in a professional, business-like manner, appropriate to the increasing importance of the road network to New Jersey's commerce. As Stevens pointed



Installation of Durax Pavement on Morris Avenue, Essex County, date unknown. Durax consisted of granite blocks laid over a concrete foundation with a sand-cement paving bed and cement or mastic filler between the blocks.

out in his 1914 report, "the whole tendency of road legislation in this and other states is towards a more centralized control. Roads have become matters of general and no longer of merely local interest."¹⁵² As such, Stevens instituted uniform standards for construction and maintenance, undertook bridge construction projects across the state, and ushered in the era of the New Jersey state highway system.

Under the Federal Highway Act of 1916 funds were apportioned in thirds based on the state's area, population, and on total post road mileage. Additionally, states needed to meet a fifty-fifty match in funding and establish a state highway department to qualify for funding. Under the act, no tolls would be allowed on federal aid roads and states were responsible for maintaining the road. If these federal aid roads were not properly maintained, future federal funds could be withheld. Initially the federal government allocated five million dollars in 1917 with five million dollar increments over the next four years for a total of 25 million dollars. A number of factors limited the number of roads constructed under the bill during its early years. The outbreak of World War I limited the availability of steel, concrete, and other materials needed for highway construction. There were also difficulties transporting materials to job sites due to

¹⁵¹A.G. Lichtenstein, 41.

¹⁵²A.G. Lichtenstein, 41-42; New Jersey Commissioner of Public Roads, *Twentieth Annual Report* (Trenton, NJ: MacCrellish and Quigley, 1913): 73.



Lincoln Highway, Mercer County, New Jersey, date unknown. Note the sign on the tree beside the railroad track to the right of the road. A pedestrian walks along the road in the distance. (Courtesy of the University of Michigan, Transportation History Collection, Special Collections Library, Lincoln Highway Digital Image Collection.)

the overextended use of railroads towards the war effort. During this period, it was also difficult to attain a proper labor force, and many states could not meet their financial obligations. By 1919 only 13 miles of federal aid roadway were completed.¹⁵³

The legislative acts of the turn-of-the-20th-century did not resolve many problems that were later exacerbated by the automobile. There was no master plan or designation of arterial routes. Local officials selected roads for improvement. It was a power they were not eager to relinquish to the state. Often the roads most in need of improvement were not those selected, and there was no guarantee that those improved by one community would connect with roads improved by their neighbors. By 1910, it was clear that reform was needed. In his 1911 report to the State Highway Commissioner, the State Supervisor of Roads noted, "because of the change in the character of traffic over our roads due to the perfection of the motor vehicle, the necessity for a classification of our improved roads has arisen."¹⁵⁴

While for the most part, highways were not numerically designated or assigned numbers during this period (the first state highway

system was designated as part of the 1917 Edge Act), some roads were named and marked. One iconic example of this type of road is the Lincoln Highway, designated in 1913. It was the first coast-to-coast highway. Its distinctive signs with horizontal red, white, and blue stripes still evoke its identity and a sense of adventure today.

e) Good Roads Era Conclusion

The Good Roads movement had successfully lobbied for the labor and materials necessary to reclaim New Jersey's roadways, which had been neglected during the last half century. By the end of the nineteenth century, several constituencies with little in common succeeded in the promotion of road improvement. The ruts and mud that separated them from markets and train lines no longer subjugated farmers. The rural standard of living rose; food prices decreased; and railroad freight revenues increased. Rural mail delivery and recreational facilities for touring cyclists enhanced communication between urban and rural districts.

The impetus behind road improvements during this period arose from an unanticipated source—a widespread bicycle craze overtook the nation in the 1880s. The major drawback was the overall poor condition of township roads, which had been badly neglected for the past five decades. Practitioners of this new recreational pursuit, however, did not allow this to become a stumbling block. During the next decade, cyclists proved adamant in their quest for improved rural roads. Local enthusiast chapters united nationally in 1880 as The League of American Wheelmen.¹⁵⁵ By 1883 there were 35,000 members nationwide, and by 1897 New Jersey membership numbered 7,000. The cyclists used public education and consistent lobbying to achieve road improvements that the agricultural sector had been unable to obtain during the previous 50 years.

Road improvements helped slow the state's declining farm values, which had begun to slide during the 1870s. By that time, railroads had developed an extensive network in the southern and mid-western states, and shipment of their produce to northern

¹⁵³Tom Kuennen, "ARTBA Helps Achieve First Federal Investment in Roads," 3-4, as found at www.ARTBA.org; Tom Kuennen, "In Face of Federal Act Failure, ARTBA Fights to Preserve Program," 17-18, as found at www.ARTBA.org.

¹⁵⁴New Jersey Commissioner of Public Roads, *Seventeenth Annual Report of the Commissioner of Public Roads* (Paterson, NJ: New Printing, 1911): 65.

¹⁵⁵Albert L. Rose, "The Highway From The Railroad To The Automobile," in *Highways In Our National Life: A Symposium* (New York: Arno Press, 1972): 85.

markets became a reality. Imported produce from these regions competed directly with New Jersey-grown products in New York and Philadelphia markets. In New Jersey, higher production and transportation costs rendered farmers unable to effectively compete in their former markets. This situation eventually led to a production shift from wheat and cattle to fruit, vegetables, and milk.¹⁵⁶ By the 1890s, some people believed the New Jersey farmer's economic salvation lay not simply in changing markets, but in the development potential of their land for "rural homes and villa sites."¹⁵⁷ Urban

residents increasingly sought out suburban retreats, and this type of development brought a financial windfall to many farmers bordering metropolitan regions. Gradually, the boundaries between urban and rural districts softened. New Jersey's picturesque country-side attracted more and more people, encouraging suburban growth.

Road improvement began to significantly alter settlement patterns in New Jersey in the 1890s. Previously, the railroads had been the lifelines of suburban development. By the 1860s, rapid transit enabled members of the upper class to live in bucolic settings like New Jersey's Llewellyn Park, while the head of the household supported this lifestyle by working in New York City. Prior to the road improvements of the 1890s, however, most suburban developments were located a mile or less from the nearest train line. Developers showed no interest in land outside this mile-wide swath, because families wanted quick, reliable access to the train lines. However, once road improvements had been completed outside this initial boundary, large stretches of the New Jersey countryside became attractive for development. According to the Public Roads Commission's 1904 annual report, prior to the Good Roads Era "no one



A roadway confined by guard rails and deep ditches, date unknown. Note that the car is pulled over, and occupants are taking a break on the opposite side of the road.

who commuted would dare to live more than a mile from the station. Now some enjoy country life five miles away from the railroad, and, barring an occasional blizzard, feel perfectly sure of reaching the station every day in time for their trains."¹⁵⁸ These improvements, however, focused on addressing local needs and did not consider potential regional or interregional impacts.

New Jersey's location between New York and Philadelphia, two major population centers, proved advantageous. People poured into New Jersey during the 1890s, increasing the state's population by 30% in merely a decade.¹⁵⁹ Outlying communities lobbied heavily to attract, from among the 439,000 new residents, the "better class of population" who were attracted by good roads and convenient transportation.¹⁶⁰ Savvy counties carefully planned and calculated their road construction and municipal beautification programs. These projects targeted urban residents with a penchant for nature. Tourists only needed a little encouragement to buy into the suburban lifestyle, rather than simply cycling through it on the weekends. Good roads and shaded avenues became potent lures for those seeking health and comfort without sacrificing convenience. Essex County invested heavily in road

¹⁵⁶New Jersey Commissioner of Public Roads, *Third Annual Report of the Commissioner of Public Roads*, 13.

¹⁵⁷*Ibid.*

¹⁵⁸New Jersey Commissioner of Public Roads, *Tenth Annual Report of the Commissioner of Public Roads* (Somerville, NJ: The Unionist Gazette Association, 1904): 73.

¹⁵⁹New Jersey Commissioner of Public Roads, *Eleventh Annual Report of the Commissioner of Public Roads* (Paterson, NJ: News Printing, 1905): 53.

¹⁶⁰New Jersey Commissioner of Public Roads, *Fourth Annual Report of the Commissioner of Public Roads*, 48.

improvements during the 1890s, with the expectation that the economic advantages brought by suburban development would exceed their original investment. This approach proved quite successful and, by 1898, Essex was considered “the richest and most favored county in the state.”¹⁶¹

In 1910, E. C. Hutchinson, New Jersey’s Commissioner of Public Roads, commented that, “state aid has done more for our state than any law ever placed upon the statute books. It has increased the value of our farms and has added to the pleasure and comfort not only of our farmers, but to that of the city men who have bought farms and built large country mansions along the line of our improved roads, thus increasing our ratables by millions of dollars.”¹⁶² By the time that the United States entered World War I, its streets and roads were well into an era where existing routes were being rebuilt, often under the direction of a trained professional, using carefully selected materials applied using modern construction methods, all paid for using funds largely provided by the counties and the state.

The creation of the original 15 state routes in 1917 represents the beginning of centralized statewide transportation planning.¹⁶³ The fifteen routes were selected because they were vital to the state’s various interests, whether commercial, recreational, or the larger national interest in defense. It also demarcates the Good Roads Era from the age when the requirements of the motor vehicle would dictate the future course of roads in New Jersey. By now there was no question that roads would be a major component of the state’s transportation system and future roadwork would be focused accordingly. Road improvements were no longer an ancillary function of the State Board of Agriculture, meant to make life better for the farmer. Thanks to the bicycle and subsequently the car and the truck, roads had become an integral part of the everyday lives of most New Jerseyans.

The movement found a receptive audience and succeeded in stirring up a great deal of enthusiasm for roads at all levels. In many progressive townships, road leagues and associations

organized to improve not only the actual roadway, but to create footpaths, cycle-paths, and beautify the roadsides through tree-planting programs.¹⁶⁴

Summary of Elements Influencing Roadway Development

- Waterways and railroads remained the chief mode of long distance transportation for both people and goods.
- Until 1891, responsibility for roadway construction and maintenance rested solely with local authorities.
- Travel for leisure purposes emerged.
- Roadway engineering emerged as a profession. Standards for roadway construction were developed, published, and publicized.
- Social reformers, farmers, and bicyclists joined together to advocate for better roads despite differing motivations.
- Responsibility for roadway construction was increasingly centralized.

Please note that the study of the Good Roads Era of road building does not include the improvement of roads undertaken by local government entities. Also, some improved urban roads dating from this era may be significant at the local level and retain integrity.

3. Good Roads Era Significant Routes

a) Criteria for Significance

The Criteria for Significance is based on, and adapted, from National Register Criteria (see Chapter II). These criteria are intended to identify roadways significant from a statewide historical perspective and truly important to the overall development of the state. Criteria for significant roadways dating from the Good Roads Era are outlined below.

In applying Criterion A, a roadway having one or more of the following attributes may have contributed to the broad patterns of

¹⁶¹Ibid.

¹⁶²Hutchinson, “The Good Roads Movement in New Jersey,” 109.

¹⁶³For descriptions of each route, with historic and current route numbers, see the significant roads of the Highway Era, beginning on page 106.

¹⁶⁴New Jersey Commissioner of Public Roads, Third Annual Report of the Commissioner of Public Roads, 32.

New Jersey's history and therefore might be considered a roadway of statewide significance:

- Contributed to the growth and development of the state
- Demonstrated regional or interregional importance; local importance does not connote significance
- Linked major population, recreation, military or political centers or destinations either within or just outside the state's boundaries
- Linked to the Good Roads Movement and exemplifying Progressive reforms and the heightened interest in road improvements

In applying Criterion B, a roadway having one or more of the following attributes associated with the lives of person(s) determined significant in the past might be considered a roadway of statewide significance:

- Associated with Good Roads Movement including Progressive reformers or statewide leaders of the Good Roads Movement
- Provided a clear, rather than casual, link between the roadway and the person(s)

Note: Roads associated with significant early-trained professional roadway engineers should be evaluated under Criterion C as the work of a master rather than Criterion B.

In applying Criterion C, a roadway that embodies a distinctive characteristic of a type, period, or method of construction, or that represents the work of a master might be considered a roadway of statewide significance if

- The roadway and its distinctive design features are evaluated within the context of the Good Roads Era
- The work of the master designer is evaluated within the context of other work by that designer during this era

In applying Criterion D, a roadway that has yielded or may be likely to yield archaeological information important in history might be considered a roadway of statewide significance if such a roadway represents an important type of building technology that cannot be documented using existing source material.

b) Significant Routes

Application of the above significance criteria yielded five historically significant roadways for the Good Roads Era:¹⁶⁵

- First roads associated with state aid spending.
 - Old Bridge to Matawan Road (4 mile section)
 - Plainfield to Metuchen Road (1.7 mile section)
 - New Brunswick to Metuchen Road (complete route, 4.85 miles)
- Nichol Avenue
- Road from Camden to Atlantic City (White Horse Pike)
- Ocean Highway
- Delaware River Drive

The Old Bridge to Matawan Road, Plainfield to Metuchen Road, and New Brunswick to Metuchen Road (current NJ Route 27) were the first roads in New Jersey, and the nation, to be improved using funds from a state aid road program. The New Jersey State Aid Act was a tremendous success and stimulated extensive road improvements throughout New Jersey. Between 1891 and 1900, New Jersey counties improved 1,500 miles of road. The improvement of roads under this act greatly affected the mobility of farmers, residents, and businesses. This, in turn, directly affected economic, commercial, and social values within the state. Most early use of this program concentrated on small, scattered road segments. As the program continued, however, the state encouraged linking various segments in order to form longer improved routes. The New Jersey State Aid Act set a nationally significant precedent as the basis for state aid acts in other states and for the establishment of the Federal Office of Road Inquiry in 1893.

¹⁶⁵While the Lincoln Highway was conceived during the Good Roads Era, its implementation fits more squarely within the Highway Era. See the Highway Era chapter for more information on the significance of the Lincoln Highway.



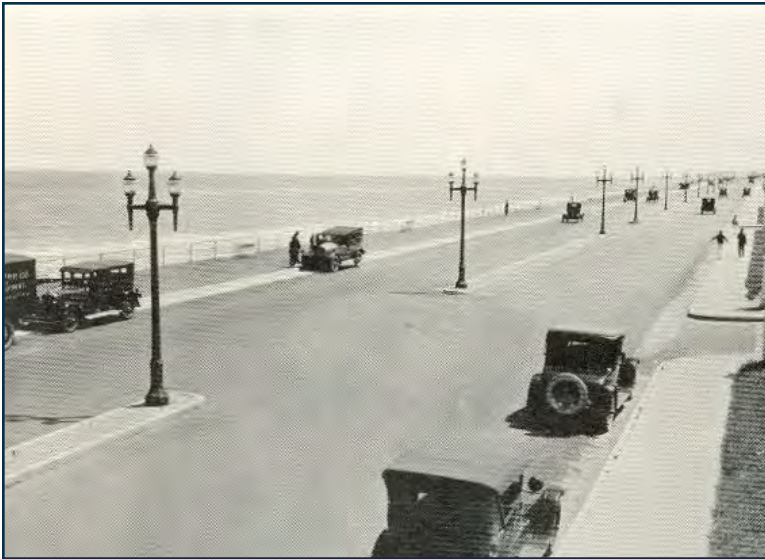
Map of the Good Roads Era's Significant Roads.

Middlesex County applied for State Aid funds for improvement to three roads in the fall of 1891. The *Old Bridge to Matawan Road* extended from Old Bridge eastward for four miles, along what is now route 516, toward Matawan in Madison Township (now Old Bridge Township). The *Plainfield to Metuchen Road* extended from the Union County line near Plainfield approximately 1.7 miles south to Holly's Corner along a portion of what is now route 531. The *New Brunswick to Metuchen Road* began at the terminus of the Albany Street Bridge and extended approximately 4.85 miles along the former Middlesex and Essex Turnpike to its intersection with Essex Street, onwards to Lake Street, continuing to the Lehigh Valley railroad bridge; this is now NJ Route 27. All three of these roads are significant under Criterion A for their associations with, and as examples of, the physical products of New Jersey State Aid road program. These roads are also significant under Criterion C as distinctive examples of road building techniques that embody a specific period of design. Most roads improved under the State Aid Act are not of statewide significance. These roads were improved at the initiation of the local municipality to meet local needs. The State Aid Act, however, is of statewide significance. These three Middlesex County roads, therefore, are significant at a statewide level as a physical representation of the State Aid Act because of their improvements. In order to convey their significance, therefore, these roads must retain a sufficient number of roadway elements that illustrate these improvements. The period of significance for these roads is limited to the date of their initial improvements.

Nichol Avenue was the first "Object-Lesson" road constructed in the United States by the federal government's ORI. The federal government established this office to disseminate information about road improvement through the nation's agricultural colleges. Municipalities supplied materials and labor; the ORI provided professional road-building expertise. The end result was a model road that was to guide future road improvement projects. Nichol Avenue was constructed in 1897 at the New Jersey Agricultural College and Experiment Station (currently the School of Environmental and Biological Sciences) in New Brunswick. Nichol

Avenue extended approximately 660 feet from George Street to the entrance to the agricultural college. Nichol Avenue is significant under Criterion A for its associations with, and as an early example of, "Object-Lesson" roads promoted by the federal government's ORI. Object-Lesson roads are significant in the context of the Good Roads Movement. This road, therefore, is significant as a physical representation of Object-Lesson roads. The significance of this road stems from its physical improvement. To convey its significance, therefore, this road must retain a sufficient number of roadway elements that illustrate its improvements. The period of significance for Nichol Avenue is limited to the date of its improvement as an Object-Lesson road.

The *Road from Camden to Atlantic City (White Horse Pike)* is significant for linking major population and recreation centers within and outside New Jersey's borders. It formed the only through route in southern New Jersey during this era and linked Philadelphia and Camden to Atlantic City (Absecon). This approximately 60-mile route went from Camden to Atlantic City via Berlin, Atco, Hammonton, De Costa, Egg Harbor City, and Absecon. Typically, State Aid funds were used to improve small stretches of road to meet local needs. In the case of the White Horse Pike, however, a concerted effort was made to improve multiple sections of roadway to form a continuous line of improved road. The route opened the area to recreational pursuits and provided a viable mode, outside of water and rail transportation, to deliver farm produce to major markets. Additionally, this route is significant for its associations with Progressive reforms that heightened interests in road improvements during the late nineteenth century. Specifically, this route improved farmers' abilities to get produce to markets and is linked to bicyclists' activities. The latter activity successfully contributed to the significant improvement of road conditions nationally. The road from Camden to Atlantic City is significant under Criterion A for its associations with the New Jersey State Aid Act – using State Aid funds, this route formed the longest line of improved roads in the state during this era; for its associations with Progressive reforms in improving roadways for farmers' to transport produce; and for its associations with



Ocean Drive, along the shore at Long Branch, Monmouth County, date unknown.

bicyclists and their advocacy during the Good Roads Movement. The period of significance for the White Horse Pike and its relationship to the Good Roads Era is 1896 to 1917. This period reflects the date when State Aid funds were applied to this road and the date that the road came under the jurisdiction of the state highway system. The route is now designated U.S. 30.

The *Ocean Highway* is significant under Criterion A as New Jersey's first designated (1909) state highway. Its designation and subsequent state funded improvements demonstrate the statewide significance of the road. In 1910 the legislature appropriated \$50,000 through the vehicle license fund and authorized the Commissioner of Public Roads to improve the route wherever necessary over the next four years. Bridges, however, were not included in the appropriation. The Ocean Highway extended from Cape May to the Atlantic Highlands via Ocean View, Beesleys Point, Somers Point, Pleasantville, Port Republic, New Gretna, Tuckerton, Manahawkin, Waretown, Toms River, Mantoloking, Point Pleasant, Asbury Park, and Seabright. The roadway's significance stems from its departure from municipalities or private turnpike companies initiating construction and maintenance of roads. Designation of this route shifted responsibilities from local to state government. As such, it was a significant precursor to the

establishment of the state highway system. Additionally, this route is significant for its associations with automobile related recreational activities. The automobile allowed for opening up previously undeveloped areas of the Jersey shore, thereby initiating a new era of resort development. The Ocean Highway is significant under Criterion A as the first route designated by the New Jersey state legislature as a state highway and for its associations with automobile related recreation activities. The Ocean Highway's period of significance extends from 1909, the date of its designation, to 1917, the date it was incorporated into the new state highway system. Several current roadways make up this historic route, including U.S. Route 9 and NJ Routes 167, 71, 88, 109, 35, 36, and County Route 585.

The *Delaware River Drive* is significant as an early route planned to promote and take advantage of New Jersey's scenic beauty. It responded to the growing use of the automobile for recreational and pleasure touring. The increasing affordability of automobiles during the second decade of the twentieth century resulted in the increased mobility of individuals and families. Destinations were only limited by the condition of roadways, not by the location of a rail or trolley line. This road was planned to extend between Trenton and the New York State line (via Lambertville, Frenchtown, and Milford), the Delaware River Drive following, so far as practicable, the course of the Delaware River. In so doing, it was hoped that the Delaware River Drive would open "up to the people of Our state the scenic wonders of the Delaware, unsurpassed by anything in [the] eastern states."¹⁶⁶ The Delaware River Drive is significant under Criterion A for its associations with automobile-related recreational activities, its use to promote state tourism, and for its early designation by the state legislature as a state highway (1911). The period of significance for the Delaware River Drive is 1911 to 1917, the date of its establishment and the date it was excluded from the new state highway system. The current roadways that make up this route include NJ Route 29 and County Route 519.

¹⁶⁶New Jersey State Legislature, *Laws of New Jersey*, Chapter 229, Laws, Session of 1912 (Trenton, NJ: MacCrellish & Quigley, 1912): 373.

4. Good Roads Era Associated Resources

Roadway Elements	bridges culverts dams retaining walls milestones toll gates roadway signage (route designation and directional signage) fencing street lighting traffic control devices grade separations guard rails road surface (hard surfaced: macadam) raised road bed adjacent drainage improvements shoulders curbing driveways/driveway cuts sidewalks pedestrian safety islands shade trees
Roadside Elements	hotels, motels residences farmhouses mills farm buildings cluster communities neighborhoods (urban or resort locations) blacksmith shops wheelwright shops produce stands commercial buildings filling stations service garages restaurants drug stores hardware stores general stores farm fields mill ponds landscaping fencing walls advertising signs (billboards, etc.)

5. Good Roads Era Integrity Thresholds

a) Location

Integrity of location means that a roadway remains in its original location for its period of significance. This aspect of integrity relates directly to the roadway's alignment. Typically, properties that have been moved (realigned) are not considered eligible for listing in the National Register. However, vertical and horizontal realignments are a type of alteration associated with the significance of this era. Therefore, segments of roadway realigned during the roadway's period of significance may retain integrity of location. Integrity of location is an important (High) quality for assessing integrity of roadways from this era. (See Figure 1 for a summary of all integrity thresholds.)

b) Design

Design integrity refers to the retention of those characteristics that were purposely included in the planning and construction of the roadway. The property must retain essential features that identify the resource as a roadway. Basic features associated with roadways are alignment (vertical and horizontal, as well as cross section, plan, and profile) and pertinent associated roadway features. A significant road from the Good Roads Era must retain a Medium level of design integrity. Design features common to roadways of this era include:

- Right-of-way width: an average roadway width of between 20 and 40 feet;
- Curb to curb width: an average "paved" surface of 8 to 16 feet;
- Grade: generally grades of less than 3% for level roads, grades of less than 5% for hilly roads, and grades of less than 7% for mountainous roads; elevated road beds with steep drainage ditches. Graded road width is a significant design feature for assessing integrity for this era.
- Curvature

The Commissioners' of Public Roads annual reports should be consulted to determine original design characteristics when evaluating a roadway's integrity of design.

c) Materials

Integrity of materials refers to the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form the roadway. Road surfacing materials common to the period include macadam, cement, concrete, sheet asphalt, and bituminous concrete. Less common roadway surfacing materials include Belgian block, wood block, vitrified brick, seashells, and gravel. Other elements common to the Good Roads Era include guide rails with concrete or wood posts; wound steel cables; iron, steel, or reinforced concrete bridges; concrete, brick, or cast iron pipe culverts; stone or concrete retaining walls/abutments; concrete pedestrian islands; concrete or brick sidewalks; stone or concrete curbs; steel/wood light posts; metal signs; and dirt, gravel, brick, granite, or concrete drainage ditches. Highway surfacing is an inherently fragile feature and is routinely replaced. Therefore, while original surfacing is a desired feature, it should not be required (Medium) for eligibility purposes. However, the retention of original materials of associated roadway and roadside elements is also important for assessing a roadway's integrity.



Delaware River Drive (Route 29), Stockton, Hunterdon County, 2000.

d) Workmanship

Integrity of workmanship refers to the physical evidence of the labor, skill, and craft expressed within the roadway or its component parts. Common examples of workmanship associated with roadways during this era include granite and brick pavements, concrete and masonry bridge abutments and balustrades, and iron/steel elements such as truss bridges or fencing. Integrity of workmanship is generally not critical (Low) for a roadway to retain integrity, but its presence strengthens the roadway's overall merit.

e) Setting

Integrity of setting refers to the physical environment of the property. The setting(s) of the roadway or a segment of the roadway should reflect the same general character, with minimal intrusions, present during the roadway's period of significance. Specific lengths of roadway or segments of roadway may vary. A road segment, however, should be of sufficient length to convey the significant character of the roadway. A roadway may contain different settings over its length. Common settings associated with roadways from this era include rural, urban, resort, cluster communities, and, to a lesser extent, suburban settings. The historic relationship between the roadway and its associated roadside elements is important. The number, type, and density of roadside elements should be appropriate to the historic setting type (rural, urban, etc.) and period of significance of the roadway. Setting is an important, but not an essential quality (Medium) when assessing the integrity of roadways from this era.

f) Feeling

Integrity of feeling refers to the property's expression of aesthetic or historic sense of a particular period of time. Integrity of feeling results from the presence of physical features that convey the property's historic character. Integrity of feeling is closely related to integrity of setting. A majority of roadside elements dating from the roadway's period of significance should be present and retain integrity. Additionally, the historic relationship between the roadway and its associated elements should be conveyed.

Integrity of Feeling is not essential (Low) within the road's overall integrity.

g) Association

Integrity of association is the direct link between an important

historic event or person and the historic property. A roadway should contain the physical features and associated elements that convey the property's historic character. These features should date from the roadway's period of significance. A significant roadway must retain integrity of Association for this era (High).

6. Good Roads Era Timeline

NATIONALLY	1870	NEW JERSEY
First brick road laid in U.S., Charleston, West Virginia, part of that city's successful bid to become the state capitol		First installation of asphalt pavement in U.S., in front of City Hall, Newark, New Jersey by a Belgian chemist named Edmund DeSmedt
George B. Selden received patent for gas-driven automobile	1879	
League of American Wheelmen founded; by 1883 it had 35,000 members	1880	
	1889	New Jersey authorized counties to issue bonds for the construction of broken-stone roads
	1891	New Jersey passes State Aid Highway Act (the first act of its kind in the nation); did not really take effect until amended in following year due to defect
First concrete road installed, Bellefontaine, Ohio Chicago – 1,000 plus attend meeting of National League for Good Roads – lobbying for national road legislation	1892	First County Park system in America founded, Essex County, NJ
World's Columbian Exposition opened in Chicago; based on census data and ticket sales, it was estimated that between 5 and 10% of America's population saw the "White City" first hand. Duryea Brothers introduced first automobile with gasoline powered internal combustion engine. Federal government established Office of Road Injury (ORI). Only six states had laws pertaining to tire width	1893	New Jersey passed shade tree statute, authorized municipalities to appoint a three-person committee in charge of planting and maintaining shade trees on public highways
Harvard University professor, Nathaniel Shaler, started nation's first road engineering curriculum; American Society for Municipal Improvements founded, helped focus better roads debate on paving materials	1894	New Jersey appointed first Commissioner of Public Roads
Experimental Rural Free Delivery established Corrugated metal pipe culvert invented	1896	

NATIONALLY

NEW JERSEY

Federal government established materials testing lab

1897

First Object Lesson Road built on Nichol Avenue at New Jersey Agricultural College and Experiment Station (now the School of Environmental and Biological Sciences) in New Brunswick, NJ. The federal government, through the Object-Lesson Road Program, set construction standards, built sample roads according to their standards, and publicized the results. Many examples were built at state agricultural schools, evincing the strong link between road improvement and farmers

Chicago began requiring drivers licenses

1898

Rural Free Mail Delivery established

1899

Horses, still vital for transportation and freight haul, result in burden on sanitation and health departments. In New York City, 2.5 million pounds of manure and 60,000 gallons of urine are released onto city streets daily
8,000 cars are registered in the United States

1900

America's first large car show held in New York City
Connecticut enacted first automobile speed law

1901

A Vermont doctor and his chauffeur completed the first cross country car trip
Massachusetts issued first official state made license plate

1903

New Jersey spent more money on road improvements than either Connecticut or New York. Although Massachusetts had spent more, their program did not include local participation, so they actually improved fewer miles of road (Massachusetts/New Jersey - \$5,150,923/\$4,545,494; 480 miles/959 miles)

Nation's first national road census of mileage, type of construction, state of repair, methods of administration, and levels of expenditure undertaken
Motor trucks introduced

1904

New Jersey administered \$2,000,000 on roads, while remaining 12 states with similar programs spent a combined total of \$607,000

Sylvanus F. Bowser invented the gas pump

1905

1906

Hunterdon County started expending public funds on roads
New Jersey required annual auto registration, also enacts law providing that receipts from licenses, fees, and fines for autos could be used as aid to counties and municipalities for repair and maintenance of roads

NATIONALLY

NEW JERSEY

Nation's first pedestrian safety island, San Francisco, CA. It was used to load and unload trolley passengers at a busy intersection
Wilson v. Shaw decision in the U.S. Supreme Court affirms constitutionality of Congressional construction of interstate roads under the interstate commerce clause, affirming the federal government's ability to fund road projects

1907

Ford released first Model T, brought automobile ownership within reach of middle class

1908

First route of the Hudson & Manhattan tubes opened (now PATH)

Nation's first driver's licenses introduced in New York

1909

New Jersey established State Highway Commission

The break up of Standard Oil resulted in the beginnings of corporate rivalry between gas companies. Gas stations began marketing strategies that involve strong attempts at brand identification
 Nation's first painted center white lines, Wayne County, MI

1910

1911

New Jersey state legislature made special appropriation to fund research on road materials

Introduction of car payments
 Federal Office of Public Roads introduced first standard specifications for road materials and construction
 Charles Kettering invented the first electric car starter

1912

New Jersey allowed state to share 40% of cost of road improvements, this is up from original 33.33%
 New Jersey passed Convict Labor Law, providing for prisoners to be employed in repair and construction of public roads
 First year that state aid highway funds could be applied to bridge construction
 New Jersey laid its first concrete road in New Village using concrete manufactured by Thomas Edison's concrete company
 New Jersey legislature passed act to "establish a state System of Highways"

Lincoln Highway named; started craze for memorial highways, and gave birth to idea of highway network

1913

Survey revealed that New Jersey has a higher percentage of vehicles per road mile than surrounding states, including New York, Massachusetts, Maryland, and Connecticut
 New Jersey began requiring licenses for all drivers, rather than just chauffeurs

American Association of State Highway Officials, forerunner of American Association of State Highway Transportation Officials (AASHTO), established

1914

NATIONALLY

American Association of State Highway Officials, forerunner of American Association of State Highway Transportation Officials (AASHTO), established

1914

**Nation's first modern stop sign, Detroit, Michigan
New York City installed first traffic control devices**

1915

Federal Aid Highway Act signed by Woodrow Wilson on June 11, based in part on New Jersey's 1891 act, creates 50/50 federal/state match

1916

1917

NEW JERSEY

Ratio of cars to number of New Jersey residents was 1:32

New Jersey passed the Egan Act, provided for issuance of bonds, not to exceed \$7,000,000, to be used for the construction of a state highway system of 13 routes. The Egan Act also provided for the creation of a Highway Commission

**New Jersey passed the Edge Acts. Designated state highway system comprised of 15 routes
New Jersey established state engineer position (New Jersey Turnpike Company)**

7. Research Questions

- Where roadway and related drainage improvements were made in urban areas to increase sanitation and decrease contagions, what archaeological evidence of these efforts might remain in place?
- Who were the recreational bicycle enthusiasts? What economic base were they from that provided free time for recreation?
- What was the impetus of the Lincoln Highway and who was involved with determining the route(s) in New Jersey? Did this designation create any roadway and roadside improvements?
- Who were the "motor tourists?" Did they emanate from the same geographical locations? What economic base were they from that provided free time for recreation and how did they differ from the bicycle enthusiasts? Were they the same people with two interests?
- Was there a lobby for the truckers or businesses involved in freight movement? If not, why not?
- How much involvement did the farming organizations, such as the granges and other agricultural organizations, have in promoting and spurring "Good Roads?"
- What was the 1917 Edge Act? Did military involvement in World War I prompt its passage?
- What was the curriculum for a "professional roadway engineer?" How did it differ from a civil engineer's education? What were some of the engineering feats emanating from this career?
- What was the Progressive Movement and its reforms? Who accepted this movement?
- Wagon wheel width and axle length could be beneficial or detrimental to road surfaces. How were the desired widths and lengths promoted?
- The installation of brick and granite block streets in urban areas do not appear in State Highway Department annual reports. Was this type of project undertaken by county governments or municipalities instead?
- How do the sanitation benefits of new roadway surfaces tie into the goals of the Progressives?

D. HIGHWAY ERA (CA. 1891 - CA. 1947)

1. Introduction

In the twentieth century, improvements in roads, combined with the affordability of the automobile, provided Americans with new transportation options. No longer restricted by fixed timetables, people could follow any passable route as far as it would take them. Pleasure trips became much more common, and the demands for improved roads and roads leading to new destinations, such as to New Jersey's coastal and mountain regions, became a topic of political and legislative consideration.

The development of a statewide highway system in New Jersey began with the implementation of the "State Aid Act of 1891" and continued into the twentieth century with the establishment

of the State Highway Commission and, eventually, with the creation of the New Jersey Department of Transportation. Under that legislation, the role of the state was to administer federal funding for improving roadways under the jurisdiction of municipal and county governments. When these local and county roadways were linked as inter-county and statewide roadways, they formed continuous inter-county and statewide origin/destination routes. These routes became the first designated highways pursuant to the creation of the State Highway System in 1917. As the volume of traffic increased, and the types of automobile came to include ever heavier and more numerous trucks, the state assumed more and more responsibility for



New Jersey Road Sign Development. Lincoln Highway sign, Jersey City, 1918 (left) (Courtesy of the University of Michigan, Transportation History Collection, Special Collections Library, Lincoln Highway Digital Image Collection), and signs along Admiral Wilson Boulevard, Camden, mid-20th century (right). Note in the photo on the right, the sign for the New Jersey Turnpike at left. The logo remains the same today.

road construction. This initial system was first expanded in 1921. Congestion around the Port of New York during World War I, as goods and troops moved into and through the New York metropolitan area, increased the sense of urgency for roadway construction and improvements, leading to major road, bridge, and tunnel construction in the region. In 1926, a more extensive network of state designated highways was proposed. The inter-county and statewide origin/destination routes facilitated economy, ease, and efficiency of regional and statewide travel, as well as local travel. This was an important transitional period, which reflects the social and political changes that occurred during that time.

Overall, during the Highway Era, New Jersey was in the forefront of some of the roadway legislation being developed at the time. The state was taking on more and more responsibility for a statewide roadway system. This era saw major innovations in technology for road building. New Jersey continued to be in the forefront in the development of this technology, often adapting or applying an innovation in what was already being used elsewhere in the world. In addition to these considerations, the country participated in two world wars and suffered through a depression during this period. These factors created major economic shifts as well as a realization that there was a need for military roads in the state. More importantly, the advent of the automobile and its availability to most Americans gave people a new sense of freedom, a sense of adventure, and a means of escape not previously known to the general public. This translated into a greater use of roadways, suburbanization, shifts in economic and travel patterns, and a new demand – that of leisure travel.

2. Highway Era Historic Context

a) Background

The New Jersey State Aid Act of 1891 provided state assistance to county and local governmental entities for the construction of improved roadway bearing surfaces. With the passage of this act,

New Jersey was the first state in which the state government – the taxpayers – participated financially in the improvement of roads. Nevertheless, all roads were still under local or county jurisdiction (the state roadway system did not come into existence until 1917). The State Aid Act of 1891, however, was inoperable until amended in 1892, at which time the inauguration and implementation of the law was imposed on the President of the State Board of Agriculture. Because of the burden this placed on this agency, the state legislature was asked to separate the roadwork from the Board of Agriculture. The New Jersey Public Roads Act of May 17, 1894, therefore, created The Office of State Commissioner of Public Roads.¹⁶⁷

Roadways from Atlantic City through to Camden, Mount Holly, Columbus, Bordentown, Trenton, Princeton, New Brunswick, Elizabeth, and Newark to Jersey City are examples of how many small local and county roadways became linked as inter-county and statewide roadways, forming continuous inter-county and statewide origin/destination routes. Other roads already built served as feeders to these routes with branches to outlying towns and cities.

The role of the federal government into the first decade of the twentieth century was limited, consisting of little more than setting standards for road construction and sending engineers into the field to oversee the construction of short “Object Lesson Roads,” the intent of which was to demonstrate exactly how a good road was constructed. This program was carried out in conjunction with state agricultural schools. The first Object Lesson Road was built in New Jersey at the present School of Environmental and Biological Sciences in 1897.¹⁶⁸

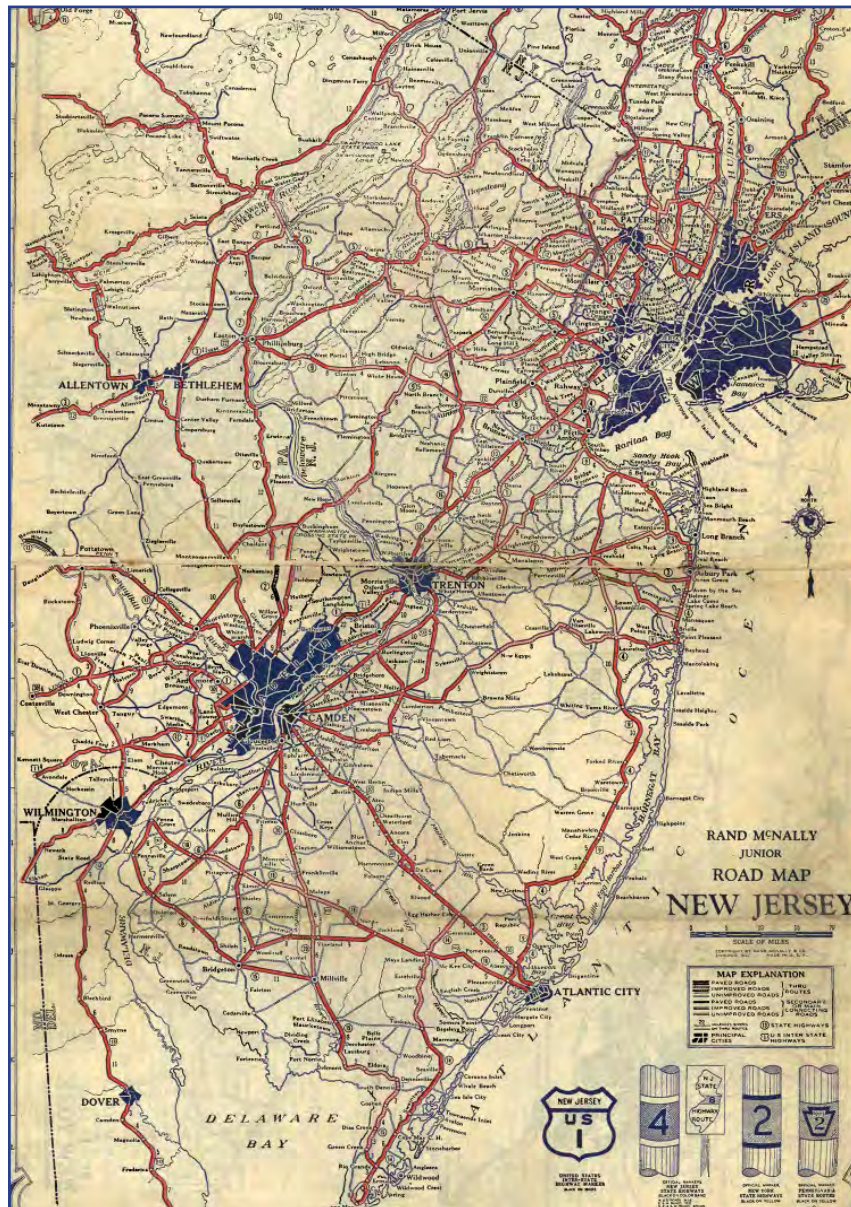
The new improved roads gave new life to the country through which they passed and were often traveled by bicycles and other vehicles. The new smooth bearing surfaces carried the weight of freight and passengers easily and pleasurably to and from the leading trade cities.

¹⁶⁷New Jersey Commissioner of Public Roads, *First Annual Report of the Commissioner of Public Roads*, 11

¹⁶⁸Holt, *The Bureau of Public Roads*, 8.

The advantages of the new roads included

- A decrease in local taxation for road construction and maintenance because state funding was now available for roadway construction;
- A decrease in living expenses because of the reduced cost of shipping merchandise and produce;
- An increase of property values because of ease of travel between extreme destinations and accessibility to an improved roadway system;
- An increase of farmer's income because of the ability to transport farm produce over longer distances at reduced cost and over a shorter period of time; and
- An increase in railroad business because of greater accessibility of depots.



Map for the motoring public, showing state designated highways and other major routes, circa 1926.

The new roads, therefore, served as a catalyst to promote economic development and improved living standards for everyone, not just those living within proximity to the better transportation routes.

Trends (and two specific events) early in the twentieth century shaped the future of the state's roads more directly. The trends included the increasing affordability of the automobile, illustrated by skyrocketing auto registrations, and the resulting mobility of individuals. Destinations were no longer limited to places where the trolley or the railroad ran; for the first time, anyone with a car could go virtually anywhere served by a decent road. Pleasure trips (as opposed to business travel) became much more common, and demand increased for roads to destinations such as the shore and the mountains. The events included World War I (and its resulting requirements to move people and goods to and from East Coast ports) and passage of the New Jersey Highway Act of 1917. To a certain extent, the first event led to the second, since wartime transportation requirements rendered some routes more important than others. Pursuant to the Federal Aid Act of 1916, which appropriated funds to states to improve post roads, the New Jersey Highway Act of 1917 created the New

Jersey Highway Department and designated routes under the care and maintenance of that department. The Federal Aid Act required states to establish a highway department and provide 50 percent of construction costs to receive federal funds.¹⁶⁹ The creation of the original 15 state routes in 1917 represented the beginning of centralized statewide transportation planning. The 15 routes were each (presumably) selected because they were vital to the state's various interests, whether agricultural, commercial, industrial, recreational, or the larger national interest in defense. Routes connecting a port with an industrial center or military base, for instance, assumed more importance than a commuter route joining a suburb to a city.¹⁷⁰

Prior to the creation of the state system of roads in 1917, improvements to roads had been primarily limited to the paving of existing roads. The 1917 system included standards for state highways for characteristics such as cross sections and vertical and horizontal alignment. Projects involving roadways on the state system, therefore, included more engineering and more land alteration. Unlike earlier eras, when roads were essentially overlaid onto the existing landforms, roads were now more highly engineered, routinely including cut and fill construction. They were also now designed for economy of construction and operation.

New Jersey's highway system took a major step forward in 1926 with the completion of a study by the State Highway Engineer that evaluated current and projected traffic demands on the roadway network as a decision making tool for proposing the designation of 45 routes. This study, and the projects that implemented it, recognized the importance of separating local traffic from through traffic, the predecessor of the concept of limited access (the Pulaski Skyway being perhaps the best-known manifestation of that concept). It also proposed that the state system would be used primarily to connect major population centers; ideally, a separate state highway would serve each destination. These highways could be either newly constructed in their entirety, or a combination of upgraded sections of existing roads connected by new construction. Connecting roads to form a transportation

system meant that roadways provided access to other legs of the system. An example is the current Route 73, connecting Philadelphia to Route 30 at Berlin. In other words, its function is to feed traffic to and from Route 30, not to connect two major destinations. Because of funding cutbacks during the Depression, completion of the system as envisioned was not achieved until the 1940s.

Historical forces at work during this era, as represented by significant roadways, can largely be related to the growth in disposable income and leisure time, and the growth of the role of the state and federal governments (brought into sharp focus by two major foreign wars and the Depression and subsequent recovery). This period is characterized by

- Roadway improvements for leisure and travel;
- Development of a public advocacy for better roads; and
- A statewide road system network.

During the State Highway System era, what may be called "roadside aesthetics" were also of growing concern. Commercial clutter and unlimited access combined to cause safety concerns, and the noise and smells of highways depressed the value of adjacent residential properties. One solution to this, besides limiting access through the design of the road (either by depressing or elevating it), was to increase the width of the right-of-way and use landscaping to enhance both the view from the road and the view of it (for example, the redesign of Route 70 as a scenic highway). The logical extension of this is the modern parkway. The Garden State Parkway, perhaps the state's best example of the modern parkway, and the Palisades Interstate Parkway were subsequently completed during the 1950s. The New Jersey Turnpike was also completed at this time, however it did not receive the same landscape design attention as the parkways.

In short, the roadway engineering paradigms in the early years of what has become the modern highway system include 1) economy of operation; 2) separation of classes of traffic; 3) limiting access;

¹⁶⁹Kise Franks & Straw, "Overview History of New Jersey Highway Development" (July 1997): 45.

¹⁷⁰John W. Herbert, "The Establishment of the New Jersey State Highway System," *New Jersey*, Vol. 5:77-82.

4) elimination of crossing traffic; and 5) enhanced aesthetics.

b) Nature of Highway Era Traffic

Statistics indicate that New Jersey residents eagerly adopted the automobile as a mode of transportation. A 1913 survey revealed that New Jersey had a higher number of vehicles per mile of road than most other states in the region, including New York, Massachusetts, Maryland, and Connecticut.¹⁷¹ The state completed 650 miles of improved roads the same year, which represented a 40% increase over the previous year.¹⁷² Nevertheless, the state's traffic density continued to place increasing demands on existing roads. Nationwide, the transportation industry reached a major turning point in 1914 when automobile production finally surpassed the manufacture of carriages and wagons.¹⁷³ Car ownership was on the upswing, and by 1916, there was one car for every 32 New Jersey residents and six cars for every mile of improved road.¹⁷⁴

Introduction of the automobile led to an entirely new form of recreation – motor touring. The car allowed Americans to see their country in a new way and gave them the flexibility to take the uncharted path and travel at their own pace.¹⁷⁵ Rand McNally introduced a popular product in 1926: the first road atlas of the United States.¹⁷⁶

There were considerable numbers of touring motorists at the time, estimated at one million people in 1923, and a new industry arose to meet their needs. Public auto-camping grounds sprang up to accommodate the basic needs of motor tourists in over 3,000 cities across the country.¹⁷⁷ As the novelty of roughing-it wore off, tourists sought the amenities of motels in the late 1920s and 1930s.

During this era, New Jersey's shore and mountain resorts garnered nationwide acclaim.¹⁷⁸ Travelers from Pennsylvania and New York, as well as others

from far-flung locations, came to take advantage of the state's recreational possibilities. The auto camping and motel industries likely played a major role in New Jersey motor tourism during this period. The novelty of motor touring that emerged in the 1910s continued throughout the 1930s. By the end of this era, however, the primary use for the automobile was functional, not simply recreational.

Commercial development followed the motorist, spreading out from urban centers along new highway networks. Merchandisers did not miss any opportunity for a sale, and soon open-air stalls selling everything from produce to crafts dotted the roadsides.¹⁷⁹ A billboard frenzy also arose at this time.

In addition to having to contend with increased automobile traffic, the state's increasing truck traffic affected road construction and planning. The year 1904 had witnessed the introduction of the motor truck, whose presence was made known by the crumbling pavements and billowing clouds of dust that trailed behind it.¹⁸⁰ The truck was a boon for farmers seeking to further reduce



Trucks and cars sharing the road on Route 29, between Bound Brook and Newark, circa 1937.

¹⁷¹New Jersey Commissioner of Public Roads, *Twentieth Annual Report of the Commissioner of Public Roads*, 93.

¹⁷²"Reports of Road Construction in New Jersey," *Good Roads* 6 (December 20, 1913): 405.

¹⁷³Rae, *The Road and Car in American Life*, 57.

¹⁷⁴Governor Fielder's Recommendations for the Work of Highway Improvement in New Jersey," *Good Roads* 11 (February 5, 1916): 68.

¹⁷⁵Warren James Belasco, *Americans on the Road: From Autocamp to Motel, 1910-1945* (Cambridge, MA: The MIT Press, 1979): 22-23.

¹⁷⁶Hugill, "Good Roads and the Automobile in the United States 1880-1929," 344.

¹⁷⁷Chatburn, *Highways and Highway Transportation*, 451.

¹⁷⁸L. E. Andrews, "Modern Road Improvement Practice Sets High Standards," *Engineering News-Record* 95, no. 2 (July 9, 1925): 48.

¹⁷⁹Tyler Poyntz, ed., *American Highways Today*, Vol. 29. *The Reference Shelf* (New York, NY: H. W. Wilson Company, 1957).

¹⁸⁰Miller, "History of the Modern Highway in the United States," 95.

shipping costs for their produce. Those who could not afford to own their own truck could procure the services of a delivery service at a cheaper rate than prevailing railroad freight fees. In addition, the bonus of direct delivery eliminated early morning trips to the rail depot; instead, transportation came directly to the farmer's home. Better off still were the farmers who could afford the down payment for their own truck. This purchase, while a major investment, allowed them increased shipping flexibility and a greater consistency in transportation costs.

Delivery trucks also became a common sight within cities, as merchandisers realized that trucks were more cost effective than trains for short-distance hauls. Governor Fielder, in his 1916 recommendations for New Jersey road improvements, acknowledged that, while railroad and water transportation had dominated the previous decade, the use of trucks for freight



Traffic in New Brunswick, Middlesex County, 1923. (Courtesy of the University of Michigan, Transportation History Collection, Special Collections Library, Lincoln Highway Digital Image Collection.)

shipment was a factor that now needed to be addressed.¹⁸¹ Short-distance trips between outlying rural districts and mid-size towns became the characteristic usage pattern of that time. Consequently, road improvements reflected those needs, resulting in a network of improved, short, radial routes emanating from each county's population center. Some of the major transportation hubs included Camden, Trenton, Newark, and Morristown.¹⁸² Only a limited number of long-distance routes were improved along their entire length, thus limiting the economic benefits of inter-regional shipments.

America's entrance into World War I further increased the motor truck's role in freight delivery. Legions of trucks crossed through New Jersey on their way to the Port of New York, where congestion had brought rail transportation to a virtual standstill.¹⁸³ General George Goethals, New Jersey's State Road Engineer, noted in 1917 that, "[t]he present and prospective war conditions affecting the handling of freight by the railroads will result in the greater use of motor trucks as well as tend to increase the loads hauled by them."¹⁸⁴ Trucks possessed greater flexibility of movement than trains. Military supply used trucks extensively to ferry provisions from railroad depots to the docks. Wartime requirements vaulted the humble delivery truck to a position of national prominence, and long-distance hauling took precedence over local deliveries.¹⁸⁵ This shift in patterns of road use later required a new approach to funding allocations for improvements suitable for intense truck traffic. During the war, however, restrictions on materials and labor severely limited new construction projects. Goethals decided to target improvements on the existing legislated trunk-line routes that were key to wartime activities rather than constructing new routes that only addressed the state's wartime roadway needs.¹⁸⁶ This forced drivers to use the state's existing road system, which had been developed for short-distance travel rather than regional transportation. By 1917, congressmen no longer saw New Jersey's highways solely as an economic asset; they became a defensive, military resource and the gateway to the Port of New York, the country's largest shipping outlet.¹⁸⁷

¹⁸¹Governor Fielder's Recommendations for the Work of Highway Improvement in New Jersey," *Good Roads* 11 (February 5, 1916): 68.

¹⁸²New Jersey Commissioner of Public Roads, *Fifth Annual Report of the Commissioner of Public Roads*, 40.

¹⁸³"Continued Activity in New Jersey Road Work Recommended by General Goethals," *Good Roads* 17 (December 29, 1917): 336.

¹⁸⁴*Ibid.*

¹⁸⁵William A. Bresnahan, "Freight Transportation on the Highway," in *Highways in Our National Life: A Symposium*, edited by Jean Labatut and Wheaton J. Lane (Princeton, NJ: Princeton University Press, 1950): 247.

¹⁸⁶"New Jersey's 1918 Road Program: State Highway Commission Adopts General Goethals' Plan for War-Time Road Improvement," *Good Roads* 15 (January 26, 1918): 42.

¹⁸⁷"Continued Activity in New Jersey Road Work Recommended by General Goethals," *Good Roads* 17: 336.

The widespread adoption of freight shipment by truck necessitated fundamental changes in the construction of roads. Trucks carried much heavier loads than carriages and wagons. Prior to the introduction of the automobile, a macadam road in good weather could support the heaviest load that a wagon was able to move.¹⁸⁸ During World War I, truck weight became a major problem. Narrow truck tires were very destructive because they could shear through the road's surface layer and cause structural destabilization.

As trucks began to compete directly with freight shipment by rail, improved roads became an increasingly important factor in reducing travel time and transportation costs. The ultimate goal for any transportation type is to move the greatest amount of goods with the least amount of effort. Pavement improvements offered one way of increasing a road's efficiency. Another factor entailed refining and upgrading existing alignments and grades. During the Good Roads Era, most improvements were limited to upgrading the road's surface. Highway departments rarely tackled regrading or improving the existing alignment. After the turn of the century, however, a change began to occur. According to the 1913 annual report submitted by the New Jersey Commissioner of Public Roads, "during the past year we have devoted more attention to the correction of alignment than ever before."¹⁸⁹

National patterns of highway use were in place by the close of World War I. The ways in which roads were used between 1917 and 1946 did not differ dramatically from the previous era. Vehicular traffic volume, however, showed a radical increase, which led to notable changes in highway design and planning during this period. Five years after the end of World War I, T. H. MacDonald, Director of the Bureau of Public Roads, identified a number of major use categories for roads. Agricultural roads comprised one of the groups, and functioned as a connection between farms and markets. These roads were generally local in nature, providing access to farmland, as well as a route for conducting daily business like marketing, socializing, and church and school attendance.¹⁹⁰ Recreational roads, including local pleasure driving routes or routes to major tourist destinations,



Rendering of the proposed Lincoln Highway at the emergence of the highway tunnel in Jersey City, date unknown. Note the proximity and concentration of rail and automobile traffic at this new link to New York City. (Courtesy of the University of Michigan, Transportation History Collection, Special Collections Library, Lincoln Highway Digital Image Collection.)

¹⁸⁸MacDonald and Fairbank, "The Development of Improved Highways," *Roads and Streets*, 66 and 71.

¹⁸⁹New Jersey Commissioner of Public Roads, *Nineteenth Annual Report of the Commissioner of Public Roads*, 67.

¹⁹⁰Chatburn, *Highways and Highway Transportation*, 223.

made up the second category. Commercial highways comprised another major type. These highways primarily served express traffic hauling agricultural goods and other types of freight, as well as inter-city bus traffic.

After the Delaware River Bridge (Benjamin Franklin Bridge) (1926) and Holland Tunnel (1927) opened, New Jersey faced a considerable increase in out-of-state traffic.¹⁹¹ The Holland Tunnel and Delaware River Bridge enabled many non-residents to travel easily into New Jersey, and this became a major highway planning consideration. The New Jersey State Highway System held a steady 30% annual increase in traffic throughout the 1920s, with even greater growth on major routes like the White Horse Pike and the Lincoln Highway.¹⁹² The state's 1935 traffic survey revealed that New Jersey had a higher proportion of out-of-state passenger traffic on its roads than any other eastern state.¹⁹³



This traffic post, on a permanent base at the intersection of two roads, was an early – although illegal – attempt to control traffic, as indicated in the original photo caption.

By the 1940s, Sigvald Johannesson stated that throughout the state of New Jersey there existed “an accumulation of undone, but immediately needed state highway work, the completion of which

cannot be delayed without seriously affecting the prosperity of the state.”¹⁹⁴ During the first two decades of the twentieth century, New Jersey’s highways extended from population centers. Most routes passed directly through these urban areas, generally on the town’s main street. Increasingly after 1920, Main Street could no longer handle both local and through traffic. Bypasses, connector highways that lay outside cities, but in proximity to them, presented engineers with one solution. The bypass concept could be applied on a variety of scales. Some of these highways were merely express, non-business routes around mid-size towns. Others were part of larger highway systems.

c) Highway Era Road Technology

The number and types of attendant highway features rose substantially during this era. Engineers addressed safety issues raised by increased traffic density and rising speeds through

the introduction of new roadway elements. Concurrently, the profit motives of property owners along the highways led to the construction of myriad roadside structures designed to cater to the motor tourist. Increasing numbers of cars on the road necessitated the invention of traffic control procedures and devices. Wayne County, Michigan saw the country’s first painted center white lines in 1911, and the first “modern” stop sign was introduced in Detroit, Michigan in 1915.¹⁹⁵ Earlier, stop-and-go signs and semaphores were used to

direct traffic during the first decade of the century. The semaphore was a simple, hand-operated stop-go mechanism that evolved into a four-way, three-color traffic light by the early

¹⁹¹Ibid., 12.

¹⁹²State of New Jersey Highway Commission, “Annual Report of Superintendent of Maintenance – Fiscal Year From January 1, 1927 to December 31, 1927” (Unpublished Report New Jersey State Library, 1917), n.p.

¹⁹³L. E. Peabody, “Some Characteristics of Traffic on New Jersey’s Highways: Extracts From a Report on the New Jersey Traffic Survey,” *Public Roads* 16, no. 2 (April 1935), 22.

¹⁹⁴Sigvald Johannesson, “New Jersey State Highway Department Division of Planning and Economics – Monographs on the Highways of New Jersey” (Unpublished Report New Jersey State Library, 1947), 11.

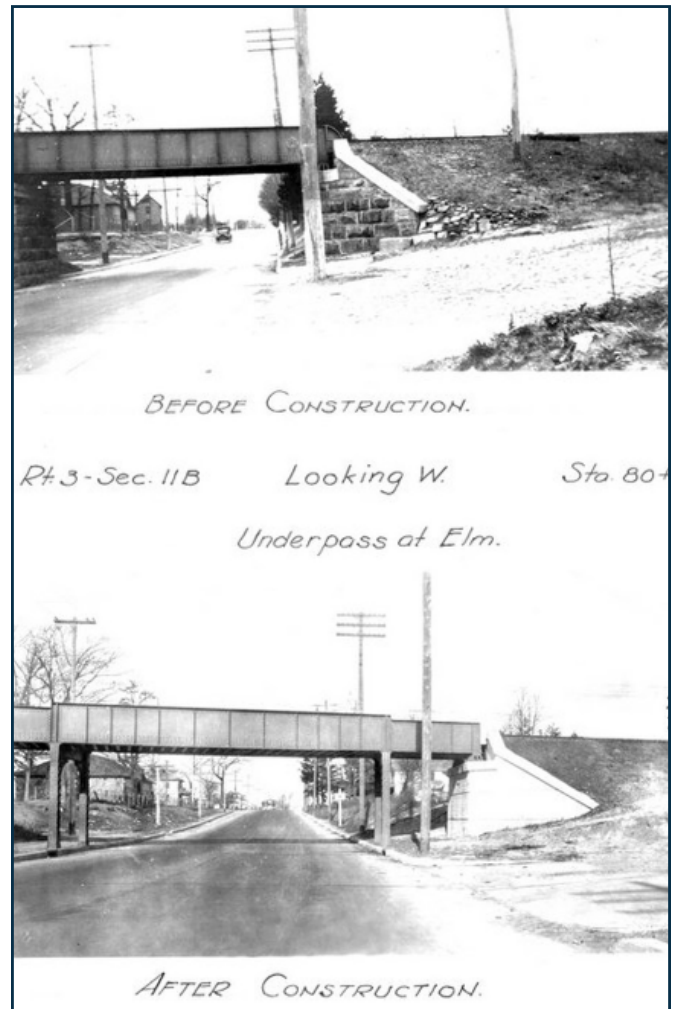
¹⁹⁵Hugill, “Good Roads and the Automobile in the United States 1880-1929,” 344.

1920s.¹⁹⁶ Pedestrian safety was a priority, and the first pedestrian safety island was installed in San Francisco in 1907.¹⁹⁷ These islands were used in trolley and bus loading areas and in the center of large intersections. New Jersey adopted licensing procedures earlier than most states. By 1913, all drivers, not simply chauffeurs, had to be licensed, which resulted in a reduced accident rate for the state.¹⁹⁸

By 1908, the generally accepted maximum grade for roadways was between eight and ten percent; however the goal was to reduce hills and valleys to the greatest extent possible.¹⁹⁹ The New Jersey Highway Commission encouraged townships to “cut down their hills and fill in their hollows,” because eventually major township routes were likely to become state highways themselves. The Commission believed that the larger initial investment necessitated by creating an appropriate alignment and grade at the outset would pay off when the time came for future improvements to the roadway.²⁰⁰ Increased, up-front investments in alignment and grading also heightened the importance of installing proper drainage systems and erosion control elements. Features like drains, culverts, cribbing, and retaining walls were crucial to the longevity of grade improvements. Road width did not increase substantially over the preceding era. The pavements of most broken-stone roads in 1908 ranged between nine and sixteen feet in width, significantly below standard widths adopted during the following decade.²⁰¹ The pavement depths at that time varied according to grade: 10 inches deep for a grade less than one percent, eight inches deep for a grade between one and four percent, and six inches deep for a grade over four percent.²⁰²

During this time period, New Jersey and other states implemented design improvements and safety features that had been developed, but not previously implemented on a wide-scale basis, due to a lack of funding. These improvements included widening curves, flattening slopes and filling ditches, installing guide rails, widening roadbeds, eliminating grade crossings, replacing obsolete bridges, and landscaping roadsides.²⁰³ General George Goethals, then a Consulting Engineer to the Highway Department, took an aggressive

stance with regard to the state’s road program. Despite wartime conditions, he rallied the railroad companies to begin participating in the 1917 legislated grade-crossing elimination program, despite restrictions on materials and funding.²⁰⁴



State Highway Administration photographs of improvements, showing a widened roadway, with grade separated railroad crossing and improved sight distance for motorists, date unknown.

Around 1917, the New Jersey State Highway Commission achieved standardization of cross-sections and profiles.²⁰⁵ Engineers also targeted curves for redesign. Rates of speed rose dramatically through advances in automotive technology during the previous decade. The legal limit in 1913 was 25 miles per hour, but the roads had not been engineered for those kinds of

¹⁹⁶Ibid.

¹⁹⁷Thomas J. Schlereth, *U.S. 40: A Roadscape of the American Experience* (Indianapolis, IN: Indiana Historical Society, 1985), 31.

¹⁹⁸“Accidents on Highways in New Jersey and New York,” *Good Roads* 5, no. 23 (June 7, 1913): 311.

¹⁹⁹Morrison, *Highway Engineering*, 167.

²⁰⁰Hutchinson, “The Good Roads Movement in New Jersey,” 110.

²⁰¹Morrison, *Highway Engineering*, 112.

²⁰²Ibid., 109.

²⁰³Johannesson, “New Jersey State Highway Department Division of Planning and Economics – Monographs on the Highways of New Jersey,” 11.

²⁰⁴“Continued Activity in New Jersey Road Work Recommended by General Goethals,” *Good Roads* 17 (December 29, 1917): 336.

²⁰⁵New Jersey Commissioner of Public Roads, *Nineteenth Annual Report of the Commissioner of Public Roads*, 65.

speeds.²⁰⁶ Due to increasing safety concerns, engineers recommended that in future construction, no curve should be less than 6 degrees or 955 feet radius.²⁰⁷

Road conditions immediately following World War I were very poor. No maintenance had been conducted for several years, and the pre-war paving systems had not been appropriate for the loads carried. The main goal of road building activities after the war was to repair the existing system and to finalize construction of a network of two-lane, paved roads linking population centers. Specifications for roads in the newly designated State Highway System (1917) required the installation of only hard surface

Beautiful Movement and created a grand landscaped boulevard as the approach to the Delaware River Bridge (now Benjamin Franklin Bridge). Commercial development and unlimited highway access combined to cause safety problems as well as visual clutter. In addition to limiting access to roadways, the State Highway Department also increased the roadway's right-of-way and used landscaping to control and enhance roadside aesthetics. The John Davison Rockefeller Memorial Highway (now known as Route 70) is a prime example of limiting roadside development to promote scenic beauty.²⁰⁹ The Palisades and Garden State parkways are natural outgrowths of this type of roadside aesthetic.



Repairs along the first concrete road in New Jersey, 1954.

pavements of a durable character such as concrete, bituminous concrete, sheet asphalt, brick, or granite.²⁰⁸

Concern with roadside landscaping and aesthetics increased during the Highway Era. Early examples of efforts to improve aesthetics included roadside tree planting. More elaborate examples included the Admiral Wilson Boulevard, which was an extension of the City

By 1930, the federal government considered a 100-foot right-of-way the minimum necessary to provide sufficient space for expansion, utility lines, sidewalks, parking, and landscaping.²¹⁰ During the 1920s and 1930s, increasing flexibility and reliability allowed improved roadways to rival the previously dominant railroad and canal systems as the preferred method of transporting passengers and freight. Intense commercial and residential development followed the growth of the highway system during the first half of the twentieth century and amplified the impact of road construction on the existing landscape.

As a result of the financial circumstances during the 1930s, considerable effort was spent to develop a system of economic analysis for road improvements. Sigvald Johannesson,

a New Jersey Highway Department engineer with a background in railroad design, was instrumental in creating an application in which traffic projections and economic factors were combined to evaluate roadway improvement alternatives. This approach was successfully used for New Jersey's renowned Pulaski Skyway.²¹¹ Johannesson later published the first book on the subject, entitled *Highway Economics*.

²⁰⁶Ibid., 66.

²⁰⁷Ibid.

²⁰⁸"The New Highway Law of New Jersey," *Good Roads* 13 (April 21, 1917): 245.

²⁰⁹For substantial additional information about the development and design of John Davison Rockefeller Memorial Highway, see Richard Grubb & Associates, Inc., "Cultural Resources Investigation, Replacement of NJ Route 70 Bridge Over Bispham's Mill Creek (Structure No. 0311-150), Pemberton and Woodland Townships, Burlington County, New Jersey," December 2002, Revised March 2003.

²¹⁰Laurence Isley Hewes, *American Highway Practice*, Vol. 1 (New York: John Wiley and Sons, Inc., 1942), 14.

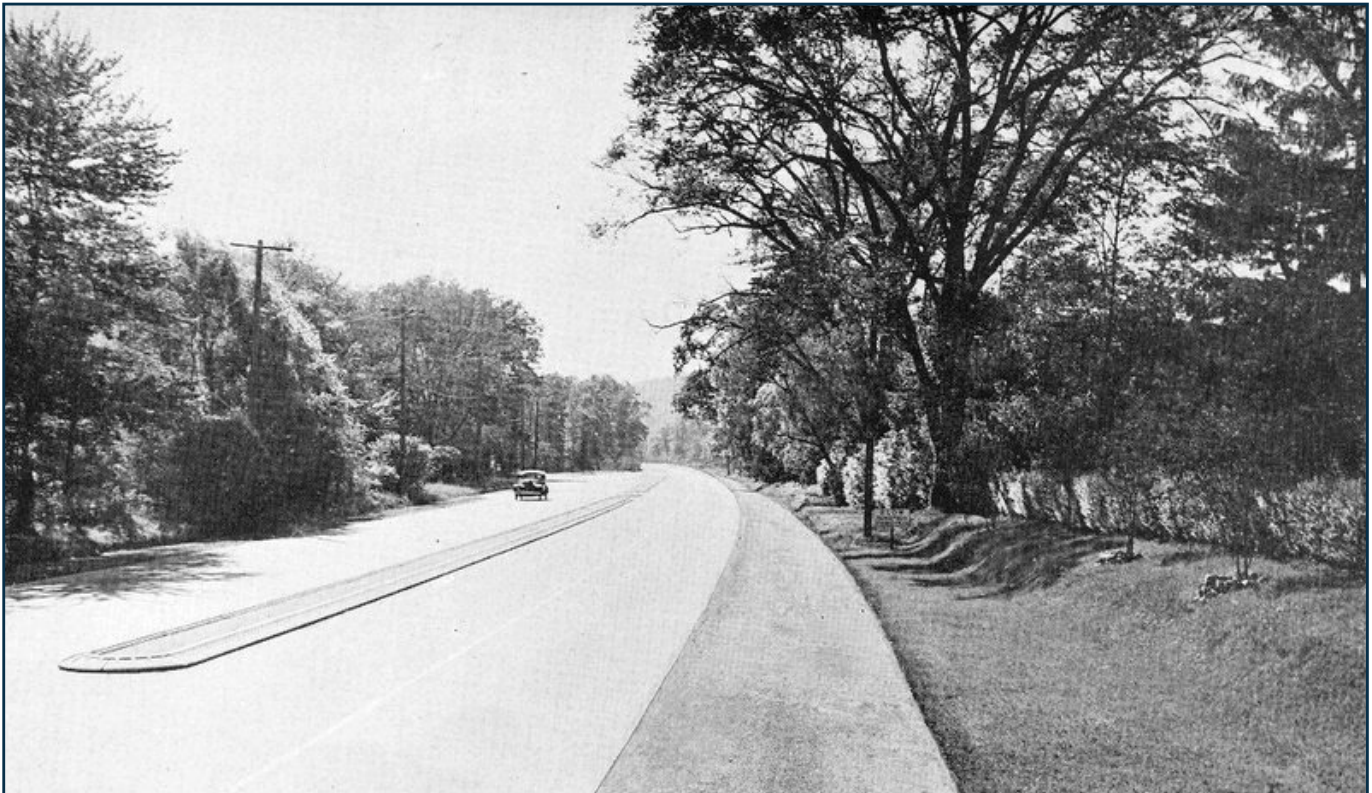
²¹¹Miller, "History of the Modern Highway in the United States," 103.

It should be noted, however, that despite the innovative nature of highway design in this era, two-lane roads remained the standard. Even in 1942, mileage of two-lane, undivided highways was 2.25 times greater than the mileage of all other highway types combined: 1,130 miles to 503.5 miles respectively.²¹² The chronological development of innovations in highway cross-section designs is as follows: 1920 – two lane, undivided with an 18-foot width; 1930 – three-lane or four-lane roadways with an approximate 40-foot width; 1935 – introduction of four-lane, divided highways with a 60-foot width; 1940 – four-lane, divided highway with depressed median strip; 1945 – four-lane, divided highway with variable width median, separated roadways on different grades, and a width over 78 feet.²¹³ This era was primarily characterized by the adaptation and improvement of existing roads rather than the construction of new routes. Proper planning and design took on paramount importance by the 1950s, as New Jersey faced an explosive increase in traffic volume that

was exacerbated by a substantial construction backlog resulting from the Depression and World War II.

d) Highway Era Administrative Innovation

New Jersey established a State Highway Commission in 1909, eight years prior to the institution of the Federal Road Aid Act's requirement. One of the Commission's first tasks entailed designating the route for the Ocean Boulevard from the Atlantic Highlands to Cape May.²¹⁴ In 1912, the New Jersey state legislature assigned the Highway Commission the task of surveying existing improved routes and developing a comprehensive system of roads that would be known as the New Jersey State Highway System.²¹⁵ Identification of a system of state roads had true importance at that time. While the New Jersey State Aid Act brought some state control to roadway construction, it nonetheless remained primarily decentralized until the advent of the State Highway Act. Prior to 1917, the following entities administered the state's road work



Route 29 between Mountainside and North Plainfield (Union and Somerset counties), designated “Blue Star Drive” by the state legislature after World War II in honor of the state’s veterans, date unknown. Note the center median, wide shoulders, and scenic landscaping.

²¹²Goldmann and Graves, *The Organization and Administration of the New Jersey State Highway Department - 1941*, Prepared for Roger Hinds, Governor's Examiner of the New Jersey State Highway Department (Trenton, NJ: n.p., June 1942): 390.

²¹³W. Brewster Snow, ed., *The Highway and the Landscape* (New Brunswick, NJ: Rutgers University Press, 1959), 13.

²¹⁴New Jersey Commission on Road Legislation, “Report to Governor James F. Fielder by his Commission on Road Legislation,” *New Jersey* 4, 23.

²¹⁵New Jersey State Highway Department, *Development of the New Jersey State Highway System*, 12.

programs: townships managed 12,380 miles; cities managed 2,500 miles; counties managed 2,400 miles; boroughs managed 2,100 miles; towns managed 850 miles; villages managed 89 miles; and toll companies still managed 38 miles.²¹⁶ Identification of and preferential funding for trunk lines became critical to the state's economic growth due to the growth of cross-state traffic that arose from increased use of trucks for long-distance hauling.

The State Highway Commission developed a plan for a 1,350-mile road system that included both existing routes as well as proposed new construction. The plan also recognized three different classes of roads: the state highway, the county road, and the municipal road. In addition to the Ocean Boulevard and Delaware River Drive, a network of highways connecting county seats and other routes of statewide importance was also proposed.²¹⁷ In 1913, the legislature authorized the State Highway Commission to take over, with the consent of the governing bodies having jurisdiction over them, 500 miles of existing roads that were to be incorporated as part of the 1,350-mile highway system. The state also took responsibility for maintenance and repairs.²¹⁸ The 1912 system never made substantial progress, however, because the Highway Commission was required to procure consent from multitudinous municipal agencies before taking over a section of road. In addition, the Commissioner never obtained sufficient funding to actually take over and improve routes.²¹⁹ In 1917, improved legislation endowed the Commission, now reorganized as the New Jersey Highway Department, with greater power and the funding necessary to take over existing roads and lay out new highways.²²⁰ The 1917 road legislation identified the 15 New Jersey state routes that were to become the foundation for today's state highway system.²²¹

The 1917 legislation (Edge Act) also established the position of Consulting Engineer to the Highway Department, a position filled by General George Goethals, famed for his leadership in the construction of the Panama Canal. Goethals succeeded R. A. Meeker, who served as the New Jersey State Highway Engineer and

played an instrumental role in establishing New Jersey's reputation as a progressive state in the field of road improvement.²²²

Goethals also assisted in the development of the Edge Plan, which was meant to guide the expenditure of the \$15,000,000 in anticipated revenue. According to contemporary sources, "The Edge plan for a State Highway System under the centralized control of the state and maintained and financed by the state, was the first step that had been taken in New Jersey toward the systematization of our highways."²²³ Goethals' proposed highway system focused on 650 miles of highways that would have 30-foot wide roadways, 16-foot wide pavements, and 3-foot wide macadam shoulders.

By 1917, the infusion of federal funds and the creation of a State Highway System altered the nature of the state's involvement with road construction in New Jersey. Prior to that date, state officials could only administer state aid funds and approve construction documents. The municipality submitting the improvement proposal actually carried out the roadwork. The creation of a State Highway System, however, gave the New Jersey State Highway Department direct jurisdiction over a number of significant routes throughout the state. Involvement at the state level then extended beyond the mere administration of funds into the realm of conducting surveys and supervising construction in the field.²²⁴

It was apparent by 1926 that the system of roads established by the 1917 legislation was not adequate for post-war needs. Additional routes had been added to the original 15 highways, but the legislature wanted a new comprehensive plan that would be used to inform future construction programs.²²⁵ William G. Sloan, State Highway Engineer, conducted a traffic study for the state. His report took an innovative approach by differentiating between local traffic and terminal traffic – traffic that passed through the state to other large population centers like New York and Philadelphia.²²⁶ Sloan's plan called for the creation of a 1,247-mile primary road system that would be maintained by the state and a 647-mile secondary road system that would be maintained by the counties.

²¹⁶The Commission for the Investigation of County and Township Highways, "The Administration of County and Township Highway in New Jersey," (Unpublished Report New Jersey State Library): 1919, 4.

²¹⁷New Jersey Commission on Road Legislation, "Report to Governor James F. Fielder by His Commission on Road Legislation," *New Jersey* 4, 23.

²¹⁸*Ibid.*, 24.

²¹⁹*Ibid.*

²²⁰New Jersey State Highway Department Bureau of Public Relations, *Development of the State Highway System*, 13.

²²¹*Twenty-Fourth Annual Report of the New Jersey State Highway Department* (Union Hill, NJ: Hudson Printing, 1918): 87.

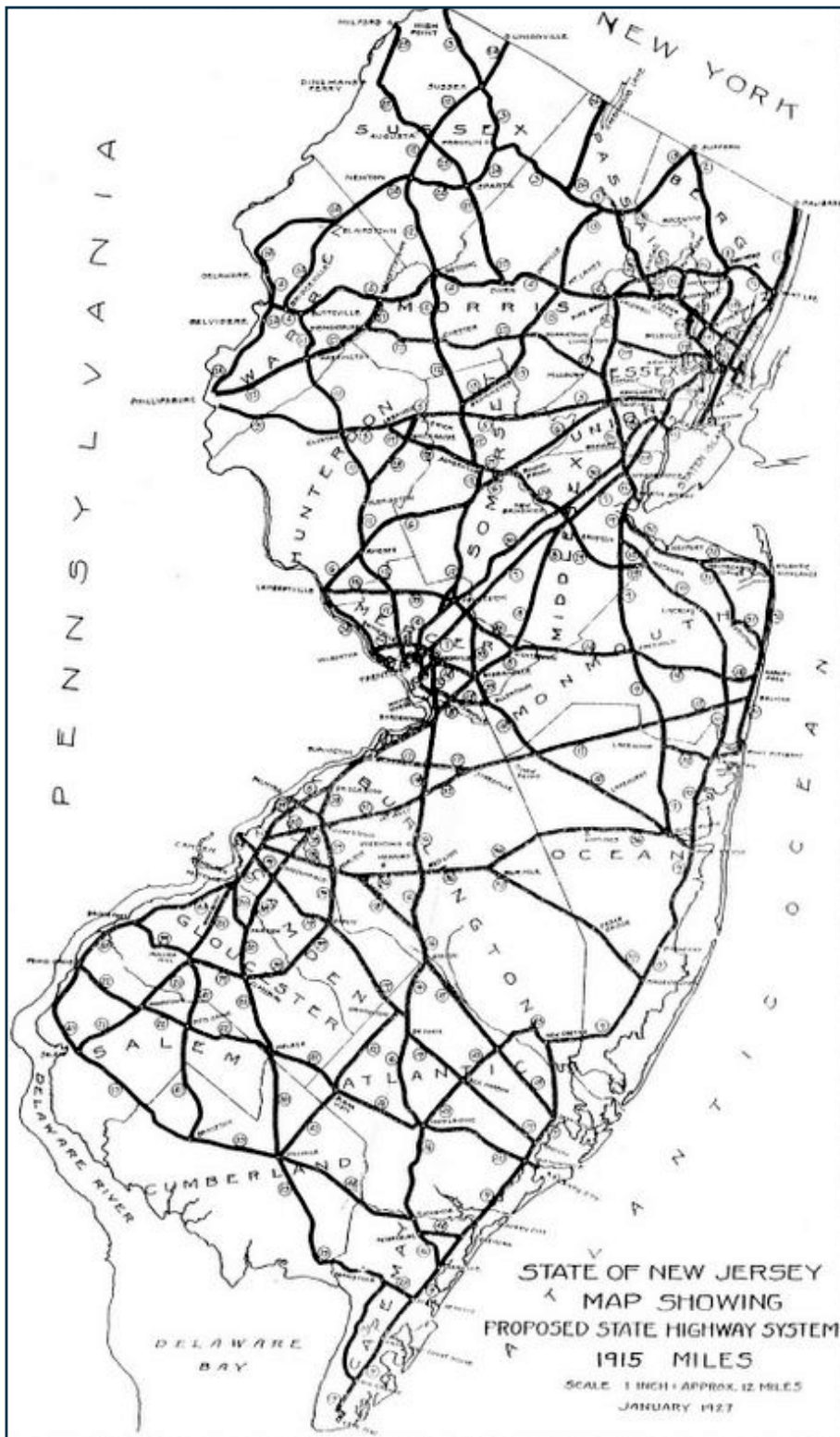
²²²R. A. Meeker, State Highway Engineer of New Jersey Resigns," *Good Roads* 14 (December 22, 1917): 327.

²²³The Commission for the Investigation of County and Township Highways," 5.

²²⁴New Jersey Commissioner of Public Roads, *Twenty-Fourth Annual Report of the Commissioner of Public Roads* (Union Hill, NJ: Hudson Printing, 1917): 15.

²²⁵Goldmann and Graves, *The Organization and Administration of the New Jersey State Highway Department*, 10.

²²⁶"State Highway Planning Based on Traffic Study," *Good Roads* 36 (January 27, 1927): 76.



State of New Jersey map showing proposed state highway system, 1927.

Sloan's top priorities for new construction were the identified terminal traffic routes. Analysis of existing traffic flows and patterns throughout the state, as well as projections of future conditions, influenced all new construction projects. Engineers anticipated that this information would help alleviate traffic problems formerly caused by mixing local and terminal traffic.

Sloan's study also recommended that the New Jersey State Highway System be designed and used primarily for through traffic between important population centers.²²⁷ The optimum system would be designed to segregate traffic by terminal destination and to develop independent highways to carry each group of traffic to its ultimate goal as quickly as possible.²²⁸ Studies of current traffic flow were conducted and then charted to identify these different traffic groups. Unfortunately, Sloan's plan, as devised, was never carried out. Both the State Highway Commission and the state legislature altered the plan based on political agendas rather than sound planning.

Sigvald Johannesson, the New Jersey Highway Department's renowned engineer and economic analyst, reevaluated the State's highway needs in 1944. His report asserted that the goals of the Highway Department over the next 25 to 30 years was to continue the work conducted in previous decades including connecting county seats and population centers, creating links to other state's highway

²²⁷ibid., 7.

²²⁸ibid., 11.

systems, and providing access to areas of scenic beauty in the state. Additional objectives of more pressing concern included the creation of bypasses and parallel routes to relieve overburdened highways and the construction of new roads through undeveloped parts of the state in order to encourage future development.²²⁹

Costs for road improvement projects spiraled upward in heavily populated counties like Bergen, Essex, Hudson, Passaic, and Union. Property values were so high in these areas that procuring additional rights-of-way for improvements or new construction had become unfeasible in many cases.²³⁰ This situation effectively stalled the implementation of superhighway designs during much of the 1930s. The expressway design was only effective in large stretches, and large blocks of funding for their construction were difficult to obtain until after World War II.²³¹



Route 21 (McCarter Highway), Newark, Essex County, 1950.

e) Highway Era Conclusion

Roadways emerged as the chief mode of transportation during the Highway Era. Where in earlier eras, railroads and water transport dominated, roadways during the twentieth century had evolved from local feeder routes into a system of highways inextricably tied to the daily lives of residents, farmers, businessmen, travelers, and a myriad of others throughout New Jersey. Once equated with inconvenience and unreliability – roadways – through standardization and systematic planning, became the ubiquitous, everyday mode of transportation connecting all parts of New Jersey.

The Highway Era built upon the important advances launched with the passage of the New Jersey State-Aid Act of 1891. This act began

the shift from localized road control to the state. This was important in two respects: it introduced design standards and brought forward ideas of connected roadways (through routes) benefiting the state as a whole. The state's role in highway administration continued

to advance with the creation of the Office of State Commissioner of Public Roads in 1894 and the establishment in 1909 of the State Highway Commission. As a result, federal funds could then be administered by the state to provide assistance for the construction of local and county roadways. By 1912, the Highway Commission considered the designation of the state's first route – the Ocean Highway – extending from Cape May to the Atlantic Highlands. At this date, the New Jersey Legislature charged the Commission with developing a comprehensive system of roads that would comprise the New Jersey State Highway System. Legislation in 1917 created the State Highway System and gave jurisdictional control to the New Jersey State Highway Department. The creation of the original 15 state routes in 1917 represented

²²⁹Sigvald Johannesson, *New Jersey State Highway Department Planning Bureau – A Comprehensive State Highway System* (Trenton, NJ: n.p., 1944): 2.

²³⁰Goldmann and Graves, *The Organization and Administration of the New Jersey State Highway Department*, 359.

²³¹Seely, *Building the American Highway System*, 155.

the beginning of centralized statewide transportation planning and uniform construction in New Jersey. This series of legislative acts extended the state's involvement beyond mere administrative duties to include planning, conducting surveys, and supervising construction activities. The highway system established during the teens and twenties formed the foundation for all later roadway developments within the state.

As the role of the state government in road planning and construction evolved, so did that of the federal government. The role of the federal government originally consisting of little more than setting "good" standards for road construction; however, by the 1920s the federal government introduced engineering paradigms for the economy of operation, separation of classes of traffic, limiting access, elimination of crossing traffic, and enhanced aesthetics. The new financial role of the federal government resulted in decreased local taxation for road construction and maintenance and reduced cost of shipping merchandise and produce.

The Highway Era also witnessed a more advanced treatment of roadways. In earlier eras, efforts focused on addressing the poor condition of most roads. During the twentieth century, road surfaces were improved, and advancements were made in materials, construction equipment, and planning, by reducing slopes and grades, removing dangerous curves, bypassing congested communities, providing adjacent landscape treatments, designating and designing for specific road use (limited access roadways), and increasing travel safety, among other considerations.

Highways became a major economic force with a strong physical presence between the first and second World Wars, whereas, during the nineteenth century they were an economic liability. The advent of the automobile required a greater demand for improved roadways throughout the state. Advocacy for improved roads for truck (freight) traffic and leisure and travel users resulted in public sponsorship for better roads and a better roadway network. The advantages of the new roads served as a catalyst to promote economic development and improved living standards

for everyone, not just those living within close proximity to the better transportation routes. As a result of these improvements, individual auto registration and roadway freight service increased significantly.

New Jersey roads evolved to meet increasing demands for efficiency, speed, and safety; and by the 1940s, New Jersey and the country were positioned to address a new era in transportation. Roadways during the Highway Era transformed dramatically under the guidance provided by the Federal government and the State Highway Engineer. The highway user now demanded direct connections and uniform roads, and had an expectation of safe and predictable travel. The interstate system, parkways, and other expressways dominated the state's landscape. Regardless of the type or size of roadway, the state's highways remained an important factor in shaping the land and communities around them.

Summary of Elements Influencing Roadway Development

- In adopting the 1891 State Aid Act, New Jersey was the first state to officially recognize its responsibility for roadway improvements.
- The 1917 New Jersey Highway Act provided for a statewide system of roadways with specific funding sources, established the validity of the concept of statewide planning, created a centralized agency whose primary function was to deal with roadways from planning through construction and maintenance, and established the concept of differing roadway functions (commercial, agricultural, recreational, and military).
- New Jersey developed or adopted roadway engineering and construction innovations including the following:
 - (1) First three-lane highway in 1920;
 - (2) Country's first "rotary" intersection constructed in Camden, New Jersey (Airport Circle) in 1925;
 - (3) Country's first cloverleaf intersection (Woodbridge) constructed in 1928;

- (4) New Jersey engineers invented the reflecting curb in 1938; and
- (5) New Jersey developed the central, concrete safety barrier (Jersey Barrier) in 1954.
- World Wars I and II generated a demand for improved overland routes (for example, Route 68).
- Demand for recreational travel changed from purely “recreation as the destination” to include “travel as the recreation,” i.e. Sunday drives and motoring vacations.
- The 1926 study by the State Highway Engineer, William Sloan, applied many of the principles recognized by the railroads to the highway system. Sloan’s report was based on empirical data and used traffic projections to plan for the separation of local and through traffic, often to destinations beyond New Jersey borders.
- Travel patterns shifted away from easily identifiable origins and destinations as the housing, employment, and population dispersed from urban areas and central business districts.
- The major and most intact network of historic transportation routes is the state and county highway system, which, for the most part, mirrors historic trail, road, and railroad corridors.

3. Highway Era Significant Routes

a) Criteria for Significance

The Criteria for Significance established by the Study Team is based on, and adapted from, National Register Criteria (see Chapter II). These criteria are intended to identify roadways significant from a statewide historical perspective and that are truly important to the overall development of the state. While numerous transportation routes were beginning to be legislated and planned, this fact does not confer significance. Rather, the physical results of that legislation as well as broad patterns of development in the state should be considered to establish the criteria for evaluation. Criteria for significant roadways dating from the Highway Era are outlined below.



Route 1, 9, and 35 cloverleaf interchange, Woodbridge, Middlesex County, 1967.

In applying Criterion A, a roadway having one or more of the following attributes may have contributed to the broad patterns of New Jersey history and therefore might be considered a roadway of statewide significance:

- Demonstrated statewide, regional, or interregional importance; local importance does not connote significance
- Included construction of new planned route that followed primarily new alignment, was constructed in a short time frame, and provided direct links between specific destinations and origins

New planned routes (in their entireties), which are constructed in a short time frame, and, which provide direct links between specific origins and destinations, will be considered significant. If a major (Trans-Hudson or Trans-Delaware) bridge or tunnel is at one terminus, a specific terminus at the other end of the project is not a requirement; rather, the actual planned facility is the important feature.

Under this criterion, the general consideration is for construction of new roadways on new alignment; however, there may be

compelling reasons to consider major routes that may have incorporated existing roadways as well as new alignment.

- Access controlled via design prior to 1945 Limited Access enabling legislation.

Example: John Davison Rockefeller Memorial Highway (Route 70, also known as the Rockefeller Memorial Highway)

- Planned aesthetic/landscaping treatments (from the beginning, not after the fact).

Examples include:

- Approach to the Lincoln Tunnel
- Route 4
- Rockefeller Memorial Highway (Route 70)

- Associated with new types of major destinations, such as those for auto touring or recreation (does not include general suburbanization).

Examples include:

- Route 202
- Lincoln Highway

- Demonstrated an important contribution to our National Defense.

Examples include:

- Route 68 (Ft. Dix)
- Morgan Boulevard (Camden, Camden County - Fairview to the New York Shipyard to facilitate employee commute)

In applying Criterion B, a roadway that is associated with the lives of person(s) significant in our past and which possesses integrity can be considered a roadway of statewide significance and be eligible for the National Register of Historic Places.

It is proposed that for a roadway in New Jersey to be considered significant for its association with the lives of persons significant in New Jersey's past, the roadway must show a clear link to that individual (a casual link to significant individuals will not be considered an association under this criterion). Additional research

will be needed to identify roadways clearly linked to persons significant in New Jersey's history. A specific (not casual, such as "built under the direction of...") link would have to be established between an individual and a particular roadway to be considered significant. Examples include

- Statewide leader in advocacy for improved roadside aesthetics
- Significant Lincoln Highway booster

In applying Criterion C, a roadway that embodies a distinctive characteristic of a type, period, or method of construction, or that represents the work of a master, or that represents a significant and distinguishable entity whose components may lack individual distinction and which possesses integrity can be considered a roadway of statewide significance and eligible for the National Register of Historic Places if a) a roadway and its distinctive design features are evaluated as significant within the context of the Highway Era, or b) the work of the master designer is evaluated as significant within the context of other work by that designer. It is proposed that in identifying distinctive characteristics of a type or period, a roadway must be evaluated within the statewide context and within a particular era of roadway development in New Jersey, for example, the Pulaski Skyway and Routes 1 & 9 in Hudson and Essex counties.

Design features such as circles and cloverleaves, implementing the principles of the system in this period, would not by themselves make a roadway significant. These types of engineering features would be considered typical for a road designed to separate cross traffic and provide smooth and efficient interchanges between routes. However, engineering features could be individually eligible or contribute to the significance of specific roadways. Likewise, a road from this period would not be significant only on the basis of its landscaping or other aesthetic design features.

In applying Criterion D, a roadway that has yielded or may be likely to yield archaeological information important in prehistory or



Map of the Highway Era's Significant Roads.

history and possesses integrity can be considered a roadway of statewide significance eligible for the National Register of Historic Places if such a roadway represents an important type of building technology that cannot be documented using existing source material. It is proposed that this criterion be applied to roadways that represent a significant type of roadway building technology that may only be evident as an archaeological resource (although no example has been identified).

b) Significant Routes

Application of the above significance criteria yielded six²³² historically significant roadways for the Highway Era:

- Lincoln Highway
- 1917 NJ State Highway System
- Admiral Wilson Boulevard
- Pulaski Skyway
- John Davison Rockefeller Memorial Highway
- Palisades Interstate Parkway

The *Lincoln Highway* in New Jersey is significant as part of the Nation's first transcontinental highway. Dedicated in 1913, the Lincoln Highway was intended to provide the shortest distance between New York and San Francisco. The Lincoln Highway found its genesis in the Good Roads Era and provided a transition into the Highway Era. Additionally, prior to the construction of Route 1, the Lincoln Highway functioned as a primary route between New York City and Trenton. The Lincoln Highway crossed from New York into New Jersey approximately two blocks south of the present location of the Lincoln Tunnel. From this location, it proceeded northwest to Weehawken. It followed a circuitous route from Weehawken through Jersey City into Newark. From Newark it continued southwest, following what would become NJ Route 27, through Elizabeth, Rahway, Edison, New Brunswick, and Trenton. It crossed the Delaware River into Pennsylvania at Trenton. The current routes encompassing the New Jersey portion of the Lincoln Highway include U.S. Routes 206 and 1T, NJ Routes 21, 27, and County Route 510.

The Lincoln Highway is significant under Criterion A for its association with the national Lincoln Highway, the first transcontinental road in the United States. Additionally, the Lincoln Highway is significant for its association with recreational travel, especially as an example of a road that encouraged travel as its own form of recreation. Its period of significance spans from the date of its establishment in 1913 to when the Lincoln Highway Association ceased activities in 1928.²³³

The 1917 *State Highway System* is significant as the first system of routes that encompassed the entire state and served the entire state. Prior to the establishment of the state highway system, roads in New Jersey (with a few exceptions) were improved or constructed by individual counties, municipalities, or private companies that serviced a limited and more local population. Creation of the state system completely changed the way roadways were planned and constructed. Control now came from a centralized office with standard guidelines and specifications. The New Jersey Highway Commission advanced the notion of through routes that benefited the entire state. The first 15 routes were essentially selected or "laid-out" to accommodate the needs of the state. It should be noted however, that some of these needs were political in nature and resulted in the draft version of the system expanding from 12 original routes to 15 at the date of its establishment.

Route No. 1 Elizabeth to Trenton via Rahway, Metuchen, New Brunswick, and Hightstown. The surveyed route followed St. George's Avenue from Elizabeth to Rahway, thence along the west side of the Pennsylvania Railroad mainline, over the Middlesex-Essex Turnpike and private right-of-way to Menlo Park. It then followed the straight road from Menlo Park to Metuchen. It continued on into Highland Park, New Brunswick, Hightstown, and then Windsor. It then continued along the east side of the Camden & Amboy Railroad to just north of Robbinsville. It then proceeded on to Hamilton Square and Mercerville, and via Nottingham Way, into East State Street, in Trenton. Current roadway designations for this route

²³²The New Jersey State Highway System of 1917 was comprised of 15 routes. Because it is significant as a system, it is counted as a single resource.

²³³The Lincoln Highway Association ceased operations in 1927; however, the completion of its last activity continued into 1928. The last activity was the installation of concrete markers all along its route.



Construction to widen the Raritan River bridge between New Brunswick and Highland Park, Middlesex County, date unknown. (Courtesy of the University of Michigan, Transportation History Collection, Special Collections Library, Lincoln Highway Digital Image Collection.)

include U.S. 130, NJ Routes 21, 27, and 33, and County Route 510.

Route No. 2 Trenton to Camden via South Broad Street in Trenton to White Horse, thence over Crosswick's bridge to Bordentown. It then proceeded through Fieldsboro, Roebling, and Burlington. It then followed Burlington Pike to Camden. Current roadway designations for this route include U.S. 130 and 206, and County Route 537.

Route No. 3 Camden to Absecon (Atlantic City) via Berlin and Hammonton following the White Horse Pike with some exceptions. These exceptions included a proposed by-pass at Hammonton and a new route connecting Atco Bridge to Ancora. Current roadway designations

for this route include U.S. 30 and County Route 561.

Route No. 4 From Route No. 1 near Rahway to Absecon.

The route proceeded from Rahway to Perth Amboy, then South Amboy, and continued into Morgan. From Morgan the surveyed route continued on to Keyport, Middletown, Red Bank, Eatontown, Long Branch, Asbury Park, Point Pleasant, Lakewood, Toms River, Tuckerton, New Gretna, and into Absecon. This is the longest of the 15 routes (110 miles) comprising the State Highway System. Current roadway designations for this route include U.S. 9 and NJ Routes 35, 71, 88, and 167.

Route No. 5 Newark to the Delaware River near Delaware via Morristown, Dover, Netcong, Budd's Lake, Hackettstown,

Buttville, and Delaware. This included an approximately nine mile new route between Netcong and Budd's Lake because of steep grades and hazardous curves. Current roadway designations for this route include U.S. 46 and NJ Routes 124, 24, and 53 and County Route 510.

Route No. 6 Camden to Bridgeton and Salem. The route proceeded from Broadway in Camden to and through Gloucester to the Gloucester-Woodbury Turnpike into Woodbury. Thence, via Mantua Turnpike to Mullica Hill. The route then split with one leg proceeding to Bridgeton and the other to Salem. Current roadway designations for this route include NJ Routes 45, 49, and 77.

Route No. 7 Hightstown to Asbury Park. This route began at the juncture of Route No. 1 at Hightstown and followed Manalapan Road to Manalapan. It then followed the Manalapan-Freehold Road to Freehold, thence along Freehold-Jerseyville Road to Jerseyville. It then proceeded along Jerseyville-Hamilton Road to Corlies Avenue and Main Street in Neptune Township where it joined with Route No. 4 and continued into Asbury Park. The route follows current NJ Route 33.

Route No. 8 Montclair to near Unionville, New York. The route followed the Pompton Turnpike from Montclair to its junction with the Patterson-Hamburg Turnpike at Riverdale; thence along the Patterson-Hamburg Turnpike to Stockholm. It then followed the Stockholm-Franklin Furnace Road to Franklin Furnace and then through Hardinstonville and Hamburg to Sussex. From Sussex it continued north to the New York State line near Unionville. Subsequent roadway designations for this route include NJ Routes 23 and 284 and County Route 506 (spur).

Route No. 9 Elizabeth to Phillipsburg. The route followed Westfield Avenue from Elizabeth to Westfield and continued on to the Plainfield city line via South Avenue. It continued through Plainfield on Front Street and Lincoln Road to Union Road. It followed Union Road through Bound Brook to Gaston Avenue and Cliff Street in Somerville. It continued along Brunswick Pike to the

Whitehouse-Lebanon Road. It then followed the Clinton-West Portal Road through Bloomsbury and Still Valley to Phillipsburg. Subsequent roadway designations for this route include NJ Routes 22, 28, and 173.

Route No. 10 Paterson to Fort Lee. The route extended from the Market Street Bridge in Paterson along Essex Street to Hackensack. From here, it followed the Bergen Turnpike to Ridgefield and the boroughs of Palisade Park, Fort Lee, and Edgewater to the Hudson River. At the date of the survey a realignment was considered along the Palisades in Cliffside Park and through the borough of Ridgefield to Edgewater Avenue and thence to the Bergen Turnpike. Subsequent roadway designations for this route include Routes 306 and 501/63.

Route No. 11 Paterson to Newark. The route followed Main Street through Paterson to Passaic. It continued on Passaic Avenue to Nutley. It followed a new line from Nutley to Franklin Avenue. It continued through to Soho Park to Harrison Street. It continued through Bloomfield and Belleville to Franklin Street, and continued on Franklin Street to the Newark city line near Branch Brook Park. NJ Route 7 is the subsequent roadway designation for this route.

Route No. 12 Paterson to Phillipsburg via Little Falls, Pine Brook, Parsippany, Danville, and then over Route No. 5 to Budd's Lake. It continued on to Washington, Broadway, and Phillipsburg. Subsequent roadway designations for this route include NJ Route 57.

Route No. 13 New Brunswick to Trenton. The route began on the west side of the city of New Brunswick and followed Somerset Street to Franklin Park. It continued on to Ten Mile Run and Kingston crossing the Delaware and Raritan Canal and Millstone River to and through Princeton. It continued on to Lawrenceville and along the Lawrenceville-Trenton Road and Princeton Avenue to the Trenton City line. Subsequent roadway designations include U.S. 206 and NJ Route 27.

Route No. 14 Egg Harbor City to Cape May City via Mays

Landing, Tuckahoe, and Cape May Court House. Subsequent roadway designations include U.S. 9 and NJ Route 50.

Route No. 15 Bridgeton to Route No. 14 at Rio Grande. The route extended from Bridgeton through Millville, Port Elizabeth, Leesburg, Delmont, Eldora, Dennisville, South Dennis, Goshen, and Rio Grande. Subsequent roadway designations include NJ Routes 47 and 49.

The 1917 New Jersey State Highway System is significant under Criterion A as the first comprehensive system of state roadways. This system provided the foundation for all future highway work in the state. All but 34 miles of the 1917 highway system were absorbed into the revised 1927 highway system. It shifted the focus of road design from meeting local needs to meeting the needs of the state. The system (first 15 routes) as a whole is considered significant with no one individual route being more significant than another. The period of significance for the original 15 routes of the New Jersey Highway Department extends from its establishment in 1917 to 1927 and the major reorganization of the highway department. The period of significance may include later alterations if alterations made to specific routes can be traced to plans and intentions dating from the period prior to reorganization.

The *Admiral Wilson Boulevard*, now a segment of U.S. 30, is significant as a grand avenue, reflective of the City Beautiful Movement, and connected the Airport Circle (New Jersey's first traffic circle) with the approaches to the Delaware River Bridge (now better known as the Benjamin Franklin Bridge). The Airport Circle formed a landscaped terminus for the boulevard and funneled traffic from points north and south to the bridge. This included especially high volumes of traffic coming from and going to New Jersey shore destinations. The Boulevard also delivered traffic to the Philadelphia region's only airport, located immediately adjacent to the traffic circle. The area adjacent to the Boulevard became a destination in itself through the development of recreation spots such as the first drive-in movie theater in the

United States, the Whoopee Coaster (an automotive roller coaster), an outdoor boxing ring, and a then rare national department store on Camden's periphery (Sears), as well as scenic spots along the Cooper River and numerous restaurants. The mile and one-half long boulevard (originally named Bridge Boulevard) extended from Penn and Linden streets at the bridge approach to the Airport Circle at Crescent Boulevard.

The Admiral Wilson Boulevard is significant under Criterion C as an example of an aesthetic landscape design reflective of the City Beautiful Movement. The wide roadway formed the grand approach to the Delaware River Bridge (Benjamin Franklin Bridge) and received, via New Jersey's first traffic circle (Airport Circle), traffic from other parts of the state. The Admiral Wilson Boulevard's period of significance extends from its establishment in 1926 to 1946 when new highway ramps were constructed at the Airport Circle to negotiate new traffic patterns from the boulevard to other roadways.



Route 1 & 9, Pulaski Skyway, between Newark and Jersey City, Essex and Hudson counties, date unknown.

The *Pulaski Skyway* is significant as a sophisticated example of elevated expressway. Designed in 1929 by Sigvald Johannesson, the 16,000-foot long viaduct was completed in 1932. Built as part of efforts to ease congestion between Jersey City and New York,

which included construction of the Holland Tunnel, the Skyway represents the highest state of highway engineering through to World War II. At the date of its construction, the Pulaski Skyway was the largest single roadway project and the most expensive to date. Additionally, it was the first highway in New Jersey planned according to a rational economic formula. The Skyway extends from Newark to the Holland Tunnel in Jersey City. It carries U.S. Route 1 & 9.

The Pulaski Skyway is significant under Criteria B and C. It is significant under Criterion B for its associations with engineer Sigvald Johannesson. In addition to his role as the chief designer of the Skyway, Johannesson provided the economic analysis that promoted the use of an elevated expressway in order to avoid congested urban areas. This was the first application of such analysis, previously used in railroad development, to highway planning and construction in New Jersey. The Pulaski Skyway is significant under Criterion C as an example of a roadway that embodies a distinctive type and method of construction. The Skyway's elevated structure exemplifies the highest state of roadway engineering. The Pulaski Skyway was listed in the National Register of Historic Places as part of the Route 1 Extension in 2005. The resource is also significant under Criterion A, for its contribution to the growth and development of New Jersey's state highway system.

The *John Davison Rockefeller Memorial Highway*, also known more simply as the Rockefeller Memorial Highway, is significant as a planned and primarily limited access, landscaped highway reconstructed prior to the 1945 limited access highway enabling legislation. The Rockefeller Memorial Highway used existing Route 40 (currently Route 70) and extended

approximately 70 miles across the state between Camden and Belmar. The completed road served as a forerunner to later New Jersey parkways such as the Garden State Parkway and the Palisades Interstate Parkway. The road is unusual in that it transformed an existing roadway into an essentially limited-access highway with special emphasis placed on aesthetic concerns. Improvements included increasing the road's right-of-way from 80 to 520 feet to limit roadside development and provide sufficient room to landscape the highway. The entire length of the roadway was graded to a more streamlined cross section. Cut slopes were flattened to a 3:1 ratio or less. Where this was not fully accomplished, a low rustic type of cedar fence was used in place of the standard white and black post and wire guide rail. The highway consisted of 52.4 miles of wooded area, 13.2 miles of open farmland, and 4.1 miles of suburban development. The road did not pass through any cities and included the removal of adjacent commercial activity.



Palisades Parkway, view north toward New York state, 1961.

The Rockefeller Memorial Highway is significant under Criterion C as characteristic of emerging design principles related to

planned landscaped highways. The Department of Transportation reconstructed an existing roadway by significantly extending the right-of-way; landscaping areas adjacent to the roadway; providing native plant material; and by screening, relocating, or eliminating commercial establishments and billboards along the roadway. The period of significance for the Rockefeller Memorial Highway is from its establishment in 1937 to 1951.

The *Palisades Interstate Parkway* is significant for its associations with recreation, transportation, regional planning, and conservation. It is also significant for its architecture, landscape architecture, and engineering. The Palisades Interstate Parkway is a 42-mile, limited access, scenic pleasure drive extending from Fort Lee, New Jersey to Bear Mountain, New York. The Parkway falls within the Palisades Interstate Park, and is currently designated U.S. Route 9W.

The Palisades Interstate Parkway is significant under Criterion A for its role in conserving a significant endangered landscape, the development and promotion of recreation and tourism, and for regional land-use planning. The Parkway was planned as a major link in a recreation-transportation corridor that extended from the southern tip of New Jersey to Bear Mountain State Park. It was an important regional planning initiative that encouraged orderly suburban growth while directing development away from fragile scenic areas and preserving them for public benefit. The Palisades Interstate Parkway is significant under Criterion C as an example of a post-World War II limited-access, scenic pleasure drive in New York and New Jersey. The Parkway is a very good example of its type and embodies the definitive characteristics of the limited-access scenic pleasure drive. The Parkway improves upon the features developed over the first half of the twentieth century in parkway design. The Palisades Interstate Parkway is defined by restricted access, the elimination of cross traffic, a broad landscaped right-of-way, separate driving lanes, banked curves, sunken roadways, mountable curbs, contrasting tones of pavement, and connections to scenic and recreational attractions. The Palisades Interstate Parkway was previously listed in the

National Register. The period of significance for the Palisades Interstate Parkway is 1935-1961.

4. Highway Era Associated Resources

Roadway Elements	<ul style="list-style-type: none"> bridges culverts retaining walls signage fencing street lighting traffic control devices grade separations guard rails wide right-of-way pavement adjacent drainage improvements shoulders curbing (reflective) driveway/driveway cuts sidewalks divided highways/dualized highways by-passes reduced (low) grades pedestrian safety islands parking (urban) channelized lanes embankments medians traffic circles landscaping
Roadside Elements	<ul style="list-style-type: none"> weigh stations motels auto camps produce stands commercial strip development gas stations/service garages restaurants (hamburger/hotdog stands) drive-in theaters auto showrooms drug stores hardware stores general stores comfort stations maintenance facilities bus shelters picnic areas scenic overlooks signage billboards

5. Highway Era Integrity Thresholds

For a roadway to be considered eligible for the National Register, the property must not only be shown to be significant under the National Register criteria, but it also must have integrity. It has been generally agreed upon that sections of a significant roadway that retain integrity must be of a sufficient length to preserve the character of the roadway. No standard minimum length or percentage of a roadway has been assigned to evaluating a road's integrity. A summary of all integrity thresholds is contained in Figure 1.

a) Location

Integrity of location means that a roadway remains in its original location for its period of significance. This aspect of integrity relates directly to the roadway's right-of-way. Properties that have been moved (realigned) are generally not considered eligible for listing in the National Register; however, during this era segments of roadways were commonly realigned to straighten curves, reduce steep grades or by-pass municipalities. These new alignments are reflective of the available technology applied to roadway construction and the more "engineered" quality of roads from this era. Therefore, segments of roadway realigned during the roadway's period of significance may retain integrity of location. Integrity of location is an important quality (High) for assessing a roadway's overall integrity.

b) Design

Design integrity refers to the retention of those characteristics that were purposely included in the

planning and construction of the roadway. The property must retain the essential features that identify the resource as a roadway. Basic features associated with roadways are alignment (cross section, plan, and profile), right-of-way, and pertinent associated roadway features. Design features common to roadways of this era include graded roadway widths of generally 20 to 30 feet (to circa 1917) and up to 86 feet (although approximately 40 feet was more common) for later time periods, standard right-of-ways of 50, 60-66, 80, or 120 feet, associated roadway features such as circles, clover leaves, interchanges, channelization, and by-passes, right-of-way landscaping, sidewalks, medians, and curbing. As-built drawings should be consulted, if possible, when assessing a roadway's integrity of design for this era. Integrity of design is the most important quality (High) for assessing a roadway's overall integrity.

c) Materials

Integrity of materials refers to the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form the roadway. Materials



Photo along the roadside, showing buildings to be removed for the creation of Route 10, Section 1A, 1919.

common to roadways of this era include road surfacing of macadam, cement concrete, sheet asphalt, bituminous concrete, and less commonly Belgium block, vitrified brick, and gravel; guide rails of concrete or wood posts with steel cables; iron, steel or reinforced concrete bridges; concrete, or cast iron pipe culverts; concrete retaining walls/abutments; concrete pedestrian islands; concrete sidewalks; stone or concrete curbs; steel/wood light posts; metal signs; and dirt, gravel, brick, granite, or concrete drainage ditches. Highway surfacing is an inherently fragile feature and is routinely replaced. Therefore, while original surfacing is a desired feature, it should not be required for eligibility purposes; however, the retention of original materials of associated roadway and roadside elements are important when assessing the integrity of roadways. Integrity of materials gains importance if those materials also reflect workmanship. Integrity of materials is not essential (Low) for a road to retain integrity.

d) Workmanship

Integrity of workmanship refers to the physical evidence of the labor, skill, and craft expressed within the roadway or its



Traffic circle, Camden, Camden County, date unknown. The circle provided an interchange between current Routes 130, 38, and 30. The Camden Airport is in the foreground, and the road to the Delaware River (now Benjamin Franklin) Bridge is in the background.

component parts. Common examples of workmanship associated with roadways during this era include granite and brick pavements; concrete and masonry elements such as bridge abutments, balustrades, and culverts; and steel elements such as those comprising bridges. Integrity of workmanship is not critical (Low) for a roadway to retain integrity, but its presence strengthens the roadway's overall integrity.

e) Setting

Integrity of setting refers to the physical environment of the property. The setting(s) of the roadway or a segment of the roadway should reflect the same general character, with minimal intrusions, present during the roadway's period of significance. Specific lengths of roadway or segments of roadway may vary; however, it should be of sufficient length to preserve the character of the roadway. A roadway may contain different settings over its length. Common settings associated with roadways from this era include rural, urban, cluster communities, strip development, and suburban settings. The historic relationship between the roadway and its associated roadside elements is important. The number

and type of roadside elements should be appropriate to the historic setting type (rural, urban, etc.) and period of significance of the roadway. A majority of roadside elements dating from the roadway's period of significance should be present and retain integrity. Setting, especially the relationship between the roadway and its associated features, may be an important quality of integrity of roadways. Integrity of setting should be viewed as of Medium importance unless the setting type changed (i.e. from rural to suburban), then integrity of setting should be viewed as High when evaluating the roadway's overall integrity.

f) Feeling

Integrity of feeling refers to the property's

expression of aesthetic or historic sense of a particular period of time. Integrity of feeling results from the presence of physical features that convey the property's historic character. Integrity of feeling is closely related to integrity of setting. A majority of roadside elements dating from the roadway's period of significance should be present and retain integrity. Additionally, the relationship between the roadway and its associated features should be present. Retention of feeling alone is not sufficient (Low) to support eligibility of a property for the National Register.

g) Association

Integrity of association is the direct link between an important historic event or person and the historic property. A roadway should contain the physical features and associated elements that convey the property's historic character. These features should date from the roadway's period of significance. Retention of association is important (High) to support eligibility of a property for the National Register.

6. Highway Era Timeline

NATIONALLY	1902	NEW JERSEY
American Road Makers (now American Road and Transportation Builders Association) organized, with mission to connect every state capital with the national capital via a highway system		
Nation's first gas tax introduced in Oregon First U.S. Army transcontinental convoy from San Francisco to Washington, DC; the trip took 62 days.	1919	
National Advisory Board on Highway Research, now the Transportation Research Board, created	1920	
Federal-Aid Highway Act added system concept to federal-aid highway program	1921	
Bureau of Public Roads joined with states to create U.S. numbered highway system for marking main interstate highways	1925	
	1926	Delaware River Bridge (now Benjamin Franklin Bridge) opened in New Jersey/Pennsylvania
Lindbergh flew nonstop across the Atlantic	1927	The Spirit of St. Louis built in Paterson, New Jersey Holland Tunnel opened in New Jersey/New York
	1928	Newark Airport opened in New Jersey Goethals Bridge opened in New Jersey/New York
	1931	George Washington Bridge opened in New York
	1933	Pulaski Skyway opened in New York

NATIONALLY

Federal-Aid Highway Act of 1944 approved National System of Interstate Highways and established a federal-aid system of principal, secondary and feeder roads
No Federal Aid authorizations during Fiscal Year 1944 and 1945

1944**1951****1955****NEW JERSEY****First 53 miles of NJ Turnpike opened****Garden State Parkway opened****7. Highway Era Research Questions**

- Build a better nationwide context in which to place New Jersey firsts. How immediately significant were New Jersey's achievements versus how significant they may be perceived today?
- Further develop the context of the collapse of rail in the New York metropolitan area during World War I and its impact on highway building in New Jersey.
- Explore the link between federal investment in roads/highways, resultant standards, and national security.



VII. RESEARCH QUESTIONS

An effort was made to provide a thorough historical context in this document and earlier studies; inevitably, questions remain. Questions and directions for future research regarding the Internal Improvements Era are listed below. This is not intended to be an exhaustive list, as the nature and content of research continues to evolve.

A. EARLY ROADS ERA

- Further explore the relationship between Native American trails/routes/paths and early colonial roads.
- Identify routes significant for association with Revolutionary troop movements and supply routes.

B. INTERNAL IMPROVEMENTS ERA

- During this era, what is occurring with the management, construction, and maintenance of other roads, i.e. public roads? [Suggestion: sample jurisdictions (a county and a local unit) from each region].
- Who is providing the money? Is there a connection between the public overseers and the private companies?
- Where are the railroad companies getting their money? Were the same investors and companies financing various modes of overland travel? [Justification: charters are being issued to the combined travel interests – Delaware & Jobstown Rail or McAdamized Road Co.]
- How was the crossing of rivers and creeks handled? Who determined crossing locations and specifications (bridge vs. ferry)? Who financed the facility?
- What were road overseers responsible for and did they all operate under a uniform set of procedures?
- How did “An Act Concerning Roads, 1846” and its amendments and permutations affect the role of the road overseer and the implementation of internal improvements?

- What is the history/chronology of the changing authority and the enabling of such authority (i.e. legislation during the Internal Improvements Era)?
- Were New Jersey’s public roads similar in material, construction, and quality of the presumably better financed turnpike roads?
- How did “An Act Concerning Roads, 1846” change the method in which roads were built in New Jersey? Were the subsequent amendments indicative of a flawed law or a work in progress?
- When did the idea of state funding for public roads first arise? Where did the opposition come from?
- What is the difference between the New Jersey Road Act versus the Constitution of 1844 in terms of transportation, and what are their current impact on roadways and roadway development?

C. GOOD ROADS ERA

- Where roadway and related drainage improvements were made in urban areas to increase sanitation and decrease contagions, what archaeological evidence of these efforts might remain in place?
- Who were the recreational bicycle enthusiasts? What economic base were they from that provided free time for recreation?
- What was the impetus of the Lincoln Highway and who was involved with determining the route(s) in New Jersey? Did this designation create any roadway and roadside improvements?
- Who were the “motor tourists?” Did they emanate from the same geographical locations? What economic base were they from that provided free time for recreation and how did they differ from the bicycle enthusiasts? Were they the same people with two interests?

- Was there a lobby for the truckers or businesses involved in freight movement? If not, why not?
- How much involvement did the farming organizations, such as the granges and other agricultural organizations, have in promoting and spurring “Good Roads?”
- What was the 1917 Edge Act? Did military involvement in World War I prompt its passage?
- What was the curriculum for a “professional roadway engineer?” How did it differ from a civil engineer’s education? What were some of the engineering feats emanating from this career?
- What was the Progressive Movement and its reforms? Who accepted this movement?
- Wagon wheel width and axle length could be beneficial or detrimental to road surfaces. How were the desired widths and lengths promoted?
- The installation of brick and granite block streets in urban

areas do not appear in State Highway Department annual reports. Was this type of project undertaken by county governments or municipalities instead?

- How do the sanitation benefits of new roadway surfaces tie into the goals of the Progressives?

D. HIGHWAY ERA

- Build a better nationwide context in which to place New Jersey firsts. How immediately significant were New Jersey’s achievements versus how significant they may be perceived today?
- Further develop the context of the collapse of rail in the New York metropolitan area during World War I and its impact on highway building in New Jersey.
- Explore the link between federal investment in roads/highways, resultant standards, and national security.



Looking west from the east end of Carnegie Lake near Princeton, New Jersey, 1923. (Courtesy of the University of Michigan, Transportation History Collection, Special Collections Library, Lincoln Highway Digital Image Collection.)

VIII. PRELIMINARY APPLICATION OF ROADWAY STUDY PRINCIPLES

A. INTRODUCTION

Prior to the finalization of the *New Jersey Historic Roadway Study*, historical research, field survey, and analysis have been performed regarding historic roads across the state to verify their eligibility for the National Register of Historic Places. The purpose of this chapter is to examine the applicability of the Study in practice. Two types of projects are presented here: Case Studies and Pilot Projects. *Case Studies* discuss examples of historic roadway segments whose eligibility for the National Register of Historic Places was evaluated prior to the development of the *New Jersey Historic Roadway Study*, and examples of those roadways that are noted as significant in the Study and have undergone a cursory field evaluation of their historical integrity. *Pilot Projects* are those roadways that were studied by NJDOT consultants using the *Draft New Jersey Historic Roads Study* (2001) as a basis for evaluating the significance and integrity of select roadway segments. For Pilot Projects, NJDOT, its consultants, and the NJHPO consulted on the report findings, and sometimes conducted joint field visits to examine the roadway segments. The roadways included in this chapter are not necessarily intended to be representative of each historic roadway era.

The information presented for each roadway below, whether Case Study or Pilot Project, includes a historical summary, and a description of the analysis by consultants, agencies, and Study Team members. For Pilot Projects, the results of NJDOT and NJHPO consultation are presented. For Case Study roadways, in instances where Study Team members visited these roadways, field observations are included, along with a brief assessment of integrity. The chapter concludes with a “lessons learned” section, which contains suggestions for improving methodologies for evaluating the significance and integrity of historic roadways that were the result of Pilot Project consultation and Case Study investigations.

B. CASE STUDIES

1. Cape May-Burlington Road/Old Cape Road

The Cape May-Burlington Road/Old Cape Road connected Cape May and Burlington via Bridgeton. Dating to the Early Roads Era, the road was mandated by the West Jersey Assembly in 1697 to connect the village of Cape May at the colony’s southern tip with its capital, roughly 80 miles to the northwest. The difficulties of construction through unsettled terrain contributed to the extended period of construction: the road was finally completed in 1707.²³⁴

NJDOT staff investigated Old Cape Road through Belleplain State Forest and Peaslee Wildlife Management Area in Cape May and Cumberland counties to determine its historic location and current status. One Parks and Forestry employee noted that the roadway likely followed township lines, taking advantage of existing survey cuts through the forest rather than establishing new routes.²³⁵ Investigators identified segments of the route through the forest, noting the location on USGS quadrangle maps. While the route roughly follows the trajectory of present-day Route 49 from the vicinity of Woodbine to Millville, the old route lies south of the present roadway, and takes more of a winding path. The route currently consists of dirt roads, light-duty roads (as classified by USGS), two-track paths, and merely clearings in the trees. The route was not always identifiable in the field. Roadside elements, such as a survey marker and former tavern site, were noted along the route.

The rural, wooded nature of this roadway as it currently exists in the state forest may be a fair representation of the roadway as it was in the 18th century. The road was essentially a path through the woods, connecting settled areas such as Cape May, Bridgeton, and villages along the way. Its degree of use and maintenance, as

²³⁴Lane, *From Indian Trail to Iron Horse*, 35-36.

²³⁵Dave Vanvorst, personal communication, April 2002.

well as the weather would have determined the road conditions – whether muddy, rutted, dry and sandy, or covered with grasses, saplings, and other overgrowth.



Old Cape Road through Belleplaine State Forest, 2002.

An application of the *New Jersey Historic Roadway Study* integrity thresholds indicate that the verified segment(s) of road through the Belleplaine State Forest and Peaslee Wildlife Management Area does not retain the desired level of integrity to qualify for the National Register. The location and association aspects of integrity must be high, and the road segment meets the location threshold. However, there appear to be few physical features or associated elements remaining from the period of significance to convey the road's association. Integrity of design, materials, and workmanship are completely lacking, though the thresholds for the latter two are "low." While the wooded setting is likely appropriate

to the operational days of the Old Cape Road, associated roadside elements are lacking. (Archaeological evidence of a tavern adjacent to the roadbed indicates the presence of roadside elements.) Electrical wires, railroad tracks, and other later elements somewhat intrude upon the setting.

More information about the character of the route in the eighteenth and nineteenth centuries would further this assessment. There is often very little written documentation associated with roadways of the Early Roads Era, particularly when the roadbed has been mostly abandoned, as is the case of the Old Cape Road. Wheaton Lane's work on New Jersey's early roadways compiled much of the information available in the 1930s, including the legislation establishing the roadways, routes, users, and other salient data. Even so, little exists about this roadway in Lane or other published or manuscript sources reviewed for this project.

2. Kings Highway

A 10-mile segment of the former Kings Highway, roughly from Kingston to Lawrenceville via Princeton, was listed in the National Register of Historic Places in 2000. The road is currently marked as NJ Route 27 and U.S. 206. The road currently has a roughly 66-foot (+/-) right-of-way, including a 2-lane cartway with 6- to 8-foot shoulders, corresponding to the four-rod measurement for many major colonial-era roadways.²³⁶ Related roadway and roadside elements include historic bridges, stone walls, mature trees and hedges, and markers. The roadway within the district passes through several other National Register listed historic districts: Princeton, Jugtown, Lake Carnegie, Kingston Mill, Delaware and Raritan Canal, Kingston Village, Stony Brook Village/Princeton Battlefield, and Lawrence.

Known at various times as the Upper Road, Kings Highway, and the Lincoln Highway, the roadway alignment shifted at several points in its history – most extensively throughout the eighteenth century and the early decades of the twentieth century, always with an eye to creating a route of the swiftest passage. The roadway

²³⁶Information about the Kings Highway is derived from the National Register nomination for this resource unless otherwise noted. Constance M. Greiff, "King's Highway Historic District," 2000. Provided courtesy of the Princeton Township Historical Commission.

was a colonial post road, stagecoach route, and motor touring destination. It was a route used for troop movements and the site of skirmishes and battles during the Revolutionary War, and



Kings Highway, entering Princeton from East Park, Mercer County, 1923. (Courtesy of the University of Michigan, Transportation History Collection, Special Collections Library, Lincoln Highway Digital Image Collection.)

influenced the development of communities along its route. While at various times its importance was superceded by the development of nearby canals, railroads, and limited-access highways, the Kings Highway has always been an important route to connect numerous communities throughout western New Jersey and into New York and Pennsylvania.

The evaluation of historical significance and integrity for this roadway was based on extensive historical research. Sources as diverse as newspaper accounts, road plans and surveys, legislation, manuscript collections, and secondary sources were

used to develop descriptions of the roadway and certain road elements, such as bridges, over time. The National Register nomination author then thoroughly examined the current roadway, identifying road widths, materials, structures, and roadway and roadside elements that contributed or detracted from the roadway. Changes over time were noted, such as the shift from bluestone and granite to concrete curbs and paving in Princeton. As evaluated in the National Register nomination, this 10-mile segment of the Kings Highway has retained its integrity of location, feeling, and association, all of which are important thresholds of integrity for the Early Roads Era as developed for this study. While the thresholds for other aspects of integrity are medium or low (design, setting, materials and workmanship), features that contribute to some of the aspects can still be found along the route.

As described elsewhere in this document, for a roadway to be of statewide significance in multiple New Jersey roadway eras, it must also retain integrity from those eras: the Kings Highway meets this test. The period of significance for this roadway extends from the eighteenth into the twentieth century, encompassing multiple eras of roadway development in New Jersey. The roadway's significance is directly related to important trends in all of the eras identified in New Jersey's historic roadway context (Early Roads, Internal Improvements, Good Roads, and Highway). Further, the physical elements of the current roadway continue to reflect elements of each of these eras, including changes to alignments, road markers, intersection and right-of-way dimensions, and bridges.

3. Paterson and Hamburg Turnpike

The Paterson and Hamburg Turnpike (Passaic-Paterson-Pompton-Hamburg-Sussex), established in 1806, is one of several turnpikes established by New York investors interested in improved connections with the natural resources of the New Jersey and Pennsylvania highlands. The route was extended west to Milford and east to the Hackensack River in 1815. Similar to other turnpikes between New York and the upper Delaware Valley, the

Paterson and Hamburg Turnpike mostly handled freight traffic. Fall and spring were the busiest seasons, with crops and livestock taken to market in the fall and products shipped to the city in the spring.²³⁷ The Turnpike ceased operations in 1860 due to the competition from railroads in the region.²³⁸

The Paterson and Hamburg Turnpike is significant as a roadway of interregional importance during the Internal Improvements Era. Only turnpikes were found to have statewide significance during this era, and those that meet the criteria are those that extended between northeastern Pennsylvania and regional New Jersey manufacturing centers, and those that traversed the “waist” of New Jersey between Philadelphia and New York.

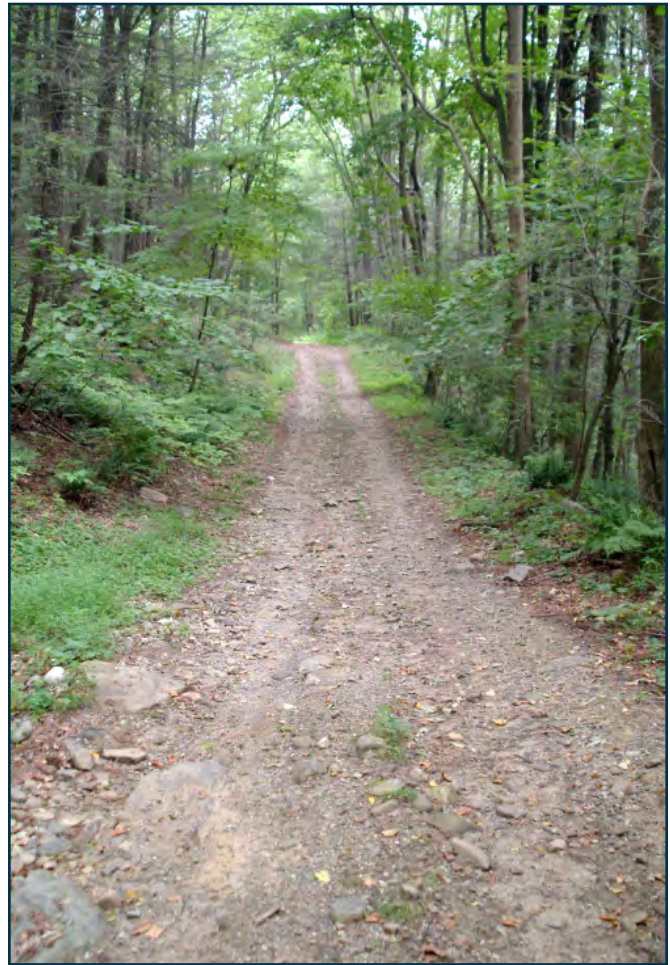
Study Team members conducted a site visit to determine the Paterson and Hamburg Turnpike’s current location and examine the extant roadway and roadside elements. The location of the roadway was found to be relatively intact, though in various states of use and improvement. Portions of the turnpike have been incorporated into Route 23, while others have been abandoned and now run through Wawayanda State Park. Portions of the route are two- and four-lane paved roadway segments, while the abandoned portions are now single-lane tracks used by state park employees. Historic buildings remain along the active route, including a possible toll house, though many buildings have been altered and updated over the last two centuries. Other related features from the turnpike era include a rock cut near Haledon and the Stockholm Methodist Church.



Sign at eastern end of Paterson and Hamburg Turnpike, Haledon, Passaic County, circa 2003.



Possible former tollhouse, Paterson and Hamburg Turnpike, circa 2003.



Abandoned Section in Wawayanda State Park, Passaic County, circa 2003.

²³⁷Lane, *From Indian Trail to Iron Horse*, 157.

²³⁸*ibid.*, 162.

Based upon the above field visit results, the team concluded that one segment of the Paterson and Hamburg Turnpike appears to meet the integrity thresholds established for the Internal Improvements Era: the “abandoned” segment of the road through Wawayanda State Park, from Stockholm to Hardistonville. For this Era, integrity of location and association must be high; integrity of design, setting and feeling may be medium; and the integrity of materials, workmanship may be low. On this section of abandoned roadway, the integrity of location is generally high, meaning that the roadbed is in its historical location. Design features such as road width, grade, and travel surface (packed dirt or gravel) remain, as does the rural, mountainous, wooded setting.

4. Lincoln Highway

The concept of transcontinental overland routes in North America had long been a fascination for many Americans. From the explorations of Lewis and Clark, to the connection of the Union Pacific and Central Pacific railroads with those of the east coast, many have strived to bridge the vast distance between the east and west coasts. The Lincoln Highway, while making yet another of these connections, also considered the journey itself an object of the trip.

An early proponent of a transcontinental roadway was the owner of the Indianapolis Speedway and founder of Prest-O-Lite carbide automobile lights, Carl G. Fisher.²³⁹ Other businessmen in Detroit, including the head of the Packard Motor Car Company, formed the Lincoln Highway Association in 1913. This group led the effort, naming itself after President Abraham Lincoln. Thus was the advent of the memorial highway in America. The Association established the Lincoln Highway as a collection of existing roadways, linked by existing or new construction, which connected to form a cross-country route. Highway markers, maps and guidebooks created by the Association provided the glue that made a cohesive route, and promoted the motor touring that would generate traffic along the roadways. Guidebooks noted towns and villages, points of interest, and locations of accommodations, garages, and supplies.

Kingston, Princeton, and Lawrenceville were noted along this segment of the highway in the guidebooks.

In New Jersey, motor touring in general created significant traffic, both from within and outside the state, particularly after the completion of the Delaware River Bridge (now Benjamin Franklin Bridge) between Camden and Philadelphia (1926) and the Holland Tunnel between Jersey City and New York (1927).²⁴⁰ Prior to the construction of Route No. 1, the Lincoln Highway functioned as a primary route between New York City and Trenton. With the advent of the federal highway numbering system in 1925, the Lincoln Highway received the designation U.S. Route 1. Part of the roadway was re-designated NJ Route 27 in 1927.



Lincoln Highway between Metuchen and Highland Park, Middlesex County, 1923. (Courtesy of the University of Michigan, Transportation History Collection, Special Collections Library, Lincoln Highway Digital Image Collection.)

²³⁹Information about the Kings Highway is derived from the National Register nomination for this resource unless otherwise noted. Constance M. Greiff, “King’s Highway Historic District,” 2000. Provided courtesy of the Princeton Township Historical Commission.

²⁴⁰State of New Jersey Highway Commission, “Annual Report of Superintendent of Maintenance – Fiscal Year From January 1, 1927 to December 31, 1927” (Unpublished Report New Jersey State Library, 1917): n.p.

The Lincoln Highway Association ceased to exist in 1927, given the new state and federal road systems traversing states and regions. The current routes encompassing the New Jersey portion of the Lincoln Highway include U.S. Routes 206 and 1T, and NJ Routes 21, 27, and 510.

As described in previous chapters, the Lincoln Highway is significant under Criterion A for its association with the national Lincoln Highway, the first transcontinental road in the United States, linking New York and San Francisco. Additionally, the Lincoln Highway is significant for its association with recreational travel, especially as an example of a road that encouraged travel as its own form of recreation. Its period of significance spans from the date of its establishment in 1913 to when the Lincoln Highway Association ceased activities in 1928.²⁴¹

A portion of the Lincoln Highway in New Jersey, in the vicinity of Princeton, was included in the National Register listing for the Kings Highway in 2000. The analysis of historical significance, appearance, and remaining physical features of the roadway included in the nomination found that the significance of this 10-mile segment of highway included the Lincoln Highway era, and that the roadway retained physical integrity from the early decades of the twentieth century. Related roadway and roadside elements identified include a gas pump shelter in the vicinity of Kingston that likely dates to this era, and a Lincoln Highway Association marker from the group's campaign to commemorate the route and Abraham Lincoln in 1928. This was the Association's final activity.

As described in the Kings Highway case study above, this is an example of a roadway for which the historical significance spans multiple eras. The Lincoln Highway was conceived in the Good Roads Era and provided a transition into the Highway Era. Further, the physical integrity of the roadway spans multiple eras; therefore, the roadway is eligible for the National Register with a period of significance that spans multiple *New Jersey Historic Roadway Study* eras.

5. U.S. Routes 1 & 9

The U.S. Routes 1 & 9²⁴² corridor is a Highway Era route located in northeastern New Jersey, running between Linden and Jersey City. It is a limited access corridor, mostly serving commuter and truck traffic through heavily urbanized portions of Union, Essex, and Hudson counties. Much of the route is elevated on a viaduct, and includes the Pulaski Skyway, soaring above the New Jersey meadowlands and boats on the Passaic and Hackensack rivers.

The need for this route became apparent during World War I-related freight congestion between New Jersey and Manhattan. Historically, the shipping piers for the region were located in Manhattan and Brooklyn, while rail yards were located in New Jersey. Complicated maneuvering was required to deliver goods from New York shipyards via smaller boats and trucks to the railroad warehouses and piers across the bay. Shortages in railroad rolling stock, infrastructure, merchant ships and manpower led to an inability to unload and transfer freight. Full rail cars remained in New York, unable to send empty cars back into the system. The lack of available rail cars created shortages in necessary items like coal and food. The passage of U.S. troops through the port of New York en route to Europe exacerbated the stranglehold on the overtaxed port. Together, these conditions prompted officials on both sides of the Hudson to investigate alternatives to ease the congestion.

While many ideas were proposed to avoid a similar situation in future, a vehicular tunnel connection between New Jersey and New York was selected. The Holland Tunnel became that connection, and Routes 1 & 9 (then Route 25) became the vehicular collector route to and from the tunnel. Besides relieving congestion – particularly freight – between New Jersey and Manhattan, another goal of the project was to relieve existing vehicular traffic congestion in Jersey City, Newark, and Elizabeth. Built as a limited access thoroughfare with access ramps, the route exhibited innovative road construction strategies and kept through traffic off local streets. Further, this was the first roadway construction

²⁴¹The Lincoln Highway Association ceased operations in 1927; however, the completion of its last activity continued into 1928. The last activity was the installation of concrete markers all along its route.

²⁴²Unless otherwise noted, information about Routes 1 & 9 is derived from a report by TAMS Consultants, Inc. entitled "Routes U.S. 1 & 9 Corridor Historic Engineering Survey, Historical Narrative & Assessment of Significance and Integrity" (August 1991). Consult this work for more detail regarding historical context, design aspects, and personalities behind the construction of this roadway.



New Jersey Terminus of the Holland Tunnel, looking east, showing the exit and entrance portals and plazas, Jersey City, 1947.

project informed by a rigorous economic analysis of alternatives. Formerly used in railroad construction, the analysis considered economic impacts of design strategies, as well as vehicle use costs.

Concurrent with the congestion issues surrounding the port of New York, wartime needs hastened the development of the state highway system in New Jersey. Fifteen routes were originally designated in the New Jersey Highway Act of 1917. As originally designated, Route 1 extended from Trenton northeast to Elizabeth. An extension from Elizabeth to Jersey City – expressly to connect to the proposed Holland Tunnel, was adopted in 1921. This was called the Route 1 Extension as well as Route 25 after roadways in the state highway system were re-numbered. The route later was recognized as a combination of U.S. highway routes designated 1 and 9, running towards Trenton and southern points along the New Jersey shore, respectively.

There is an extensive amount of primary source documentation about this highway, from State Highway Administration annual reports, to as-built drawings, newspaper and journal articles, and other contemporary sources. Much of this was cited in consultant reports in the 1980s and '90s. Of particular note is an assessment of the historical significance of the U.S. Routes 1 & 9 corridor

prepared by TAMS Consultants, Inc. as part of NJDOT's efforts to identify historic resources under the National Historic Preservation Act. The study was prepared well before the *New Jersey Historic Roadway Study* was underway, and contains thorough contextual information, placing the roadway in its time, among its peers. A 6.25-mile stretch of U.S. Routes 1 & 9 was determined eligible for the National Register as a historic district in 1996; U. S. Route 1 Extension segment, the Pulaski Skyway, was listed in the National Register in 2005.

The Discussion of General Significance (Chapter IV) in the TAMS report summarizes the significance of the roadway in terms of its place in the early planning and construction of highways in the United States, its influence on highway design, and comparisons to other contemporary routes such as the German autobahn, multi-lane highways in the Detroit area, and viaducts in Chicago. An analysis of this data against National Register criteria clearly demonstrates the significance of this roadway. Applying the significance criteria for the Highway Era later developed in the New Jersey Historic Roadway Study, the combined Routes 1 & 9 clearly fulfills the criteria. The roadway is of regional importance, and was built on a new alignment that was planned and built in a relatively short period of time. In fact, the roadway is cited in the discussion of roads that are eligible under Criterion C as an example of a roadway with distinctive characteristics of its time as evaluated within a statewide context and period of development (see page 104).

The evaluation of physical integrity in the TAMS report is thorough and logical.²⁴³ The several miles of roadway were divided into segments, and within each segment the roadway was evaluated on several fronts: integrity of alignment, features (bridges, ramps, viaducts, etc.), materials, etc. The authors systematically catalogued and analyzed the features within each section and changes over time against as-built drawings, state records, and other sources. The segments of the highway that retained high integrity were those that retained the original alignment and design features with minimal modifications. Changes that did not affect

²⁴³See TAMS, Chapter VI, p. 52-58.

integrity included routine changes to and maintenance of the roadbed, median barriers, and easily removable alterations such as guide rails. Where multiple modifications occurred such that the overall appearance was obliterated, the roadway was considered to have lost its integrity. When comparing this analysis to the integrity thresholds as presented in the *New Jersey Historic Roadway Study*, the roadway meets the high integrity standards necessary for location, design, and association. The integrity of setting does not appear to have been considered, nor that of workmanship. While the aspects of workmanship and material integrity are of low importance for Highway Era resources per the Study, it can likely be argued that several areas of high integrity exist in those areas where balustrades, granite curbs, and other design and material elements remain; several such areas exist on the segment of highway determined eligible for the National Register.

C. PILOT PROJECTS

1. Old York Road

Old York Road²⁴⁴ was established in the early eighteenth century, and served as a major connection between New York and Philadelphia; the route crossed the Delaware River at Lambertville. The name “Old York Road” was given when the entire route was improved across the state in 1764, distinguishing it from the road that crossed the Delaware at Trenton. The presence of Old York Road led to the settlement of southern and eastern Hunterdon County largely prior to that of the rest of the county, as well as the establishment of ferry service at Lambertville in 1719. The community of Ringoes, settled around John Ringo’s tavern, began along the road during this period.

The 1764 improvements were to apply to a width of 66 feet; however, the ongoing maintenance of the road often covered only the width of one vehicle. The Swift-Sure Stagecoach line began service along Old York Road circa 1769, and was a major force in settlement and commercial enterprise along the route. Taverns, livestock accommodations, farms, mills, blacksmith shops,

churches, and other signs of community appeared during the course of the eighteenth century. Service on the stagecoach lines was interrupted during the Revolutionary War, and the route was routinely used for troop and supply movements through the region. Despite increasing traffic from the stagecoach line and other travelers, the road appears to have remained a dirt path through the eighteenth and into the nineteenth centuries. A covered bridge was built to carry the Old York Road over the Delaware River circa 1813 at Lambertville, supplementing the long-running ferry service. From the Revolutionary War up to the 1830s, stagecoach traffic increased significantly, as had the use of the road by other regional travelers and those moving to points west.

The early nineteenth century brought trends that resulted in significant changes in the use of the Old York Road. The creation of turnpikes in the region lured some traffic to other roadways, particularly the Trenton and New Brunswick Straight Turnpike (now Route 1), and the Hunterdon & Sussex Turnpike and New Brunswick – Easton Turnpike. This era also saw the construction of canals and railroads, creating new swift, and often more comfortable, travel alternatives. Passengers, mail, and other freight used the new modes extensively, to the detriment of the Swift-Sure and other stagecoach lines in the region.

In the twentieth century, expansion and improvements in the roadway system impacted the Old York Road. New sections were built to eliminate curves and steep grades, new interchanges were created, and a new section of road was built to bypass Mt. Airy in 1929 when a new bridge was constructed over the Alexauken Creek. The increased accessibility of the area by road has brought changes to settlement patterns along its length, including the subdivision of farms for housing and increased commercial and institutional development.

The Old York Road was a NJDOT pilot roadway, and was the subject of extensive historical research and reconnaissance survey by Michael Baker Jr., Inc., as well as a field review by consultant, NJDOT, and HPO staff in preparation for a bridge replacement

²⁴⁴Unless noted otherwise, information about this roadway analysis is from a report by Michael Baker Jr., Inc. entitled “Phase I Archaeological Survey, Phase II Archaeological Testing, and Intensive Architectural Survey of the New Jersey Route 179 Bridge over Alexauken Creek Project Area and Architectural Reconnaissance and Historic Road Survey of a Portion of New Jersey Route 179 and Hunterdon County Route 514 (The Old York Road), Townships of West Amwell and East Amwell, Hunterdon County, New Jersey,” prepared for the New Jersey Department of Transportation, August 2002.



Old York Road, York at Washington Streets, Lambertville, Hunterdon County, circa 2002.



Northbound Old York Road, off of Route 179, Mt. Airy, Hunterdon County, circa 2002.

project. Approximately 8.4 miles of the roadway were examined, including adjacent areas on both sides of the road; roadway and roadside elements related to the significance and previously identified period of significance (c. 1624-1815, per the *Draft New Jersey Historic Roads Study*) were considered. The portion of Old York Road studied during this effort was a section that was bypassed by later construction on Route 179; it was already included in the National Register-listed Mount Airy Historic District. Because the general significance and integrity of the roadway were fairly well established, the NJHPO comments focused mainly on the methods and content for the analysis of future roadways.

One comment was that the period of significance for individual roadways should be established based upon the results of the research for that particular roadway; this will most likely not coincide directly with the period of significance for the historic roadway era that it falls within, and may cover multiple eras.²⁴⁵ Comments were also given regarding the method for documenting and analyzing contributing or National Register-eligible properties related to the historic roadway. Suggestions include modifying the level of survey to create documentation that is somewhere between reconnaissance level and intensive level to gain the information necessary to make determinations without expending more effort than is necessary. Another suggestion was to phase the documentation such that additional work beyond the reconnaissance level is done on properties that appear to relate to the significance of the roadway.

2. Ocean Highway/Route 4 (U.S. Route 9)

Tourists from the New York and Philadelphia metropolitan areas have been traveling to the New Jersey shore for recreation for over one hundred years. Railroads first made the shore accessible for recreational purposes, and improved roads brought new waves of visitors. One of the first major roadways created to cross the state in the late nineteenth century connected Jersey City with Atlantic City – a sign of the draw of the shore.²⁴⁶ The route was commonly referred to as the Main Shore Road.²⁴⁷ In 1909, the New Jersey state legislature appointed a special commission to determine the feasibility of constructing an “ocean boulevard” between Cape May and the Atlantic Highlands.²⁴⁸ This route became known as Ocean Boulevard, then Ocean Highway, and was the first designated state highway in New Jersey. The route traveled through Beesleys Point, Somers Point, Pleasantville, Port Republic, New Gretna, Tuckerton, Manahawkin, Waretown, Toms River, Mantoloking, Point Pleasant, Asbury Park, and Seabright. A series of bridges were constructed to make connections along the route, funded by local chambers of commerce, in 1915. Together with the Delaware River Drive, the then Ocean Boulevard was a cornerstone in the state’s plan to create a 1,500-mile statewide road system connecting county

²⁴⁵Information about SHPO comments about the eligibility and integrity analysis of this roadway are contained in Dorothy Guzzo, Letter to Miriam Crum, 02-1866, September 16, 2002.

²⁴⁶New Jersey Commissioner of Public Roads, *Fifth Annual Report of the Commissioner of Public Roads* (Trenton, NJ: The J. L. Murphy Publishing Co., 1898): 40.

²⁴⁷Richard Grubb & Associates, Inc., “Cultural Resources Investigation, Replacement of US Route 9 Bridge over Westecunk Creek (Structure No. 1501-155), Eagleswood Township, Ocean County, New Jersey,” prepared for Greenman-Pedersen, Inc. and New Jersey Department of Transportation, May 2005, 4-8.

²⁴⁸“Extension of the New Jersey Road System,” *Good Roads* 11 (January 1910): 34.

seats and other “thoroughfares of state-wide importance.”²⁴⁹ The road was designated Route 4 when New Jersey’s State Highway System was established in 1917. The road has since been re-numbered as Route 9.

In the *Draft New Jersey Historic Roadway Study*, Ocean Highway was determined to have statewide significance under Criterion A as the state’s first designated state highway (1909) with state-funded improvements. This marked the transition from municipal or privately (turnpike)-funded improvements to state road maintenance and construction. Further, the route has significant associations with automobile-related recreational activities and, consequently, burgeoning resort development in the early twentieth century. The *Draft New Jersey Historic Roadway Study* considered the period of significance to extend from 1909 to 1917, encompassing its date of state designation and its incorporation into the new state highway system.

A reconnaissance survey and evaluation of a two-mile segment of Ocean Highway in Eagleswood Township, Ocean County, led to a recommendation that this segment of road is eligible for the National Register of Historic Places. The analysis by Richard Grubb & Associates, and further discussion among NJDOT and NJHPO staff, resulted in consensus on the roadway’s significance, and that sufficient integrity remains along the stretch between 65.95 and 66.84 on the northbound portion and 64.92 and 65.95 on the southbound portion.²⁵⁰

The reconnaissance survey identified features of and along the roadway that corresponded to a proposed period of significance of 1909-1927; this encompassed the periods of significance of Ocean Highway, as well as its later designation as Route 4.²⁵¹ Given these dual designations for this roadway, the significance of the route encompasses two roadway eras according to the *Study*: the Good Roads and Highway eras. The two-mile segment of roadway analyzed in this study found that the route retained integrity of location, setting, feeling, and association, essentially for both eras. Further, while integrity of design, materials, and

workmanship have been diminished by subsequent improvements, the U.S. Route 9 bridge over Westecunk Creek and the paved roadway dimension (40-42 feet) were found to be consistent with state roadway design during the Highway Era. Roadside features prominently contributed to the roadway’s setting, feeling, and association, including farmhouses, commercial buildings and uses, and bungalows. Many of these features were present prior to or built during the period of significance of Ocean Highway/Route 4. While this analysis used a reconnaissance survey approach to assessing the integrity of the roadway, with a basis in established research and an understanding of the roadway and roadside characteristics, this approach yielded results sufficient to evaluate the National Register eligibility of the roadway segment.

3. John Davison Rockefeller Memorial Highway

The John Davison Rockefeller Memorial Highway, now also known as Route 70 and the Rockefeller Memorial Highway, extends from Pennsauken, Camden County, to Wall Township, Monmouth County. Like many other routes of the Highway Era, the route was built upon existing roads, in this case the 1927 state designated Route 40. The road was re-named the John Davison Rockefeller Memorial Highway in 1937.

Roadside landscaping and aesthetics were a growing interest during the Highway Era, leading to numerous efforts to make the traveling experience more pleasant. Tree planting, development of grand landscaped boulevards, and other initiatives are monuments to these efforts. Safety was also an issue on the roads, and unlimited road access and adjacent commercial development were deemed dangers to motorists, resulting in efforts to minimize access points and de-clutter roadsides of distractions. These principles were employed in the design of the Rockefeller Memorial Highway, foreshadowing the aesthetics of the Palisades and Garden State parkways.

Gilmore Clark, a nationally significant landscape architect, re-designed the roadway such that it had limited access, little or no

²⁴⁹“Highway Legislation in New Jersey,” *Good Roads* 3 (February 17, 1912): 101; “New State Laws Proposed for New Jersey,” *Good Roads* 3 (January 6, 1912): 17; Commission of Road Legislation, “Report to Governor James Fielder by His Commission on Road Legislation,” *New Jersey* 4, 23.

²⁵⁰Dorothy Guzzo, Letter to Pamela Garrett, 05-0659-2, July 20, 2005, 2-3. This analysis was performed in preparation for the replacement of the Route 9 bridge over Westecunk Creek.

²⁵¹Richard Grubb & Associates, Inc., “Cultural Resources Investigation, Replacement of US Route 9 Bridge” 2-2, 7-1. The Route 4 designation extended from Absecon north to the vicinity of Rahway.

development in the viewshed, and incorporated native species in the landscaping. The right-of-way of the newly christened road expanded from 80 to 520 feet, allowing for a broad landscaped buffer. The grading was adjusted, and natural cedar fencing was used as guide rails rather than standard black and white post and wire guide rails. Existing roadside development within the new broad right of way was removed. A “sample parkway” through the Lebanon State Forest was presented to the public in 1939. This is the roadway segment that today retains the greatest degree of integrity. The road was designated NJ Route 70 in 1953.

Ten miles of the Highway were evaluated as part of a bridge replacement project at Bispham’s Mill Creek.²⁵² Based upon the resulting report and a field visit by NJDOT, NJHPO and consultant staff, the NJHPO determined that a roughly seven-mile segment of the John D. Rockefeller Memorial Highway Historic District was eligible for the National Register in 2003. The roadway fulfilled criteria A and C as the

- “first example of a parkway in New Jersey with a designed landscape,”
- as a “publicly sponsored beautification of civic space, a link between the City Beautiful Movement and Lady Bird Johnson [sic] latter efforts towards highway beautification”
- as a “planned, primarily limited access highway constructed prior to the 1945 limited access highway legislation”; it was a model for the New Jersey Turnpike and Garden State Parkway
- for its association with nationally significant landscape architect Gilmore Clarke.

A field visit by the consultant, NJDOT, and NJHPO determined that the segment between mileposts 26.25 and 33.4 retained its historic integrity.²⁵³ The period of significance was 1937 to 1952, encompassing the establishment of the Highway to the 50-year National Register cut-off at the time of the eligibility determination.

Richard Grubb & Associates’ evaluation of the Rockefeller Memorial Highway was the result of close collaboration among the consultant, NJDOT, and NJHPO. Researchers delved into several repositories in New Jersey, but also extended the search for relevant information to the Rockefeller Archives in New York, and provided information on additional repositories outside of New Jersey that may be consulted for additional information. Similar to other pilot projects and case studies, a detailed review of available documentation of the initial construction and changes over time, augmented by reconnaissance level field survey, resulted in a firm analysis of the historical integrity of the roadway.

In addition to a thorough evaluation of the significance of the roadway, the analysis identified the character-defining features of the Highway.²⁵⁴ This is a very helpful tool for future analysis of other roadway segments. While in this case the integrity of the entire roadway was investigated, in most instances this will not be possible. The establishment of character-defining features for a historic roadway at the time of determining the roadway’s significance provides a framework for consistently evaluating the integrity of historic roadways against established benchmarks.

The *New Jersey Historic Roadway Study* enumerates roadway and roadside elements that may be associated with roadways of different eras; however, any number of these may actually apply to a specific roadway or segment. Determining the character-defining features for a specific roadway, therefore, narrows the focus to the critical aspects of the roadway that should be preserved to maintain historic integrity.

The consultant used the National Register eligibility evaluation criteria in the *Draft New Jersey Historic Roadway Study* (Kise Straw & Kolodner, Inc. 2001) in its analysis. While the analysis confirmed the Highway’s eligibility per Criterion C, it noted that while the resource does not satisfy Criterion A per the *Study*, it would if evaluated solely against the National Register Criteria for Eligibility (36 CFR 60.4). The application of the “Integrity Matrix” resulted in a recommendation that the Highway exceeded the

²⁵²See Richard Grubb & Associates, Inc., “Cultural Resources Investigation, Replacement of NJ Route 70 Bridge Over Bispham’s Mill Creek (Structure No. 0311-150), Pemberton and Woodland Townships, Burlington County, New Jersey.” Additional context, history of the Highway, and design features are included in this report.

²⁵³All information regarding eligibility and integrity from a letter from Dorothy Guzzo to Janet Fittipaldi, 03-0367-1, January 27, 2003.

²⁵⁴See Richard Grubb & Associates, Inc., “Cultural Resources Investigation, Replacement of NJ Route 70 Bridge Over Bispham’s Mill Creek (Structure No. 0311-150), Pemberton and Woodland Townships, Burlington County, New Jersey,” i.

thresholds of the matrix, thereby retaining the integrity required for National Register eligibility.

4. U.S. Route 130 (Route 2)

The section of U.S. Route 130 examined as a pilot project by NJDOT and its consultant, URS Corporation, Inc. (URS), is located between Cedar Lane and Crystal Lake in Florence and Mansfield townships, Burlington County.²⁵⁵ Originally designated as state highway Route 2 in 1917, the route is currently a divided highway with a grass median.

The report presents a historical summary of Route 2 and subsequent routes (Route 25 and U.S. 130), particularly focusing on design characteristics of each roadway development period as they were applied to the study roadway segment and changes over time. Route 2, as established at the founding of New Jersey's state highway system in 1917, connected Trenton and Camden. When construction was completed in 1919, the road had a 35-foot road surface and 15-foot unimproved shoulders within a 65-foot right of way. The road passed through an evolving landscape, with several uses devoted to the motoring public, including gas stations, billboards, a "tourist hotel," and farm stands.

When the state highway system was expanded in 1927, Route 2 was redesignated as Route 25. The road was subsequently rebuilt in 1935, creating a dualized highway with two 20-foot concrete road surfaces, 10-foot concrete shoulders with flanking 10-foot unimproved shoulders, and a 20-foot grass median within a 100-foot right of way. Concrete pass-throughs, 30 feet wide, broke the grass medians so that drivers could make left and U-turns. Other features included concrete curbs and wire rope guide rails.

In 1953, Route 25 became U.S. Route 130. A number of modifications have been made to the roadway over the years, including the replacement of road surface (now asphalt), removing median pass-throughs and creating dedicated left turn lanes, larger travel lanes, and minimized medians.

The NJHPO concurred with the recommendation that this segment of U.S. 130, formerly Route 2 and 25, was not eligible for the National Register as part of National Historic Preservation Act consultation in 2003. While the roadway's significance was established in the Draft New Jersey Historic Roads Study, the integrity of Route 2 was limited. Only two roadway elements remained from the Route 2 era, namely sections of two bridges over Craft's Creek and the Kinkora Branch Railroad. Similarly, only three examples of roadside elements from this period were extant.

Because the significance of the historic Route 2 had already been established in the *Draft New Jersey Historic Roadway Study*, the report relies on this previous work for context. Research instead focused on the study roadway segment, and related roadway and roadside elements, and changes over time. The consultant then compared research findings and field examinations to the statewide significance context and integrity thresholds. This minimized the research required on the part of the consultant, likely minimizing project costs. Further, a reconnaissance level field survey was sufficient to identify and characterize those roadway and roadside elements that remained from earlier roadway development eras. There were no substantive comments on the methodology or findings in correspondence from the NJHPO.

D. LESSONS LEARNED

A review of the methods, results, and consultation correspondence from the NJHPO reveals several lessons to learn from the preliminary application of the principles of the *New Jersey Historic Roadway Study* in the field. Many of these issues were identified during the planning and execution of the Study, and the practical application of the document has clarified some areas, as summarized below.

Research. While the *New Jersey Historic Roadway Study* contains a great deal of historical information about each of the roadway eras and what is significant in each era, in all cases there is more to learn about the state's historic roadways. Additional research

²⁵⁵Unless otherwise noted, information on this roadway and analysis is summarized from URS Corporation's report, "Cultural Resources Report, U.S. 130 Over Craft's Creek Bridge, Florence and Mansfield Townships, Burlington County, New Jersey," prepared for the New Jersey Department of Transportation, August 2003. This project was undertaken in preparation for the replacement of the Route 130 bridge over Craft's Creek.

should be done to supplement the Study, particularly in the case of those routes significant during the Early Roads and Internal Improvements eras. The Old York Road report is an instance where the consultant's additional research provided a significant amount of additional information and context for the roadway and related development along the route. Additional research in all eras would be useful to identify character-defining features (discussed further below).

Period of Significance: The period of significance for individual roadways should be refined based upon more detailed research for a particular road or segment. The period of historic roadway development defined for each era in the *Study* is intended as an umbrella to encompass the broad reaches of time periods when certain trends in roadway development were to be found. These periods are not intended to function as periods of significance for individual roadways.

Character-Defining Features: The establishment of character-defining features for a roadway provides a framework for the evaluation of integrity. This would then be applicable when analyzing an entire route or a single segment of roadway, or completing the analysis in phases. Established character defining features provide a consistent baseline for analyses over time and by a variety of parties, whether NJDOT or NJHPO staff or consultants.

Field Documentation: As a result of one Pilot Project, the NJHPO suggested considering a new level of effort for documenting

roadside elements: either create a mid-level effort somewhere between reconnaissance or intensive-level documentation, or conduct phased investigation such that resources are documented at the reconnaissance level first, then at the intensive level for those that relate to the roadway's significance. Other Pilot Projects described above used reconnaissance-level investigations to examine roadway and roadside elements to determine the level of integrity of the roadway. This seemed to be an appropriate level of investigation, particularly for Highway Era roadways. The more detailed and prevalent available documentation in the later roadway eras provides ready evidence for determining whether these roads maintain character-defining features and whether the setting and other aspects remains fairly consistent. Reconnaissance level investigations are appropriate for roadways of later eras where documentation is more readily available to assist in the analysis, while more in-depth research and documentation will be required for roads of earlier eras to coalesce and supplement available documentation.

The exhaustive efforts expended to document and evaluate the relatively short segments of Pilot Project roads and those listed in the National Register (Kings Highway) point to the tremendous efforts necessary to document and evaluate the integrity of entire historic routes, which often extend for dozens of miles. While likely pushing full route evaluations far into the future, undertaking these assessments as a matter of course during scheduled NJDOT projects is the most prudent way to fully catalogue the historical integrity of New Jersey's historic roadways.



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APPENDIX C. HISTORIC MAPS AND ATLASES: CHRONOLOGICAL BIBLIOGRAPHY

- 1682-1740s *Early Roads of the Philadelphia Metropolitan Region of Southern New Jersey.* In Patrick, Kevin J. "Settlement Patterns in the Philadelphia Metropolitan Region of Southern New Jersey." Unpublished report. 1983. On file at the Gloucester County Historical Society, Woodbury, New Jersey.
- Shows Kings Road, Great Road, and Irish Road.
- 1745 Dalley, John. *A Map of the Road from Trenton to Amboy.* 1745. Copied by G. Bancker in 1762. Reprint in *New Jersey Road Maps of the 18th Century.* Princeton, NJ: Princeton University Library, 1981.
- Hand drawn map showing the Old Dutch Road. Includes buildings along roadway. Princeton's comments state that Bancker "copied Dalley's survey faithfully, adding a few names, which perhaps indicate changes that had taken place in the interval between 1745 and 1762."
- 1747 Alexander, James. *Map No. II.* Engraved by James Turner from Alexander's manuscript. Included in the publication of the "Elizabeth-Town Bill in Chancery." Reprint in John P. Snyder, *The Mapping of New Jersey: The Men and the Art.* New Brunswick, NJ: Rutgers University Press, 1973.
- Shows Upper Road, Lower Road, Minisink Trail.
- 1749 Evans, Lewis. *A Map of Pensilvania, New-Jersey, New-York, And the Three Delaware Counties.* Reprint in John P. Snyder, *The Mapping of New Jersey: The Men and the Art.* New Brunswick, NJ: Rutgers University Press, 1973.
- According to John P. Snyder's *The Mapping of New Jersey: The Men and the Art*, this map was the first reasonably accurate map. Shows several roads. Among the earliest map printed in America. Available at the Library of Congress.
- 1755 Evans, Lewis. *A Map of the Bristish and French Dominions in North America.* Reprint in John P. Snyder, *The Mapping of New Jersey: The Men and the Art.* New Brunswick, NJ: Rutgers University Press, 1973.
- According to John P. Snyder's *The Mapping of New Jersey: The Men and the Art*, this map profoundly influenced many subsequent maps of the area.
- 1755 Fry, Joshua and Peter Jeffereson. *A Map of the most Inhabited Part of Virginia Containing the whole Province of Maryland with part of Pennsylvania, New Jersey and North Carolina.* London: Thomas Jefferys, 1755. In Klemp, Egon, ed. *America in Maps Dating from 1500 to 1856.* Translated from the German by Margaret and Jeffrey C. Stone. New York: Homes & Meier Publishers, 1976. On file at the New Jersey State Library, Trenton, New Jersey.
- Only shows southern third of state. Shows one road connecting Gloucester, Salem, and Greenwich, which is part of the Great Road from Gloucester to Salem. Available at the Library of Congress.

- 1758 Thomas Jefferys. *A General Map of the Middle British Colonies in America*. Reproduced in John P. Snyder, *The Mapping of New Jersey: The Men and the Art*. New Brunswick, NJ: Rutgers University Press, 1973.

According to John P. Snyder's *The Mapping of New Jersey: The Men and the Art*, this map corrected and improved Evans' map. Available at the Library of Congress.

- 1765 Evans, Lewis. *A General Map of the Middle British Colonies in America*. London: John and Carrington Bowles, ca.1765. In Klemp, Egon, ed. *America in Maps Dating from 1500 to 1856*. Translated from the German by Margaret and Jeffrey C. Stone. New York: Homes & Meier Publishers, 1976. On file at the New Jersey State Library, Trenton, New Jersey.

Shows approximately five roads: the road from Burlington to Salem, Greenwich towards Cape May, Trenton north to the Norton area, Phillipsburg to Amboys, Old York Road, and Newark north to New York. Available at the Library of Congress.

- 1766 Dunham, Azariah. *A Map of the Division line Between the Counties of Middlesex & Somerset*. 1766. Reprint in *New Jersey Road Maps of the 18th Century*. Princeton, NJ: Princeton University Library, 1981.

Hand drawn map of the Old Dutch Road. Includes buildings along roadway.

- 1768 Holland, Samuel. *The Provinces of New York and New Jersey; with Part of Pennsylvania, and the Governments of Trois Riviers, and Montreal*. London: Thomas Jeffreys, 1768. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.

Shows several roads.

- 1775 Snyder, John P. *A reconstructed map showing townships and counties as they actually existed*. In John P. Snyder, *The Mapping of New Jersey: The Men and the Art*. New Brunswick, NJ: Rutgers University Press, 1973.

Produced in two sections: northern and southern New Jersey. Shows a few roads.

- 1776 Sauthier, Claude Joseph. *A Map of the Province of New-York, to which is added New-Jersey*. London: William Faden, 1776. In Klemp, Egon, ed. *America in Maps Dating from 1500 to 1856*. Translated from the German by Margaret and Jeffrey C. Stone. New York: Homes & Meier Publishers, 1976. On file at the New Jersey State Library, Trenton, New Jersey.

Shows several roads and division of East and West Jersey.

- 1776 Lewis, S. *A Plan of the Northern Part of New Jersey Shewing [sic.] the Positions of the American and British Armies after Crossing the North River in 1776*. Drawn by S. Lewis from Surveys by order of Gen. Washington. Engraved by F. Shallus, 1776. In Marshall, John. *The Life of George Washington*. Philadelphia: 1807, Maps Plate IV. Reprint in Fite, Emerson D. and Archibald Freeman. *A Book of Old*

Maps Delineating American History from the Earliest Days down to the Close of the Revolutionary War. New York: Dover Publications, Inc., 1969. Plate 66. On file at the New Jersey State Library, Trenton, New Jersey.

Only northeast portion of state. Shows numerous roads.

- 1776 *A Map of the Country Round Philadelphia including Part of New Jersey, New York, Staten Island & Long Island.* 1776. On file at the New Jersey State Library, Trenton, New Jersey.

Shows approximately seven roads.

- 1777 Kitchin, Thomas. *Seat of War in the Environs of Philadelphia.* London, 1777. In *The London Magazine. London, 1777.* Plate XLVI, 586. Reprint in Fite, Emerson D. and Archibald Freeman. *A Book of Old Maps Delineating American History from the Earliest Days down to the Close of the Revolutionary War.* New York: Dover Publications, Inc., 1969. Plate 67. On file at the New Jersey State Library, Trenton, New Jersey.

Only portion of state along Delaware River. Shows a few roads. Available at the Library of Congress.

- 1777-1778 Faden, William. *The Province of New Jersey, Divided into East and West. Commonly Called The Jerseys.* 1777. Reproduced in Lane, Wheaton J. *From Indian Trail to Iron Horse: Travel and Transportation in New Jersey 1620-1860.* Princeton, NJ: Princeton University Press, 1939, and in John P. Snyder. *The Mapping of New Jersey: The Men and the Art.* New Brunswick, NJ: Rutgers University Press, 1973.

Wheaton Lane states that "this map, although of course not accurate, is the best road map of colonial New Jersey." According to John P. Snyder's *The Mapping of New Jersey: The Men and the Art*, this map is larger and more detailed than Evans, but less accurate; became the most popular map to 19th and 20th century New Jersey history enthusiasts; is best known and most frequently reprinted; followed 1769 survey; approximated roads, showing them nearly as straight lines between towns, but there were few surveys to improve his accuracy. Available at the Library of Congress.

- 1780 Hinton, J. *A New and Accurate Map of New Jersey from the Best Authorities.* London: The Universal Magazine [?], 1780. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.

Shows numerous roads.

- 1781 Berthier, Louis-Alexandre. *Route of the French Army across New Jersey, August 1781. 1781.* Reprint in *New Jersey Road Maps of the 18th Century.* Princeton, NJ: Princeton University Library, 1981.

Hand drawn map showing route taken by Rochambeau's Army from New Hempstead, NY to Trenton, NJ. Includes buildings along roadway.

- 1789 Christopher Colles. *A Survey of the Roads of the United States of America*.
- According to John P. Snyder's *The Mapping of New Jersey: The Men and the Art*, this map is the 1st set of road maps published in US; covers main route between Albany, NY and Yorktown, VA, Road from Paulus Hook (Jersey City) to Philadelphia via Trenton; Erskine-DeWitt maps played a significant role in Coles' maps; book reproduced by Harvard University Press in 1961.
- 1795 Lewis, Samuel. *The State of New Jersey compiled from Authentic Information*. Philadelphia, PA: W. Barker, 1795. On file at the New Jersey State Library, Trenton, New Jersey. And reproduced in John P. Snyder. *The Mapping of New Jersey: The Men and the Art*. New Brunswick, NJ: Rutgers University Press, 1973.
- Shows numerous roads. More accurate than Faden's map according to John P. Snyder in *The Mapping of New Jersey: The Men and the Art*. Available at the Library of Congress
- 1799 Payne, John. *State of New Jersey*. New York: J. Low, 1799. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.
- Shows numerous roads.
- L. 18th cent. *A New and Accurate Map of the Present Seat of War in North America*. London [?]: n.d. On file at the New Jersey State Library, Trenton, New Jersey.
- Only north three-quarters of state. Shows numerous roads.
- L. 18th cent. *The Jerseys &c. &c.* Engraved for Dr. Gordon's *History of the American War*. n.d. On file at the New Jersey State Library, Trenton, New Jersey.
- Shows several roads.
- Colonial *Colonial New Jersey*. In Cranmer, H. Jerome. *New Jersey in the Automobile Age: A History of Transportation*. Vol. 23 The New Jersey Historical Series. Princeton, NJ: D. Van Nostrand Company, Inc., 1964.
- Shows "major colonial roads."
- L. 18th and E. 19th cent. *Base Roads of the Eighteenth and Early Nineteenth Centuries*. In Patrick, Kevin J. "Settlement Patterns in the Philadelphia Metropolitan Region of Southern New Jersey." Unpublished report. 1983. On file at the Gloucester County Historical Society, Woodbury, New Jersey.
- Shows numerous roads radiating out from Camden.
- 1801 Doolittle, A. *New Jersey*. Philadelphia: Mathew Carey, 1801. On file at the New Jersey State Library, Trenton, New Jersey.

Probably from Carey's *American Pocket Atlas*, 2nd ed., 1801 according to citation for similar map at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey. Shows numerous roads.

- 1801-1860 *The Principal Turnpikes and Plank Roads, 1801-1860*. In Lane, Wheaton J. *From Indian Trail to Iron Horse: Travel and Transportation in New Jersey 1620-1860*. Princeton, NJ: Princeton University Press, 1939.
- Includes names of all seventy-six roads shown.
- 1804 Carey, Mathew. *The Main Road from Philadelphia to New York, 1804. The Traveller's [sic.] Directory: or, A Pocket Companion, shewing [sic.] the Course of the Main Road from Philadelphia to New York; and from Philadelphia to Washington: with Description of the Places through which It passes, and the Intersections of the Cross Roads. Illustrated with an Account of such remarkable Objects as are generally interesting to Travellers*. From Actual Survey by S.S. Moore and T.W. Jones. Second Edition. Philadelphia: Printed for Mathew Carey, 1804. Reprint in *New Jersey Road Maps of the 18th Century*. Princeton, NJ: Princeton University Library, 1981.
- Shows Old Dutch Road. Shows buildings with names, bridges, and other details such as a "causeway" of logs over the salt marshes north of the Passaic River. According to John P. Snyder's *The Mapping of New Jersey: The Men and the Art*, this map is the second American Road Atlas.
- 1804 Lewis, S. *New Jersey*. 1804. On file at the New Jersey State Library, Trenton, New Jersey.
- Shows two main roads and a few others.
- 1810 *New Jersey*. 1810. On file at the New Jersey State Library, Trenton, New Jersey.
- Shows numerous roads.
- ca.1812 *A Map of the State of New Jersey, to his Excellency Joseph Bloomfield, Governor, the Council and Assembly*. Philadelphia, PA: W. Harrison, 1812 [?]. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.
- Negative photocopy of northern portion only available. Shows turnpikes with names. [difficult to read]
- 1812 New Jersey, 1812. From Giberson, William. *Chart Book, Toms River*. Boston: Thomas & Andrews, n.d. In Rose, T.F., H.C. Woolman, and T.T. Price. *Historical and Biographical Atlas of the New Jersey Coast*. Philadelphia: Woolman & Rose, 1878. Reprint Toms River, NJ: Ocean County Historical Society, 1985. On file at the New Jersey State Library, Trenton, New Jersey.
- Shows two main roads—one in the north and one in the south—and five secondary roads. Similar to Lewis' 1804 map.

- 1814 Carey, Mathew. "New Jersey." *American Pocket Atlas*. Philadelphia, PA: Mathew Carey, 1814. On file at the New Jersey State Library, Trenton, New Jersey.
- Shows numerous roads.
- 1814-1816 Lewis, Samuel. *The State of New Jersey compiled from the Most Authentic Information*. Philadelphia, PA: T.S. Manning [?], 1816 [?]. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.
- Shows numerous roads.
- 1823 *Geographical Statistical, and Historical Map of New Jersey*. 1823. On file at the New Jersey State Library, Trenton, New Jersey.
- Shows several roads.
- 1824 Finley, A. *New Jersey*. Philadelphia, PA: A. Finley, 1824. On file at the New Jersey State Library, Trenton, New Jersey.
- Shows numerous roads.
- 1828 Thomas Gordon. *A Map of the State of New Jersey*. Reproduced in John P. Snyder. *The Mapping of New Jersey*. New Brunswick, NJ: Rutgers University Press, 1973.
- H.S. Tanner, engraver. Shows turnpikes. More roads and more accurate than Watson. Last revised by Robert E. Horner in 1854, therefore, remained a map of authority for 30 years. (not Thomas Francis Gordon, who compiled *Gazetteer of the State of New Jersey and History of New Jersey*, 1834).
- ca.1831 Finley, A. *New Jersey*. Philadelphia: A. Finley, 1831[?]. On file at the New Jersey State Library, Trenton, New Jersey.
- Shows numerous roads. Similar to Finley's 1824 map, except this map shows two railroad lines.
- 1834 Tanner, H.S. *New Jersey. Tanner's Universal Atlas*. Philadelphia: H.S. Tanner, 1834. Reduced from T. Gordon's Map. On file at the New Jersey State Library, Trenton, New Jersey.
- Shows numerous roads and railroad lines. Has chart listing routes between Philadelphia and New York by stage, etc.
- 1834 Thomas F. Gordon. *New Jersey*. 1834. On file at the New Jersey State Library, Trenton, New Jersey. And reproduced in John P. Snyder. *The Mapping of New Jersey: The Men and the Art*. New Brunswick, NJ: Rutgers University Press, 1973.

- ca.1835 Shows "principal stage roads." [large map]
Illman, Thomas. *New Jersey*. 1835. On file at the New Jersey State Library, Trenton, New Jersey.
- Shows numerous roads.
- 1835-1836 Greenleaf, Jeremiah [?]. *New Jersey*. Brattleboro, VT [?]: G.R. French [?], 1835 or 1836. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.
- Shows numerous roads, some are illustrated as primary routes.
- 1841 Gordon, Thomas. *New Jersey*. New York [?]: Morse and Breese [?], 1841. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.
- Shows numerous roads. Also canals and railroad lines.
- ca.1850 *Map of New Jersey Reduced from T. Gordon's Map*. Philadelphia, PA: Thomas, Cowperthwait & Co., 1850 [?]. On file at the New Jersey State Library, Trenton, New Jersey.
- Shows numerous roads and railroad lines. Has chart listing routes between Philadelphia and New York by stage, etc. Similar to Finley's 1834 map.
- 1850s *Base Turnpikes of the Philadelphia Metropolitan Region of Southern New Jersey, 1850s*. In Patrick, Kevin J. "Settlement Patterns in the Philadelphia Metropolitan Region of Southern New Jersey." Unpublished report. 1983. On file at the Gloucester County Historical Society, Woodbury, New Jersey.
- Shows turnpikes radiating from Camden.
- ca.1855 Colton, J.H. Colton's *New Jersey*. New York, NY: J.H. Colton, 1855 [?]. On file at the New Jersey State Library, Trenton, New Jersey.
- Shows numerous roads.
- ca.1856 Desilver, Charles. *Map of New Jersey compiled from the latest authorities*. Philadelphia, PA: Charles Desilver, 1856 [?]. On file at the New Jersey State Library, Trenton, New Jersey.
- Shows numerous roads. Similar to Colton's ca.1855 and Gordon's ca.1850.
- 1868 Johnson, A.J. *Johnson's New Jersey*. New York, NY: A.J. Johnson, 1868. On file at the New Jersey State Library, Trenton, New Jersey.
- Shows numerous roads. [large map]

- 1878 Rose, T.F., H.C. Woolman, and T.T. Price. *Historical and Biographical Atlas of the New Jersey Coast*. Philadelphia: Woolman & Rose, 1878. Reprint. Toms River, NJ: Ocean County Historical Society, 1985. On file at the New Jersey State Library, Trenton, New Jersey.
- Shows detailed road system integrated with railroads. [difficult to read roads. large map]
- 1902 New Jersey Geological Survey. *Road Map of the State of New Jersey*. Trenton, NJ [?]: n.d., shows 1902. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.
- “Improved roads” shown in red. [large map]
- 1903 New Jersey Geological Survey. *Road Map of the State of New Jersey*. Trenton, NJ [?]: 1903. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.
- “Improved roads” shown in red. [large map]
- 1912 New Jersey Geological Survey. *Road Map of the State of New Jersey*. Trenton, NJ [?]: 1912. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.
- “Improved roads” shown in red. [large map]
- 1917 Wanamaker, John. *The Wanamaker Automobile Road Map: Philadelphia and Vicinity*. 1917. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.
- Shows simplified/schematic road system.
- 1917 New Jersey [“Hammond’s Complete Map of New Jersey”]. New York, NY: C.S. Hammond and Co., 1917. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.
- Shows “principal through routes” in bold red.
- 1918 New Jersey Geological Survey. *Road Map of the State of New Jersey*. Trenton, NJ [?]: 1918. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.
- “Improved roads” and “turnpikes” shown in red. [large map]
- 1918-1925 *Reference Map of New Jersey*. Chicago, IL: Rand McNally and Co., between 1918 and 1925. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.
- Very detailed. [large map]

- 1921 New Jersey Geological Survey. *Road Map of the State of New Jersey*. Trenton, NJ [?]: 1921. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.
- “Improved roads” shown in red. [large map]
- 1923 Stead, Carroll W. *Auto Road Map of New Jersey and Eastern Pennsylvania Showing Main Routes*. Trenton, NJ: L.B. Price, 1923. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.
- Shows “main routes.”
- 1925 [New Jersey] State Highway Commission. *1925 Road Map of New Jersey*. New York: General Drafting Co., Inc., 1925. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.
- Shows various road types and improvements of the state highway system.
- 1926 *Metropolitan Terminal Routes*. In *Report of the State Highway Engineer to the New Jersey State Highway Commission*,” Plate 17. Trenton, NJ: MacCrellish & Quigley, 1926.
- 1926 *State of New Jersey Map Showing Present Highway System Taken Over, and Other Legislated Routes Not Taken Over*. In *Report of the State Highway Engineer to the New Jersey State Highway Commission*,” Plate 14. Trenton, NJ: MacCrellish & Quigley, 1926.
- 1926 *State of New Jersey Map Showing Proposed Construction Program*. In *Report of the State Highway Engineer to the New Jersey State Highway Commission*,” Plate 18. Trenton, NJ: MacCrellish & Quigley, 1926.
- 1926 *State of New Jersey Map Showing Proposed System of Primary and Secondary Highway Routes*. In *Report of the State Highway Engineer to the New Jersey State Highway Commission*,” Plate 15. Trenton, NJ: MacCrellish & Quigley, 1926.
- 1926 *State of New Jersey Map Showing Relation Between Proposed and Present Highway Systems*. In *Report of the State Highway Engineer to the New Jersey State Highway Commission*,” Plate 16. Trenton, NJ: MacCrellish & Quigley, 1926.
- 1926 *State of New Jersey Map Showing Relation Between Traffic Flow and Proposed Highway System*. In *Report of the State Highway Engineer to the New Jersey State Highway Commission*,” Plate 13. Trenton, NJ: MacCrellish & Quigley, 1926.
- 1926 *State of New Jersey Map Showing Trend and Flow of Traffic*. In *Report of the State Highway Engineer to the New Jersey State Highway Commission*,” Plate 12. Trenton, NJ: MacCrellish & Quigley, 1926.

Note: According to John P. Synder's *The Mapping of New Jersey: The Men and the Art*, railroads, not the highways, became the standard for linking towns on the conventional maps in the late nineteenth century. Thus, many historic state atlases show railroads but no roads. These include:

- 1870 Cram, George F. *New Jersey*. Chicago, IL: George F. Cram, after 1865, 1870 [?]. On file at Special Collections and Archives, Rutgers University Libraries, New Brunswick, New Jersey.
- 1872 Beers, Frederick W. *State Atlas of New Jersey*. New York, NY: Beers, Comstock & Cline, 1872. On file at the New Jersey State Library, Trenton, New Jersey.
- 1873 Hopkins, Griffith Morgan. *Combined Atlas of the State of New Jersey and the County of Hudson*. Philadelphia, PA: G.M. Hopkins & Co., 1873. On file at the New Jersey State Library, Trenton, New Jersey.
- 1873 Hopkins, Griffith Morgan. *Combined Atlas of the State of New Jersey and the City of Newark*. Philadelphia, PA: G.M. Hopkins & Co., 1873. On file at the New Jersey State Library, Trenton, New Jersey.
- 1913 Rand, McNally & Company. *The New Ideal State and County Survey and Atlas of New Jersey and Pennsylvania*. Chicago, IL: Rand McNally, 1913. On file at the New Jersey State Library, Trenton, New Jersey.

APPENDIX D. HISTORIC ROADWAYS TIMELINE

NATIONALLY		NEW JERSEY
EARLY ROADS ERA		
Raleigh's expedition established Roanoke Colony in what is now North Carolina	1585	
Virginia Dare was the first European born in North America at the Roanoke Colony	1587	
Jamestown established by Capt. John Smith	1607	
	1609	Henry Hudson on Half Moon sailed up the Hudson River
Mayflower landed at Plymouth Rock	1620	
The Ordinance of Virginia authorized the convening of the first legislative assembly in America	1621	
Dutch built Fort Orange in Albany, New York	1624	
Dutch established New Amsterdam on Manhattan Island	1625	
Peter Minuit bought Manhattan Island from the Indians	1626	
	1638	New Sweden settled by Peter Minuit along Delaware River
	1629	First Dutch land grant for west bank of Hudson River (Jersey City)
	1644	Dutch surrendered New Netherlands to England
	1647	Peter Stuyvesant became Director General of New Netherlands
	1655	Dutch forced Swedes to give up forts in southern New Jersey
Filippo di Chiese built first long distance coach in Berlin, Germany	1660	
	1664	English consolidated rule over New Jersey
	1673	First Public Roads Act in New Jersey
	1676	Second Public Roads Act in New Jersey
	1681	Burlington-Salem Road authorized
William Penn founded Philadelphia	1682	Third Public Roads Act in New Jersey

NATIONALLY

NEW JERSEY

	1683	Burlington-Perth Amboy (“Lawries” Road) authorized
First steam engine patented by Thomas Savery in England	1698	
	1702	East and West proprietorships end and New Jersey became a royal colony under a common governor with New York
Guillame Delisle drew first accurate map of Europe	1725	
	1738	New Jersey became a separate royal colony with own governor – Lewis Morris
France opened Engineer School of Bridges and Highways	1747	
Pennsylvania’s Conestoga wagon introduced by Dutch settlers	1760	
Three tiered road marking invented by Pierre Tresaguet in France	1764	
Steam engine condenser patented by James Watt	1769	
Declaration of Independence signed First commercial steam engine produced by James Watt	1776	
	1777	State seal established
World’s first iron bridge built in Shropshire, England	1781	
Inventor John Fitch developed the steamboat and operated a service in the Delaware Valley	1785	
First steam boat launched on the Delaware River by John Fitch	1787	
Federal Constitution ratified; took effect 1789	1787-1789	
Federal government established	1789	
First horse-drawn railroad in England	1795	
INTERNAL IMPROVEMENTS ERA		
Pierre Tresaguet the “Father of Modern Road” developed a new kind of road – using broken stone	1775	
Inventor John Fitch developed the steamboat and operated a service in the Delaware Valley	1785	Steam boat operated between Philadelphia and Trenton

NATIONALLY

NEW JERSEY

Federal Constitution ratified; took effect 1789	1787-1789	
Federal government established	1789	New Jersey first state to ratify the Bill of Rights
Alexander Hamilton's Report on Manufactures advocated advantages of a more industrialized nation; inadequate transportation facilities an obstacle	1791	Society for Useful Manufacture granted charter by New Jersey
Philadelphia and Lancaster Turnpike opened; settlement of the Northwest Territory (now the states of Ohio and Indiana) increased	1794	
	1795	First turnpike company chartered in New Jersey (New Jersey Turnpike Company)
	1801	Morris Turnpike chartered, the New Jersey Turnpike to be built
Thomas Jefferson signed the Louisiana Purchase	1803	
	1804	Newark Turnpike, the only publicly funded turnpike constructed during this era in New Jersey
National Road/Cumberland Road connecting the Ohio Valley with eastern seaboard authorized by Congress	1806	
Robert Fulton's steamboat <i>Clermont</i> began New York-Albany route	1807	Colonel John Stevens of Hoboken launched a commercial steamboat system
Albert Gallatin, Secretary of the U.S. Treasury presented to Congress an extensive plan for internal improvements, particularly highways and canals	1808	
War of 1812; British ransacked D.C. and blockaded coastal waters	1812-1814	
Erie Canal authorized; opens in 1825	1817	
National Road completed; portion of Lancaster Turnpike extended	1818	
U.S. Supreme Court, in <i>Gibbons v. Ogden</i> , established federal government jurisdiction over interstate commerce	1824	
Baltimore and Ohio Railroad construction began	1828	
	1830s-1840s	Peak period of Turnpike Era in New Jersey, by 1830s 51 turnpike companies are created, although only half build roads
	1831	Morris Canal opened

NATIONALLY

NEW JERSEY

	1834	Delaware and Raritan Canal opened; Camden & Amboy Railroad service began
	1835	Morris and Essex Railroad incorporated
Economic Panic of 1837	1837	
	1839	First all-rail route between Camden and Jersey City began service
Mexican War	1846-1848	
California Gold Rush	1849	Central Railroad of New Jersey (CNJ) created, combining Elizabeth & Somerville Railroad and Somerville & Easton Railroad Company; eventually, CNJ combined over 50 predecessor railroads
	1853	Delaware Lackawanna & Western Railroad incorporated, merging two small railroads
First transatlantic telegraph cable completed	1858	
Civil War	1861-1865	
National banking system established	1863	
Transcontinental railroad completed	1869	
	1870	First asphalt pavement laid in U.S. in Newark by Belgian chemist Edmund J. Desmedt. John A. Roebling & Sons Company founded – a nationally renowned bridge builder
	1871	Pennsylvania Railroad enters NJ with the long-term lease of the United New Jersey Railways and Canal Company properties
Panic of 1873; nationwide economic depression	1873	
Brooklyn Bridge opened; a product of Roebling Co.	1883	
	1891	New Jersey passed law to provide money to build and maintain roads throughout the state
	1897	New Jersey established a plan to eliminate existing toll roads in the state
	1921	New Jersey's last turnpike road of this era converted to public use (Camden County)
GOOD ROADS ERA		
First brick road laid in United States, Charleston, WV, part of that city's successful bid to become the state capitol	1870	First installation of asphalt pavement in United States, in front of City Hall, Newark, NJ by a Belgian chemist named Edmund DeSmedt

NATIONALLY

NEW JERSEY

George B. Selden received patent for gas-driven automobile

1879

League of American Wheelmen founded; by 1883 it has 35,000 members

1880

1889

New Jersey authorized counties to issue bonds for the construction of broken-stone roads

1891

New Jersey passes State Aid Highway Act (the first act of its kind in the nation), does not really take effect until amended in following year due to defect

First concrete road installed, Bellefontaine, OH
Chicago – 1,000 plus attend meeting of National League for Good Roads, lobbying for national road legislation

1892

First County Park system in America founded, Essex County, NJ

World's Columbian Exposition opened in Chicago; based on census data and ticket sales, it was estimated that between 5 and 10% of America's population saw the "White City" first hand
Duryea Brothers (Charles and Frank) introduced first automobile with gasoline powered internal combustion engine
Federal government establishes Office of Road Inquiry
Only six states had laws pertaining to tire width

1893

New Jersey passed shade tree statute, authorized municipalities to appoint a three-person committee in charge of planting and maintaining shade trees on public highways

Harvard University professor, Nathaniel Shaler, started nation's first road engineering curriculum; American Society for Municipal Improvements founded, helped focus better roads debate on paving materials

1894

New Jersey appointed first Commissioner of Public Roads

Experimental Rural Free Delivery established
Corrugated metal pipe culvert invented

1896

Federal government established materials testing lab

1897

First Object Lesson Road built on Nichol Avenue at New Jersey Agricultural College and Experiment Station (now School of Environmental and Biological Sciences) in New Brunswick, NJ. The federal government, through the Object-Lesson Road Program, set construction standards, built sample roads according to their standards, and publicized the results. Many examples were built at state agricultural schools, evincing the strong link between road improvement and farmers

Chicago began requiring drivers licenses

1898

Rural Free Mail Delivery established

1899

NATIONALLY

NEW JERSEY

Horses, still vital for transportation and freight haul, result in burden on sanitation and health departments. In New York City, 2.5 million pounds of manure and 60,000 gallons of urine are released onto city streets daily
8,000 cars are registered in the U.S.

1900

America's first large car show held in New York City
Connecticut enacted first automobile speed law

1901

A Vermont doctor and his chauffeur completed the first cross country car trip
Massachusetts issued first official state made license plate

1903

New Jersey spent more money on road improvements than either Connecticut or New York. Although Massachusetts had spent more, their program did not include local participation, so they actually improved fewer miles of road (MA/NJ - \$5,150,923/\$4,545,494; 480 miles/959 miles)

Nation's first national road census of mileage, type of construction, state of repair, methods of administration, and levels of expenditure undertaken
Motor trucks introduced

1904

New Jersey administered \$2,000,000 on roads, while remaining 12 states with similar programs spent a combined total of \$607,000

Sylvanus F. Bowser invented the gas pump

1905

1906

Hunterdon County started expending public funds on roads
New Jersey required annual auto registration, also enacts law providing that receipts from licenses, fees, and fines for autos could be used as aid to counties and municipalities for repair and maintenance of roads

Nation's first pedestrian safety island, San Francisco, CA. It was used to load and unload trolley passengers at a busy intersection
Wilson v. Shaw decision in the U.S. Supreme Court affirms constitutionality of Congressional construction of interstate roads under the interstate commerce clause, affirming the federal government's ability to expend money on roads

1907

1908

First route of the Hudson & Manhattan tubes opened (now PATH)

Ford releases first Model T, brought automobile ownership within reach of middle class

1909

New Jersey established State Highway Commission

Nation's first driver's licenses introduced in New York

1910

The break up of Standard Oil resulted in the beginnings of corporate rivalry between gas companies. Gas stations began marketing strategies that involve strong attempts at brand identification

1911

New Jersey state legislature made special appropriation to fund research on road materials

NATIONALLY

NEW JERSEY

Nation's first painted center white lines, Wayne County, MI

Introduction of car payments
 Federal Office of Public Roads introduced first standard specifications for road materials and construction
 Charles Kettering invented the first electric car starter

Lincoln Highway named; started craze for memorial highways, and gave birth to idea of highway network

American Association of State Highway Officials, forerunner of AASHTO, established

Nation's first modern stop sign, Detroit, MI
 New York City installed first traffic control devices

Federal Aid Highway Act signed by Woodrow Wilson on June 11, based in part on New Jersey's 1891 act, created 50/50 federal/state match

HIGHWAY ERA

American Road Makers (now American Road and Transportation Builders Association) organized, with mission to connect every state capital with the national capital

Nation's first gas tax introduced in Oregon
 First U.S. Army transcontinental convoy from San Francisco to Washington, DC; the trip took 62 days.

National Advisory Board on Highway Research, now the Transportation Research Board, created

1912

New Jersey allowed state to share 40% of cost of road improvements, this is up from original 33.33%
 New Jersey passed Convict Labor Law, providing for prisoners to be employed in repair and construction of public roads
 First year that state aid highway funds could be applied to bridge construction
 New Jersey laid its first concrete road in New Village using concrete manufactured by Thomas Edison's concrete company
 New Jersey legislature passed act to "establish a state System of Highways"

1913

Survey revealed that New Jersey has a higher percentage of vehicles per road mile than surrounding states; including New York, Massachusetts, Maryland, and Connecticut
 New Jersey began requiring licenses for all drivers, rather than just chauffeurs

1914

1915

1916

Ratio of cars to number of New Jersey residents was 1:32
 New Jersey passed the Egan Act, provided for issuance of bonds, not to exceed \$7,000,000, to be used for the construction of a state highway system of 13 routes. The Egan Act also provided for the creation of a Highway Commission

1917

New Jersey passed the Edge Acts. Designated state highway system comprised of 15 routes
 New Jersey established state engineer position

1902

1919

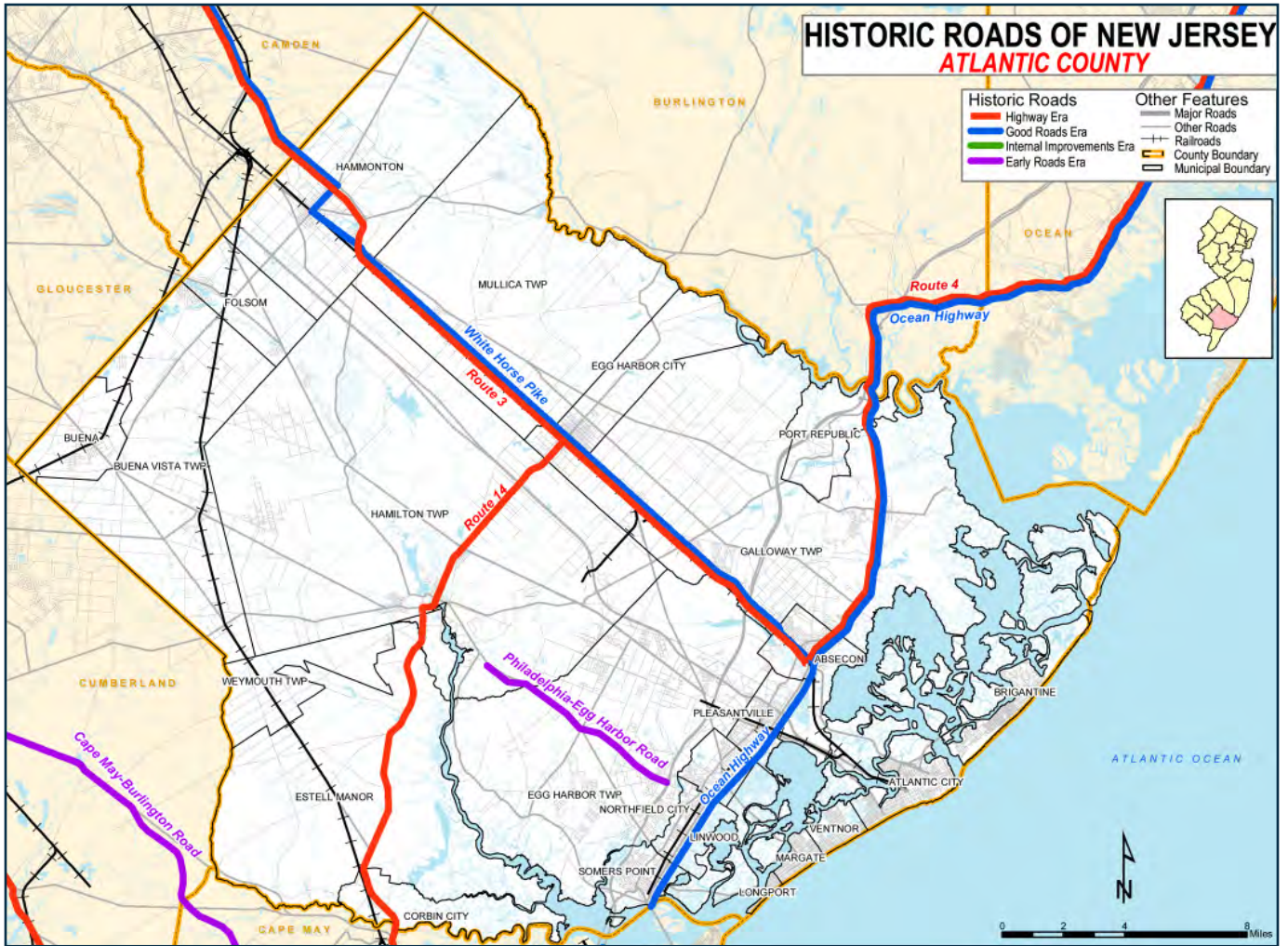
1920

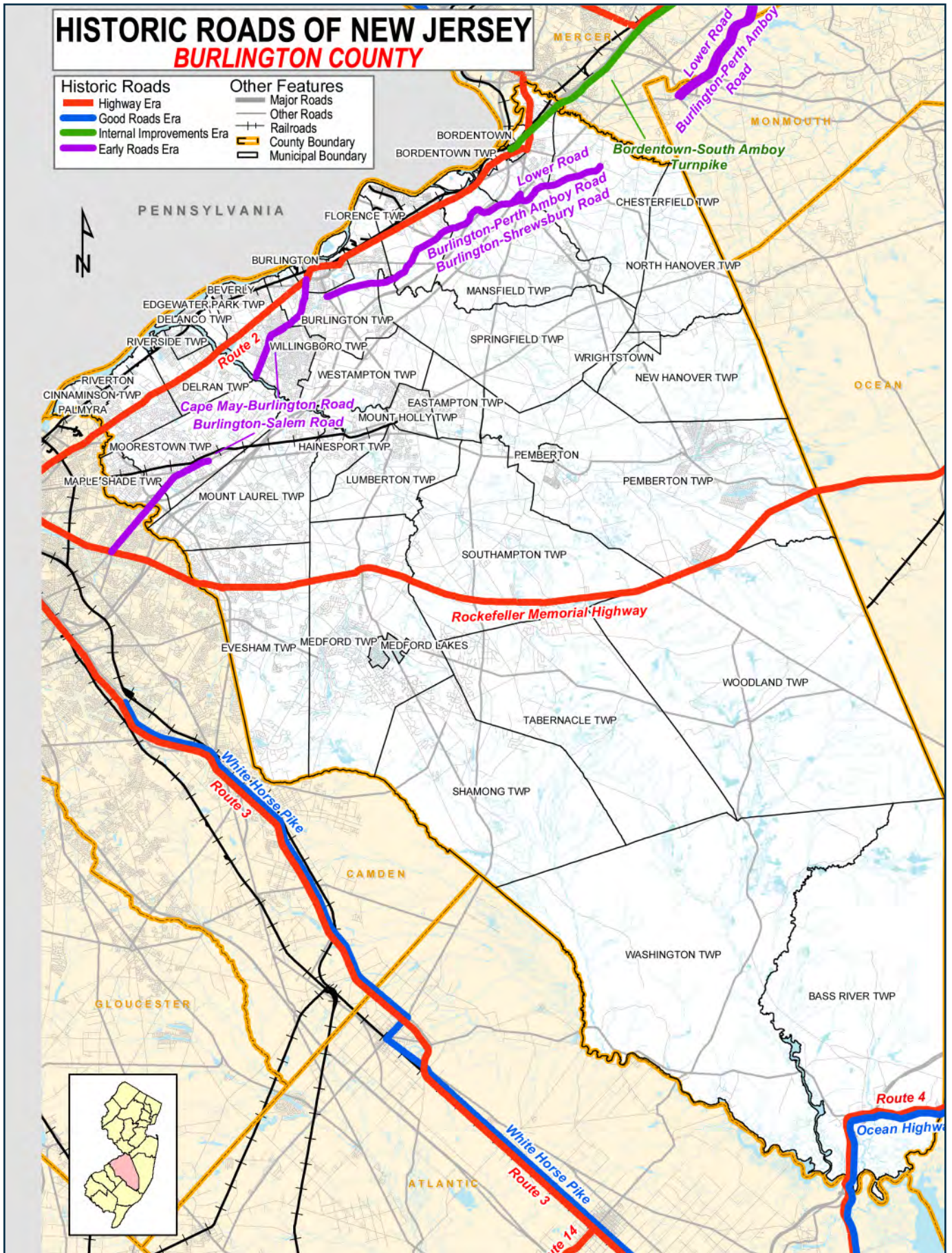
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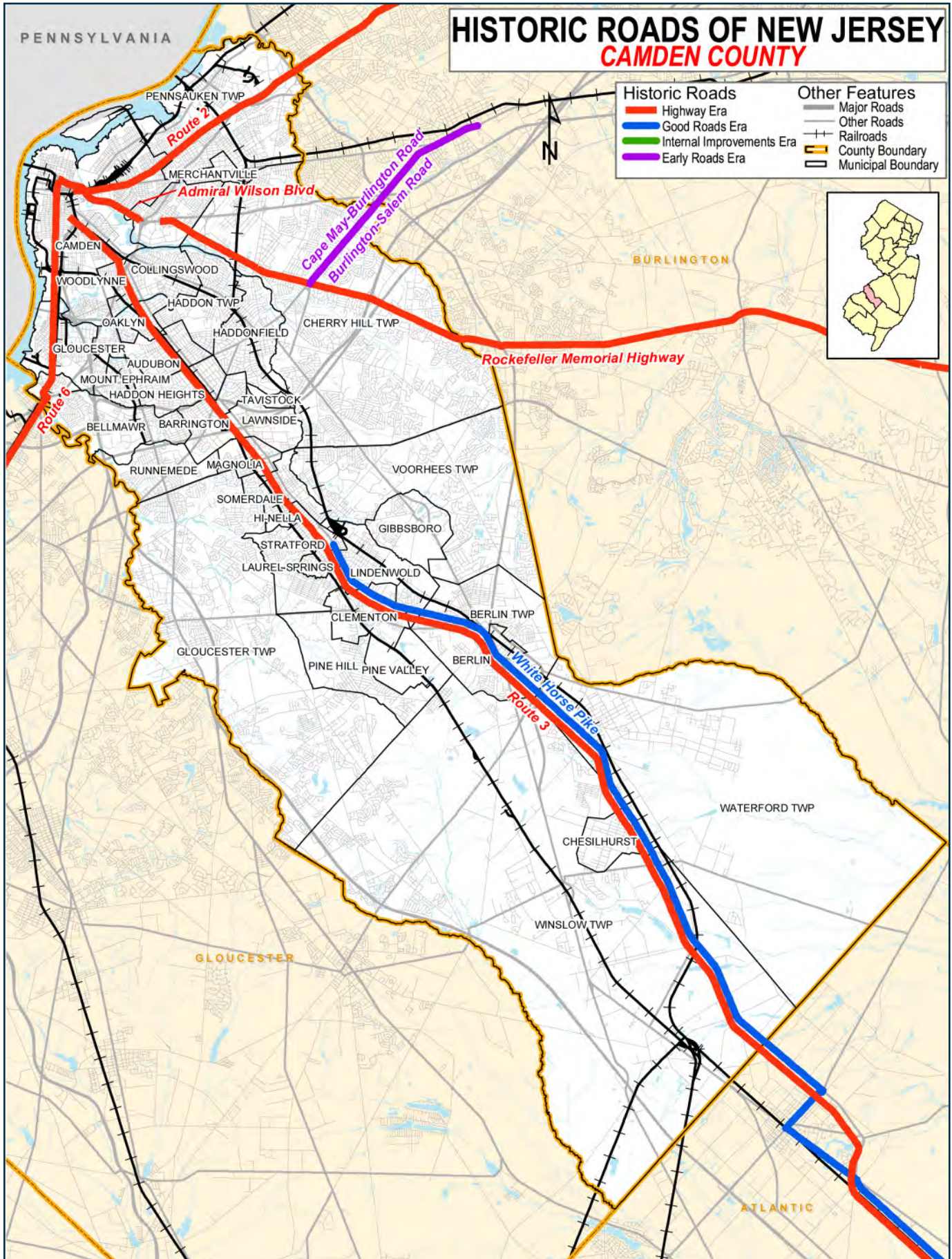
NEW JERSEY

<p>Federal-Aid Highway Act added system concept to federal-aid highway program</p> <p>Bureau of Public Roads joined with states to create U.S. numbered highway system for marking main interstate highways</p>	<p>1921</p> <p>1925</p>	
	<p>1926</p>	<p>Delaware River Bridge (now Benjamin Franklin Bridge) opened in New Jersey/Pennsylvania</p>
<p>Lindbergh flew nonstop across the Atlantic</p>	<p>1927</p>	<p>The Spirit of St. Louis built in Paterson, New Jersey</p> <p>Holland Tunnel opened in New Jersey/New York</p>
	<p>1928</p>	<p>Newark Airport opened in New Jersey</p> <p>Goethals Bridge opened in New Jersey/New York</p>
	<p>1931</p> <p>1933</p>	<p>George Washington Bridge opened in New York</p> <p>Pulaski Skyway opened in New York</p>
<p>Federal-Aid Highway Act of 1944 approved National System of Interstate Highways and established a federal-aid system of principal, secondary and feeder roads</p> <p>No Federal Aid authorizations during Fiscal Year 1944 and 1945</p>	<p>1944</p>	
	<p>1951</p> <p>1955</p>	<p>First 53 miles of New Jersey Turnpike opened</p> <p>Garden State Parkway opened</p>

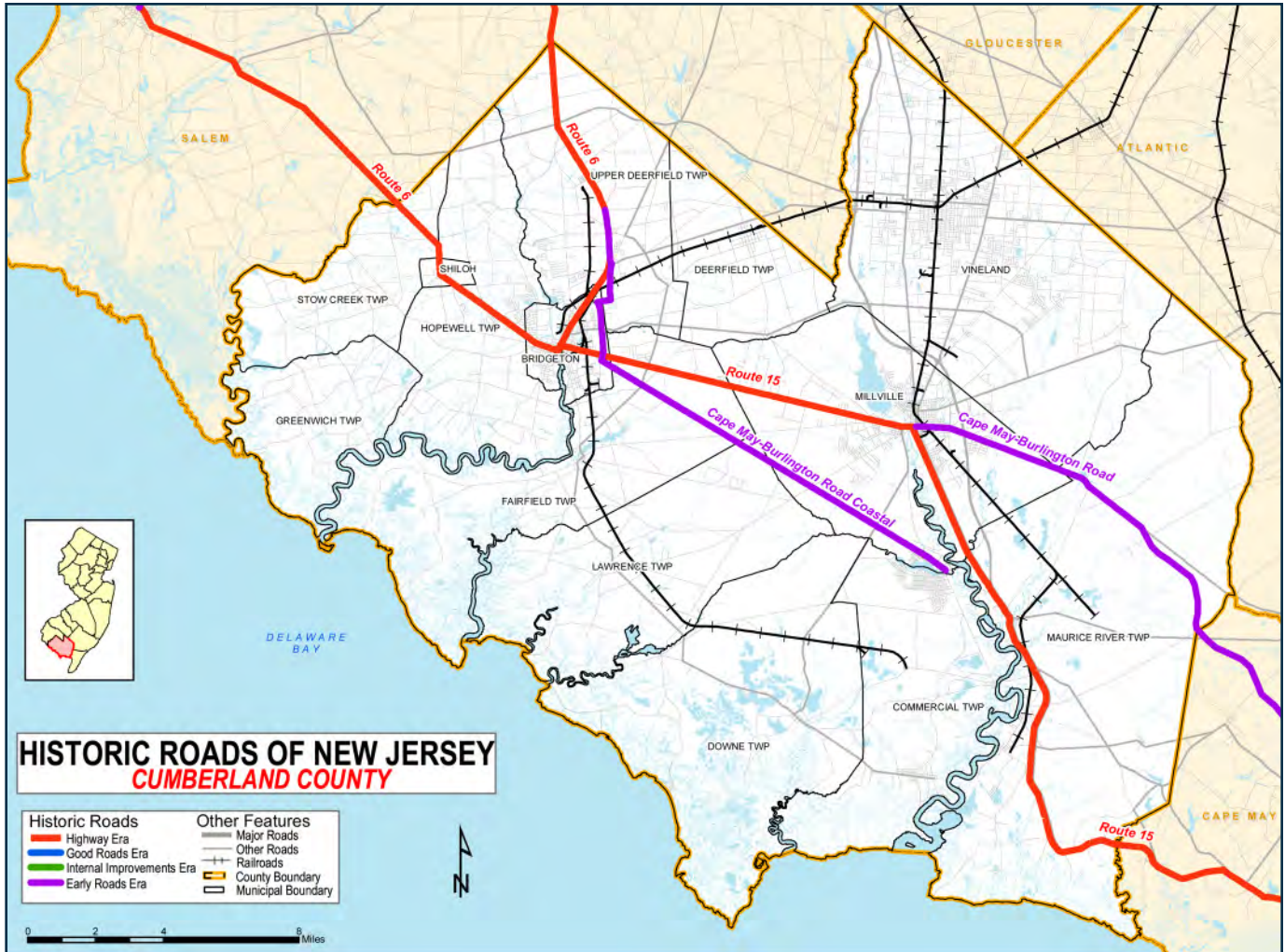
APPENDIX E. COUNTY GIS MAPS OF HISTORIC ROADWAYS

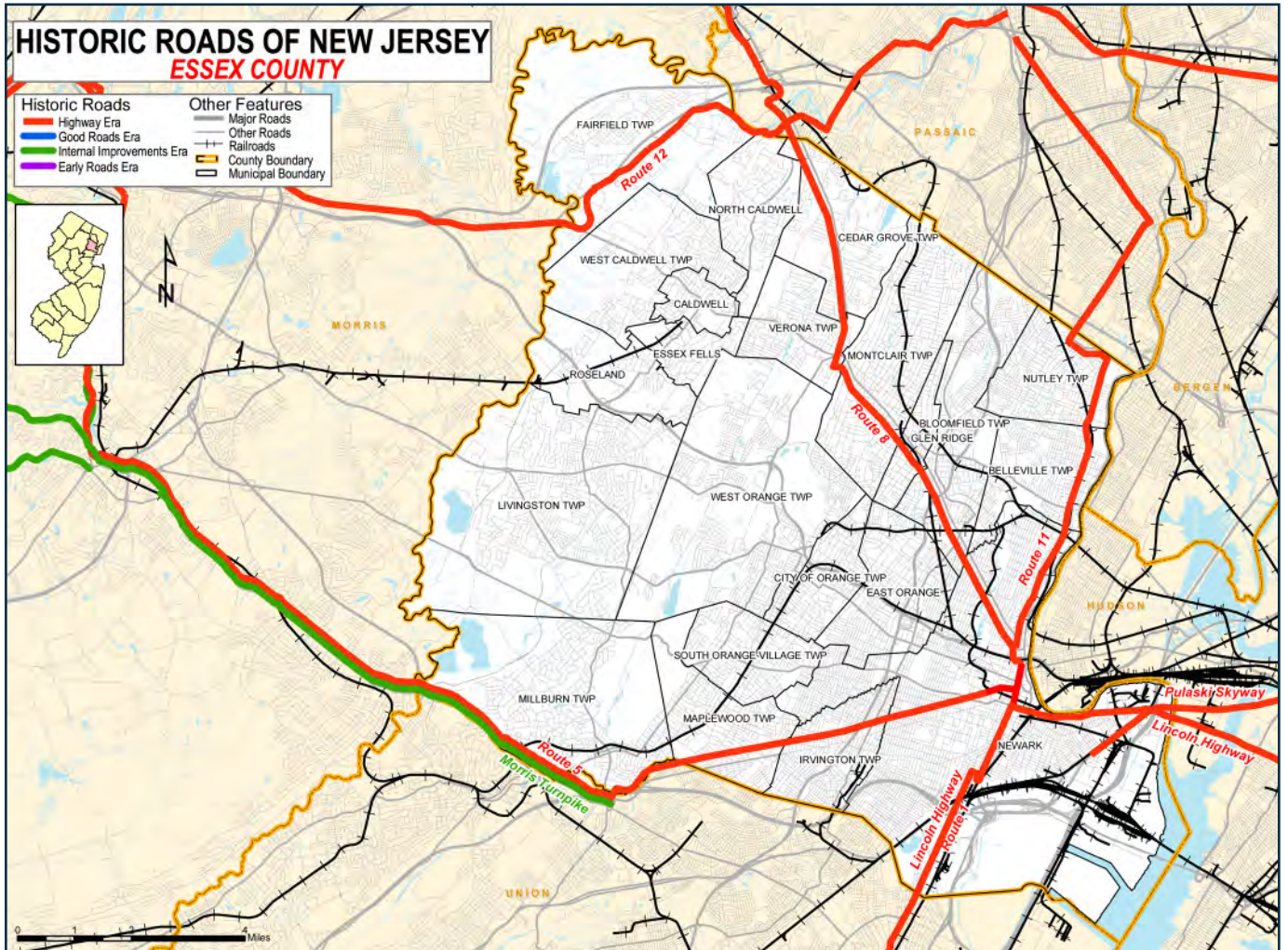


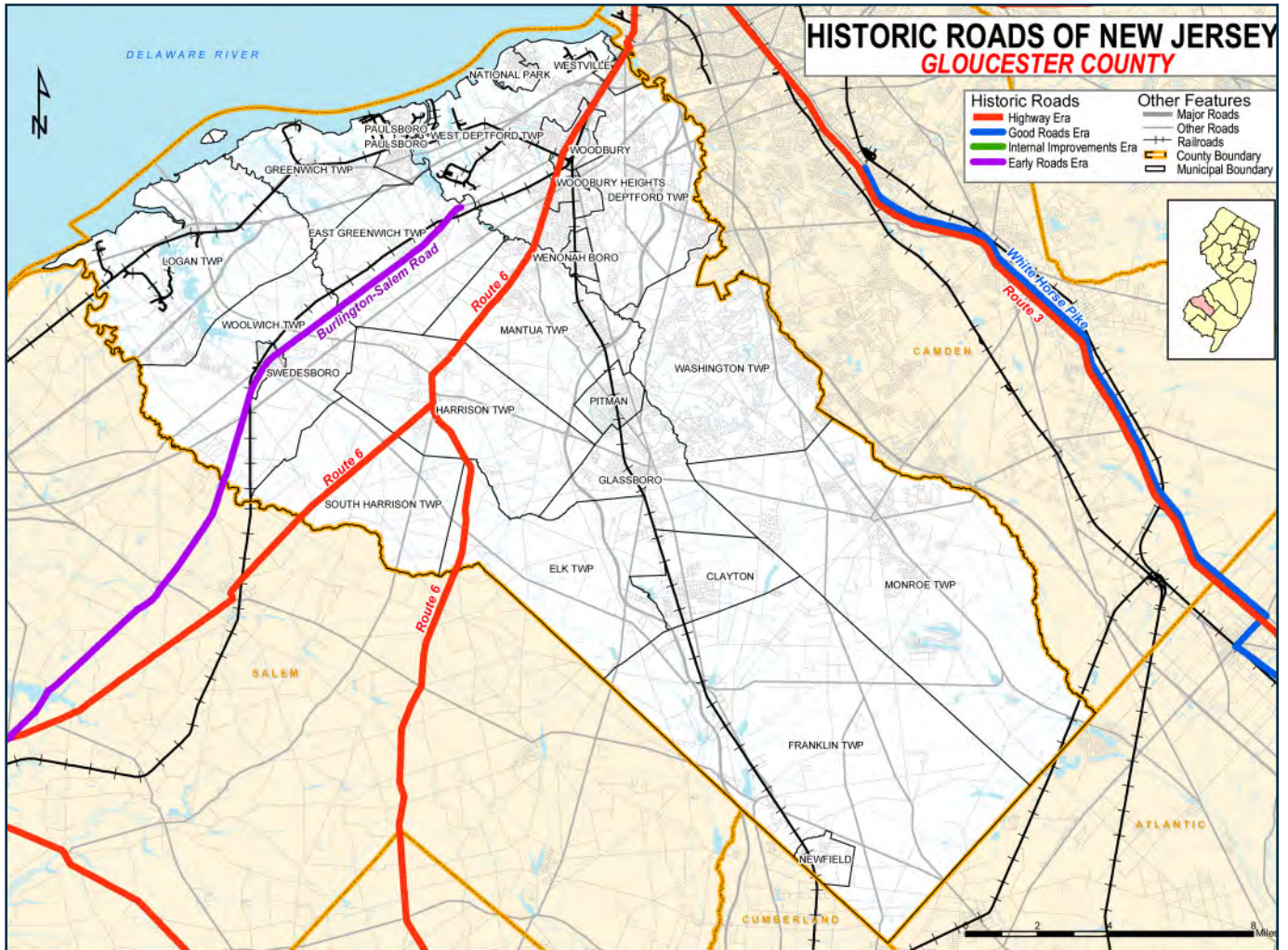




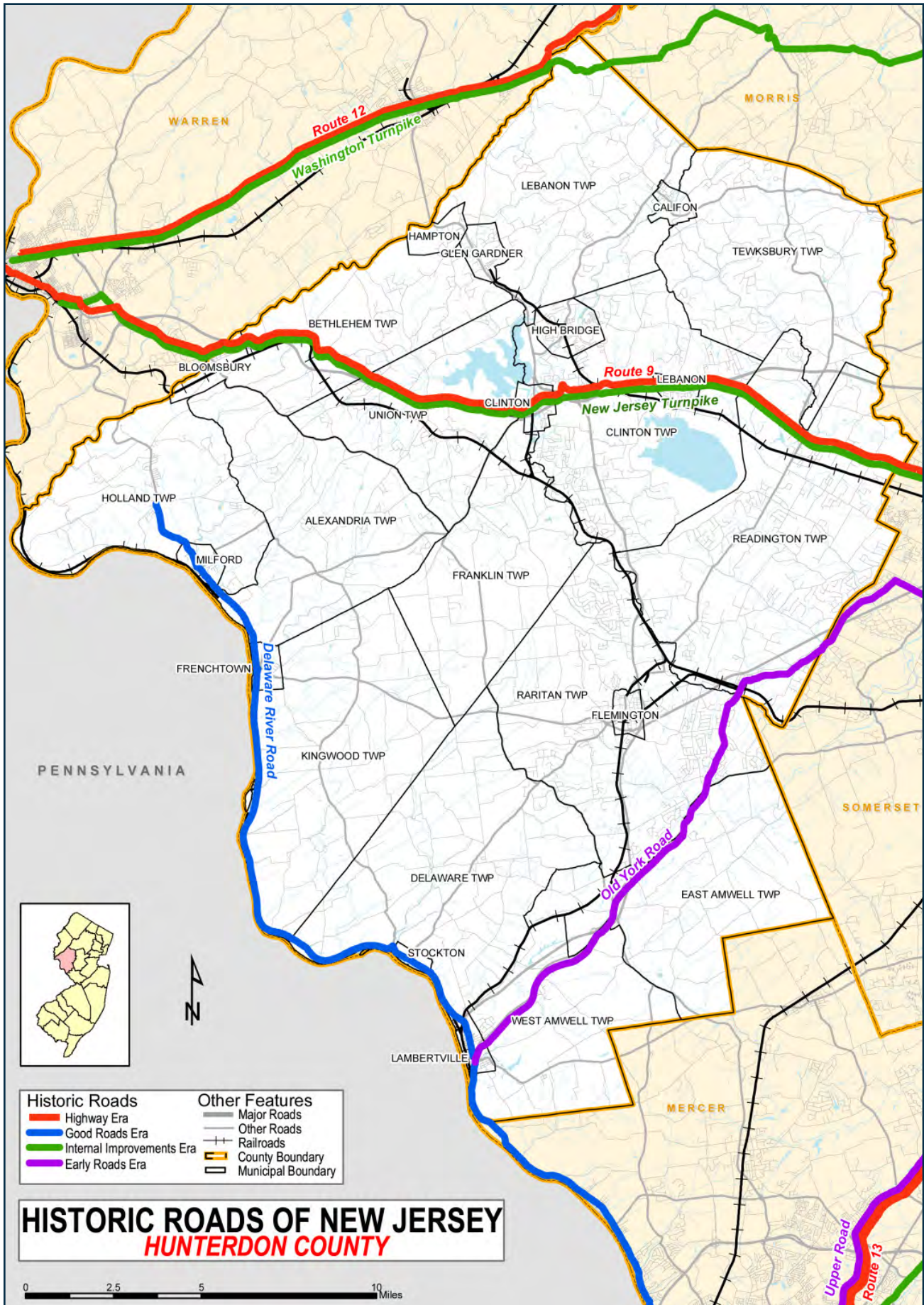


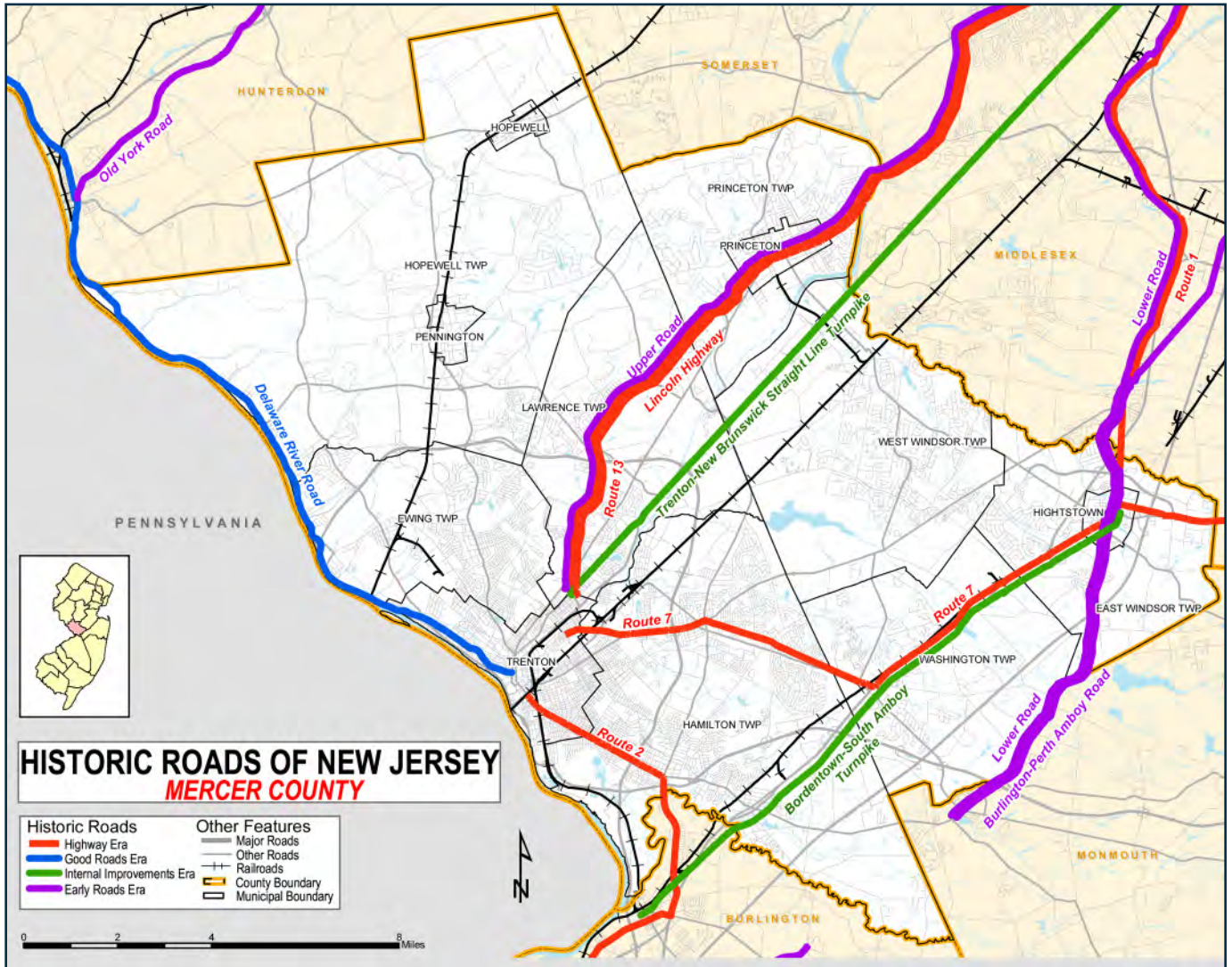


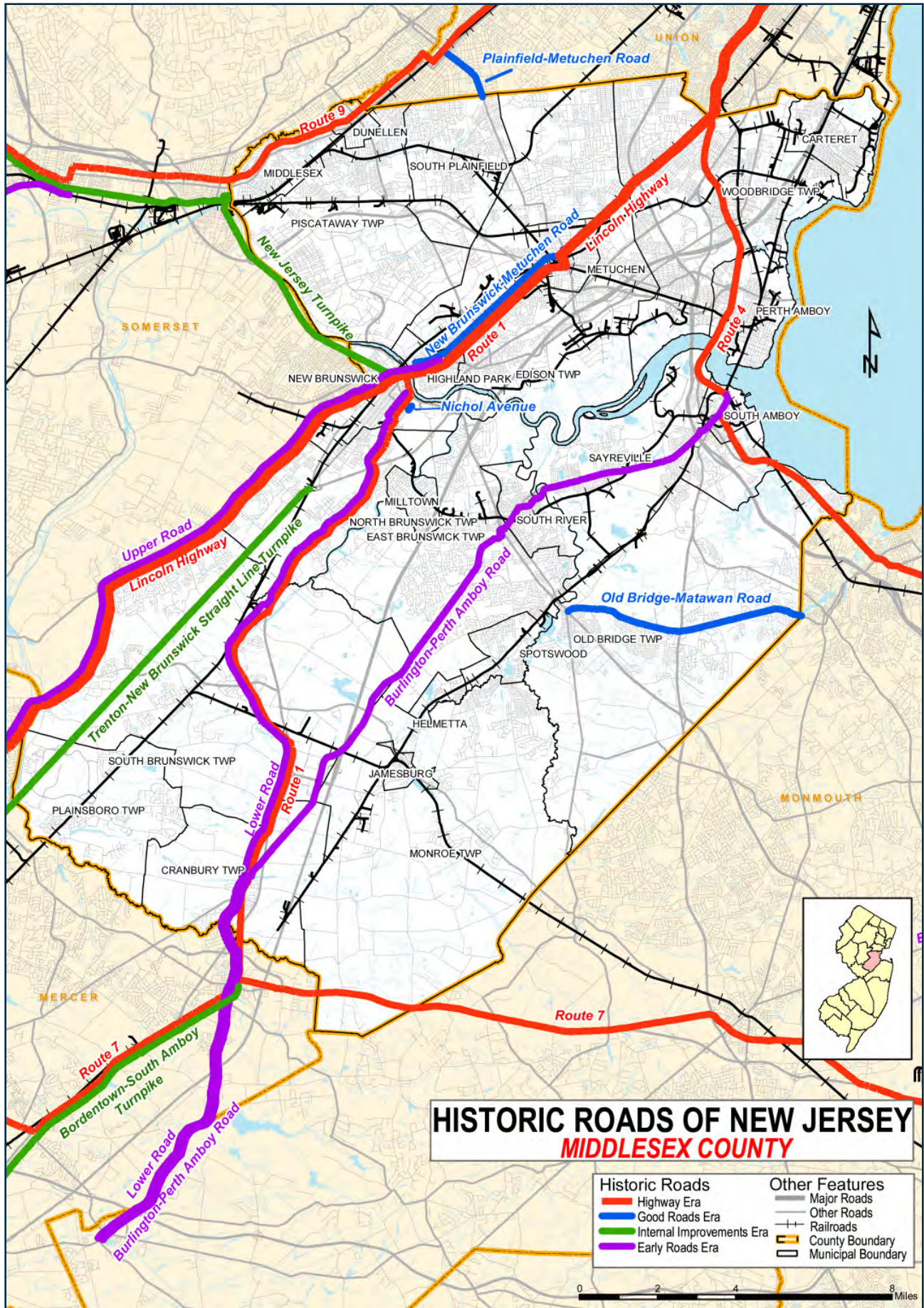


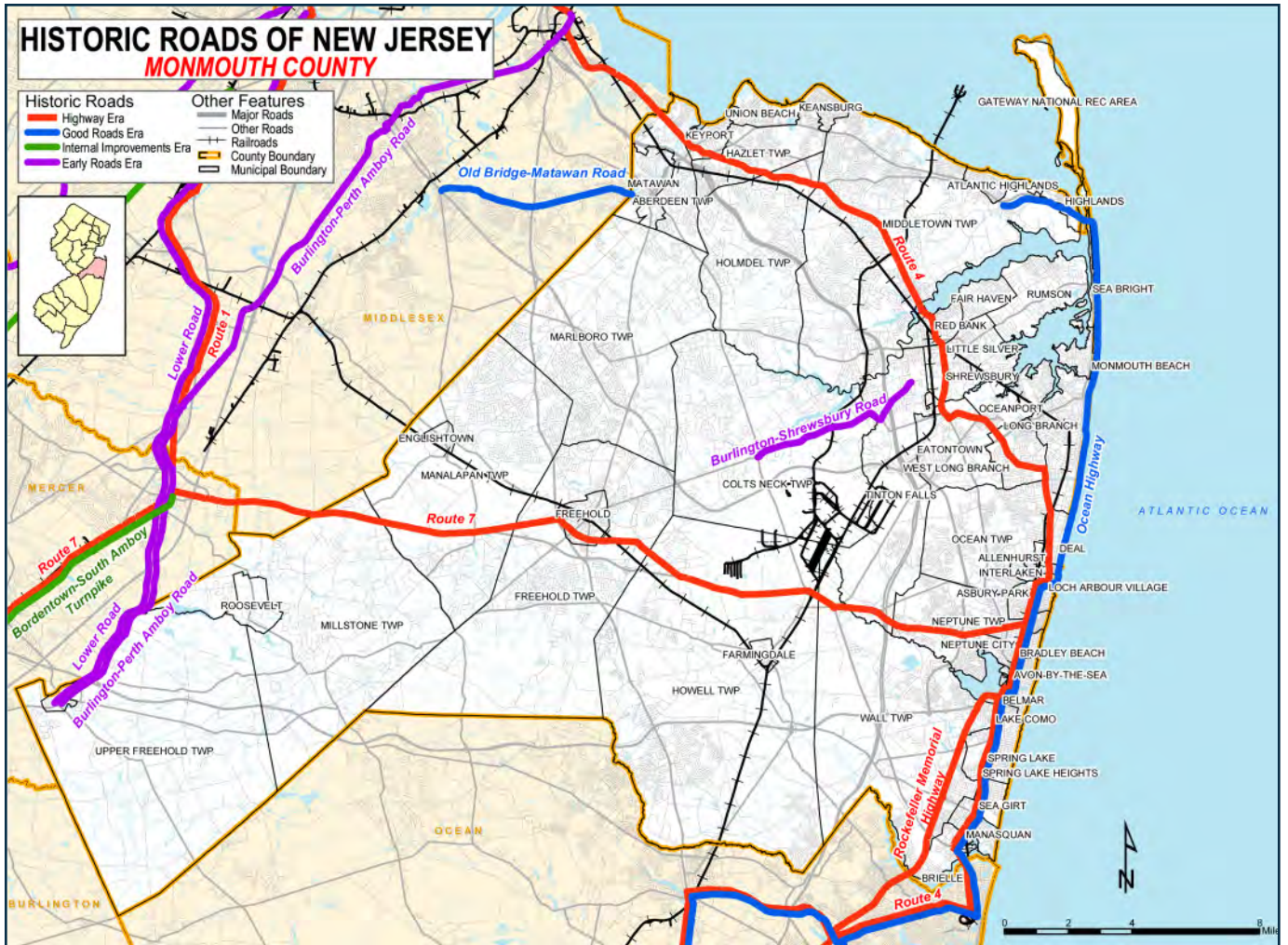


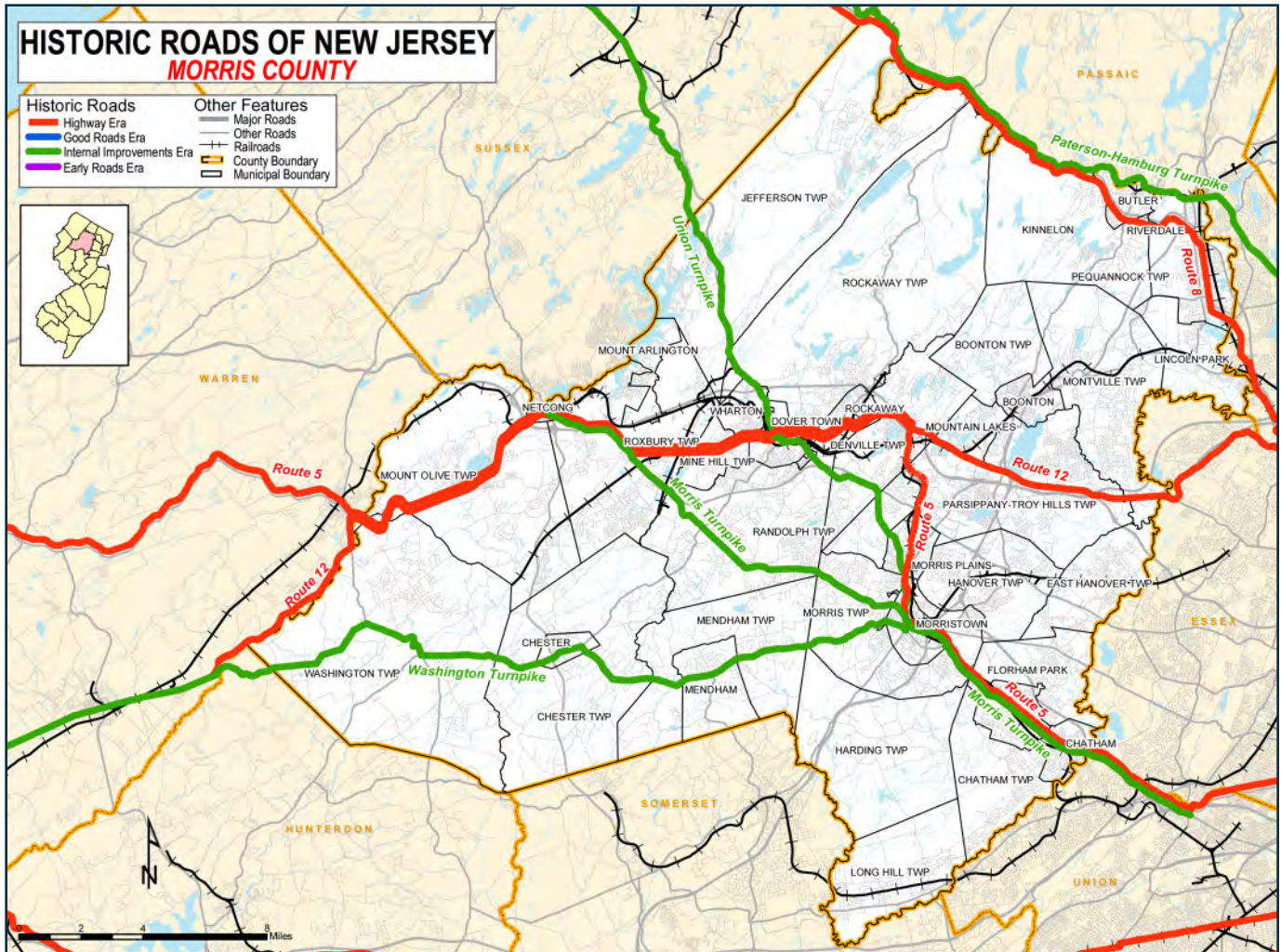


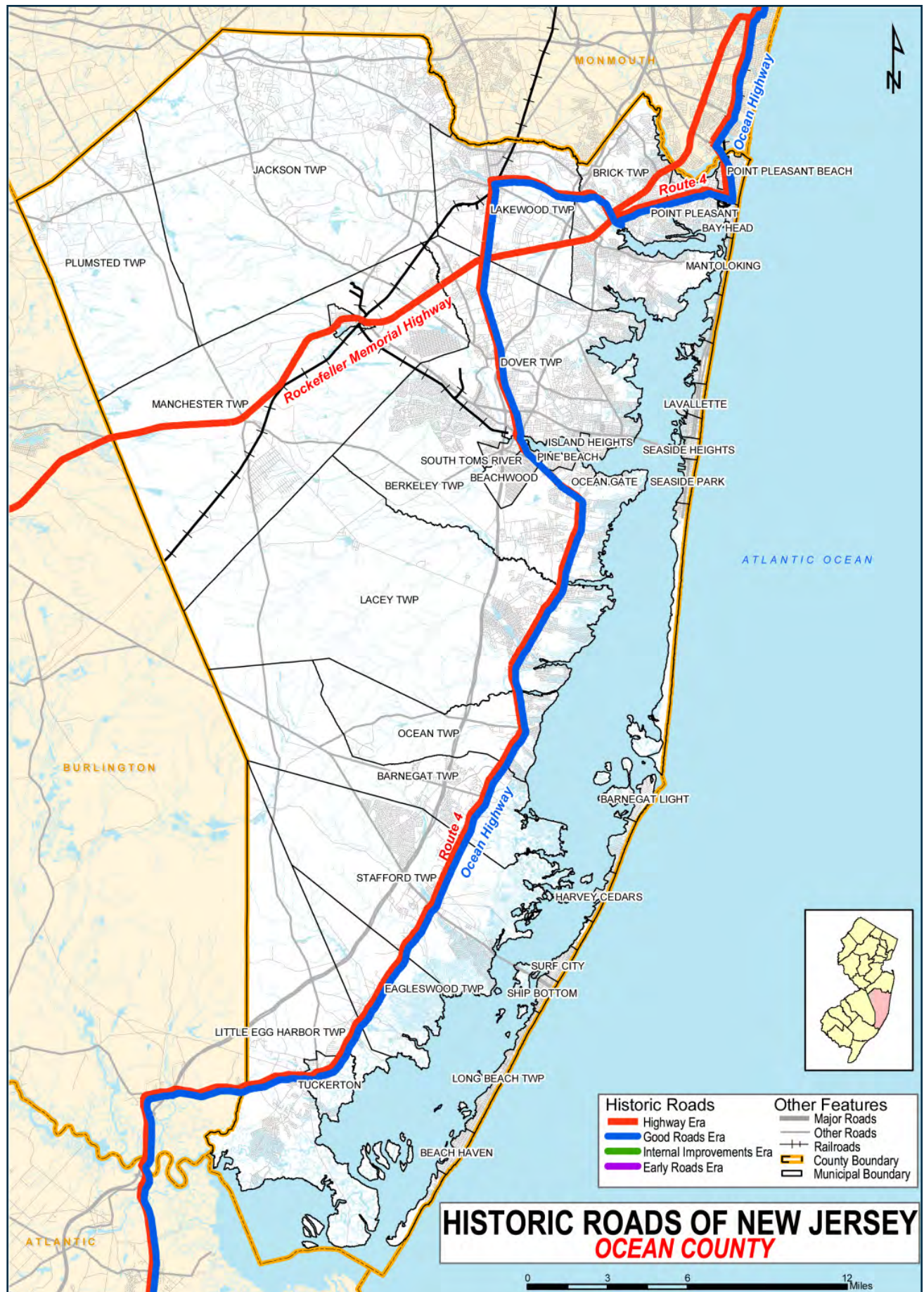


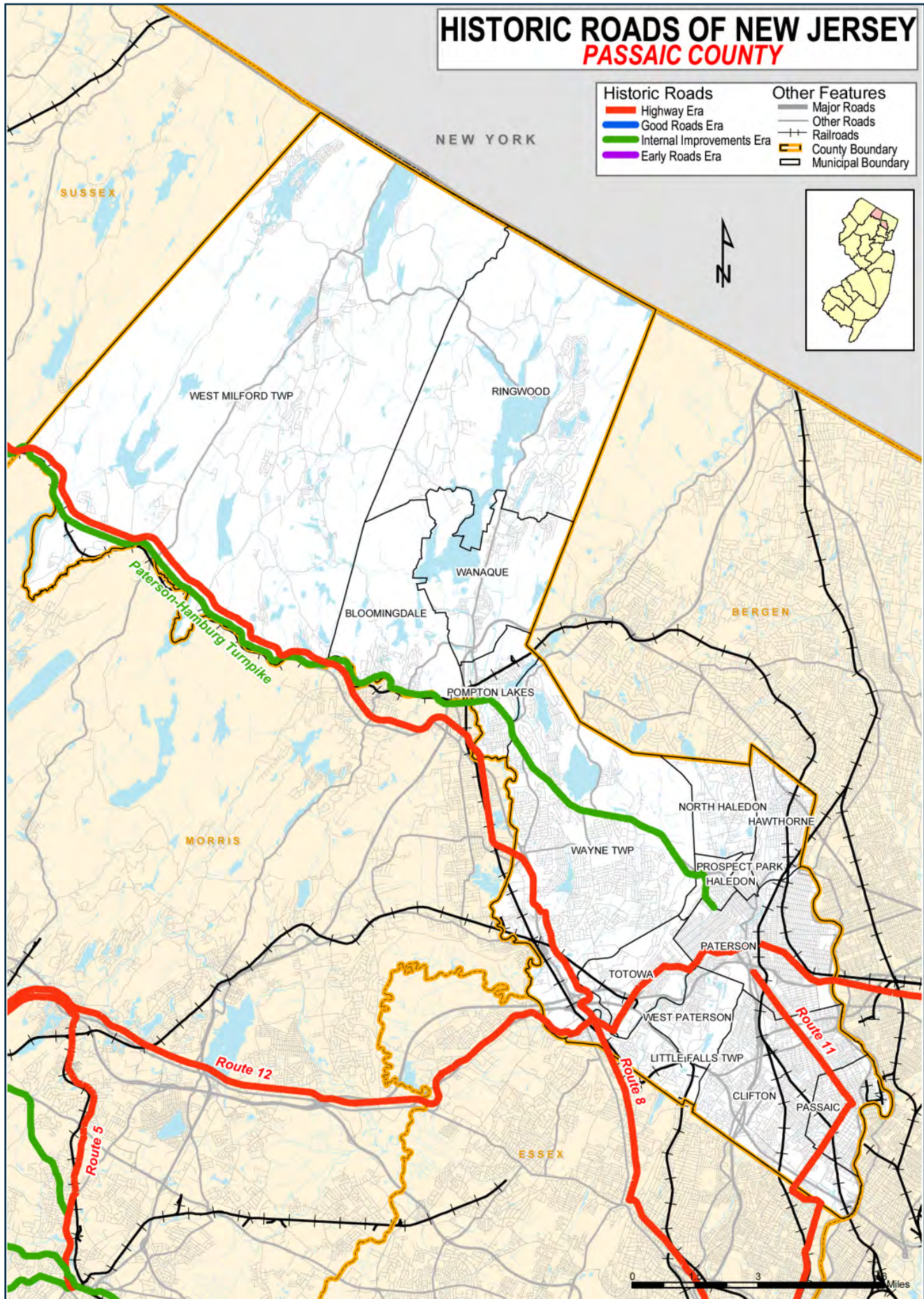


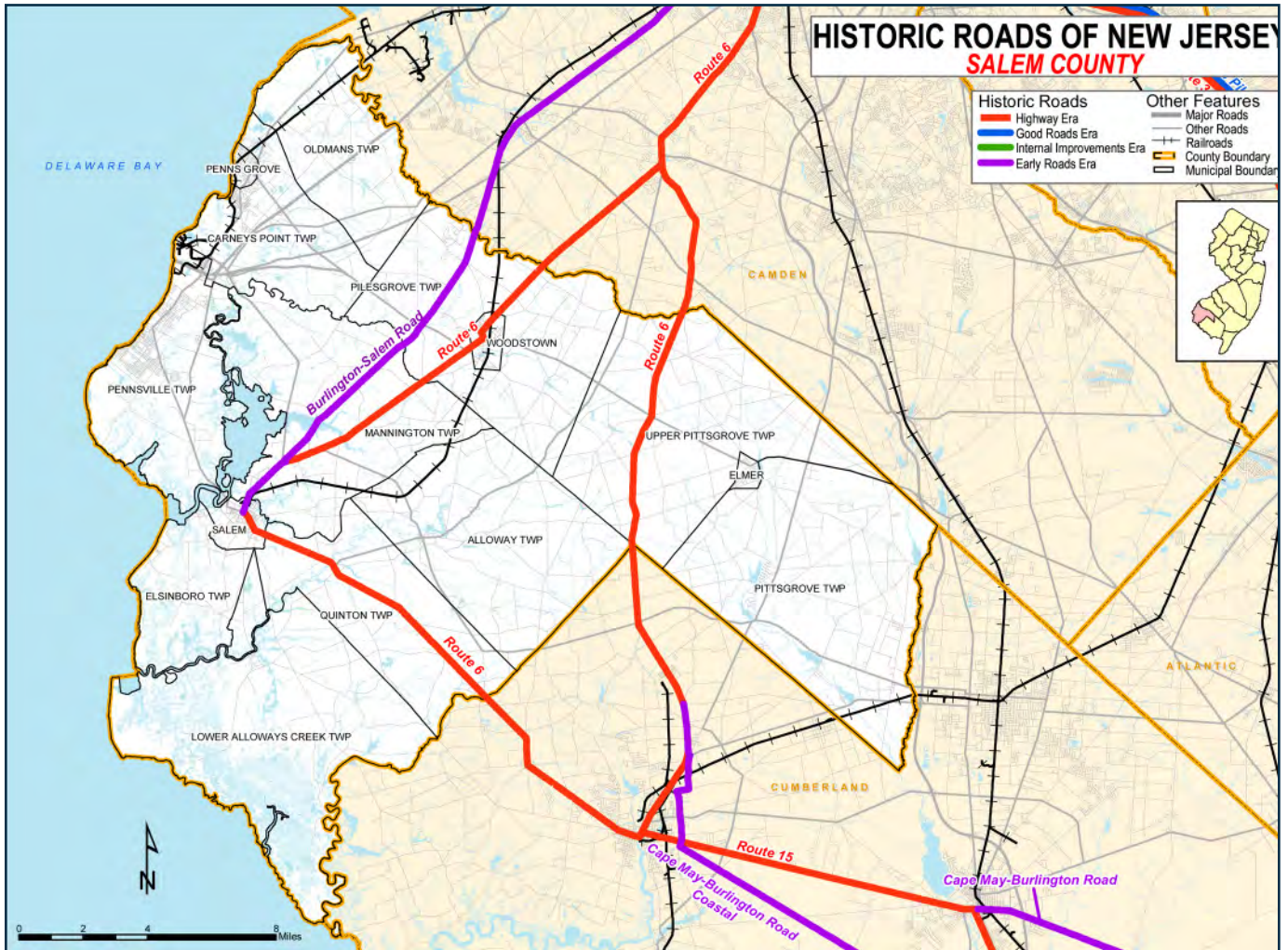


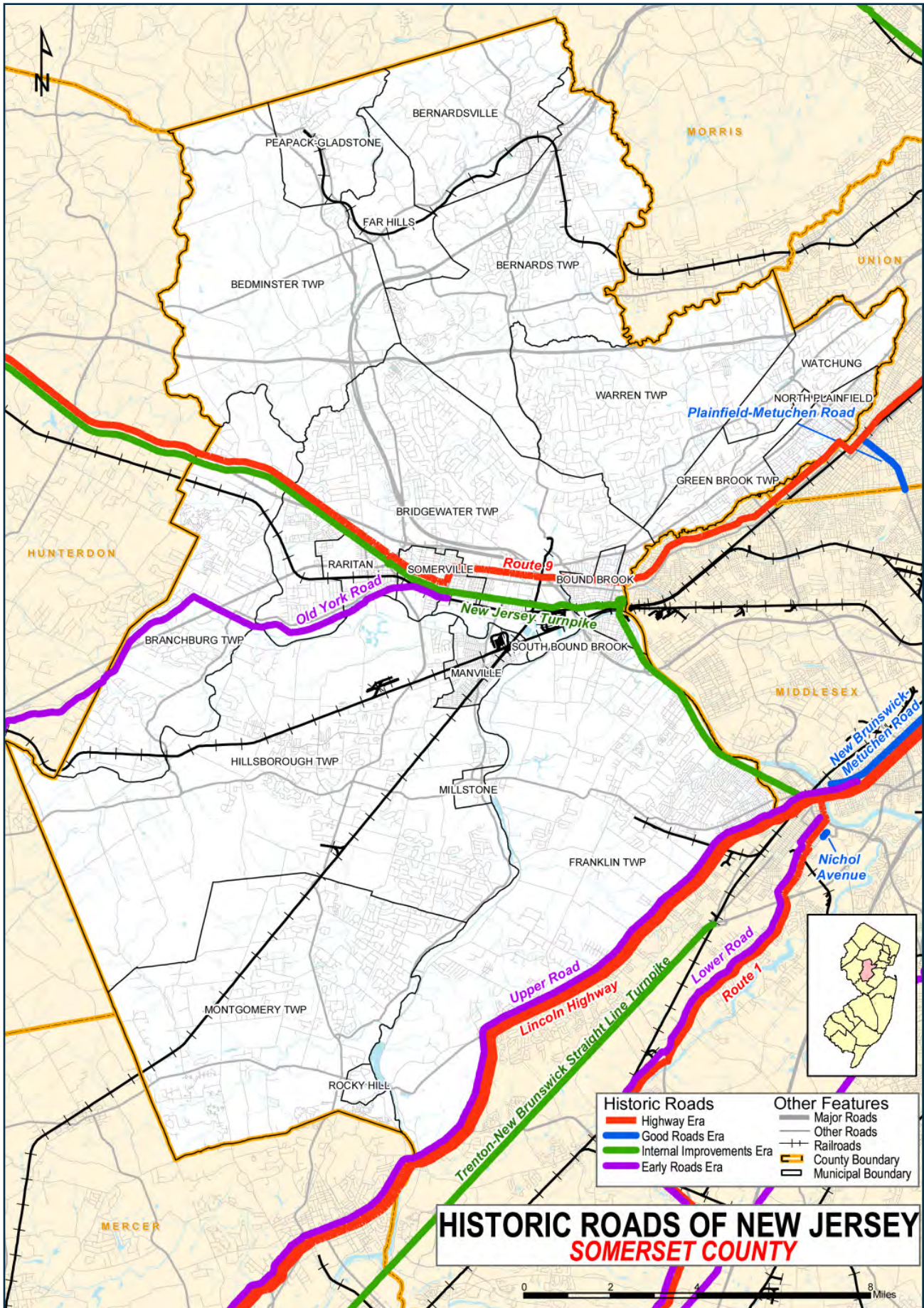


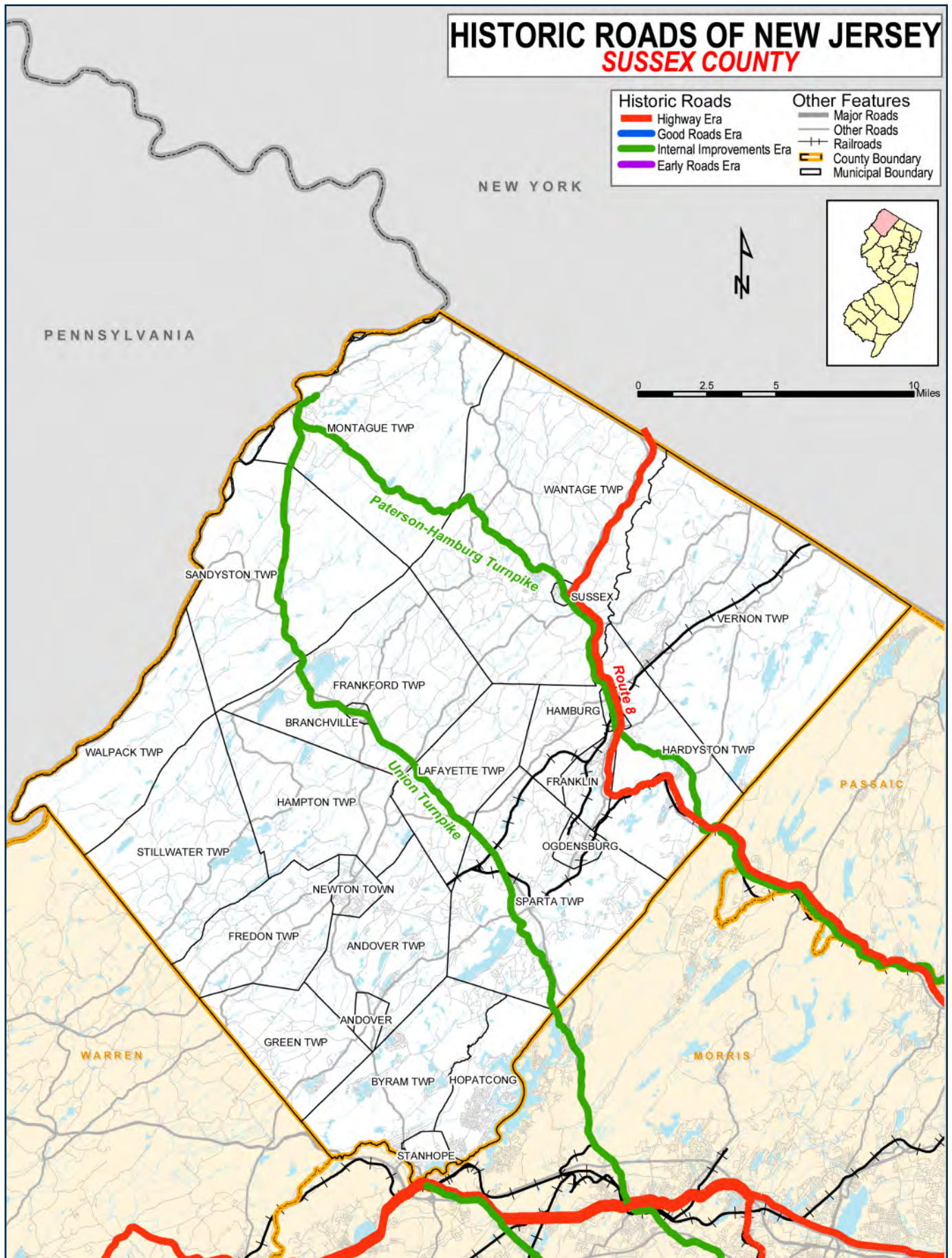


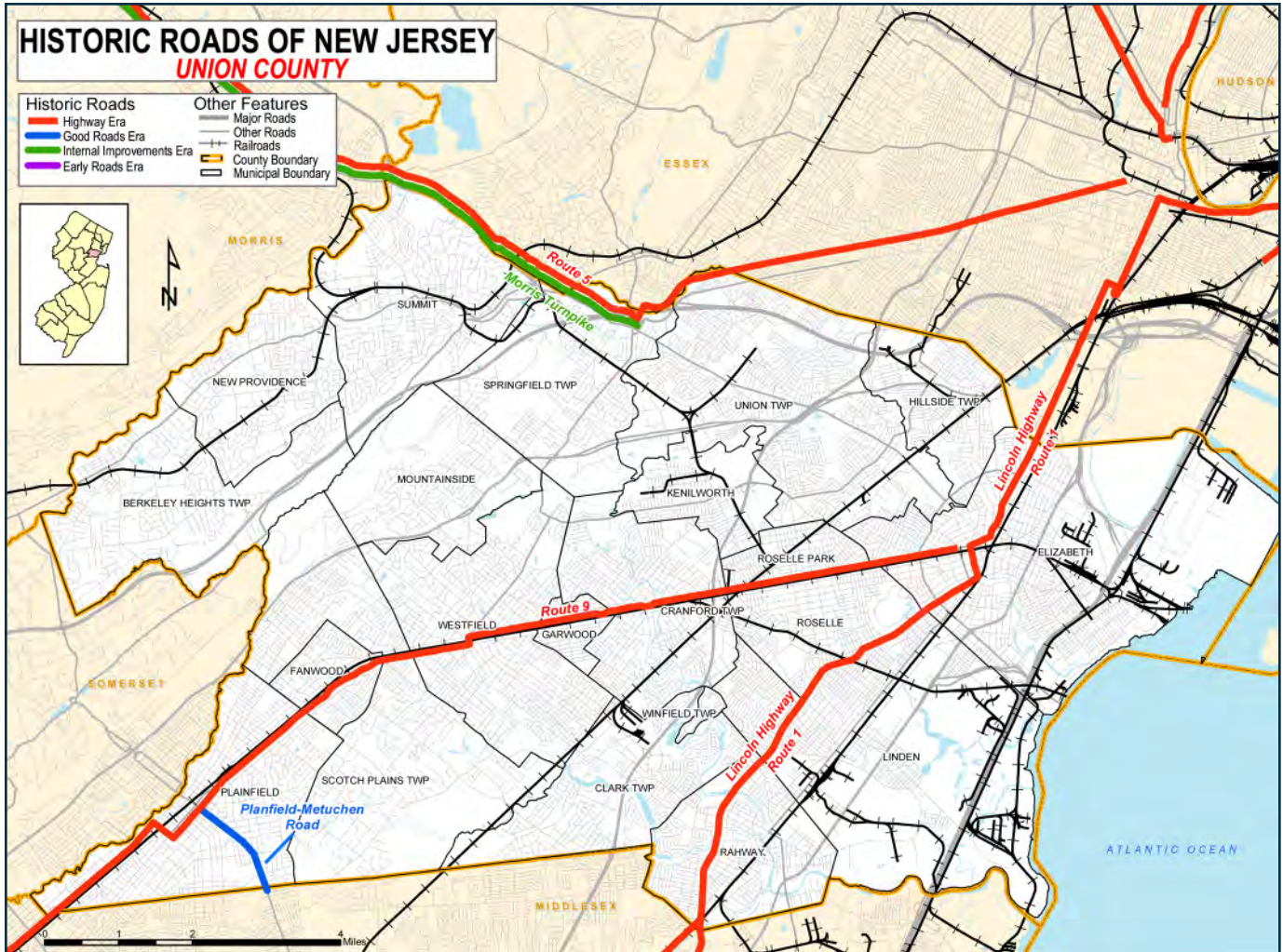


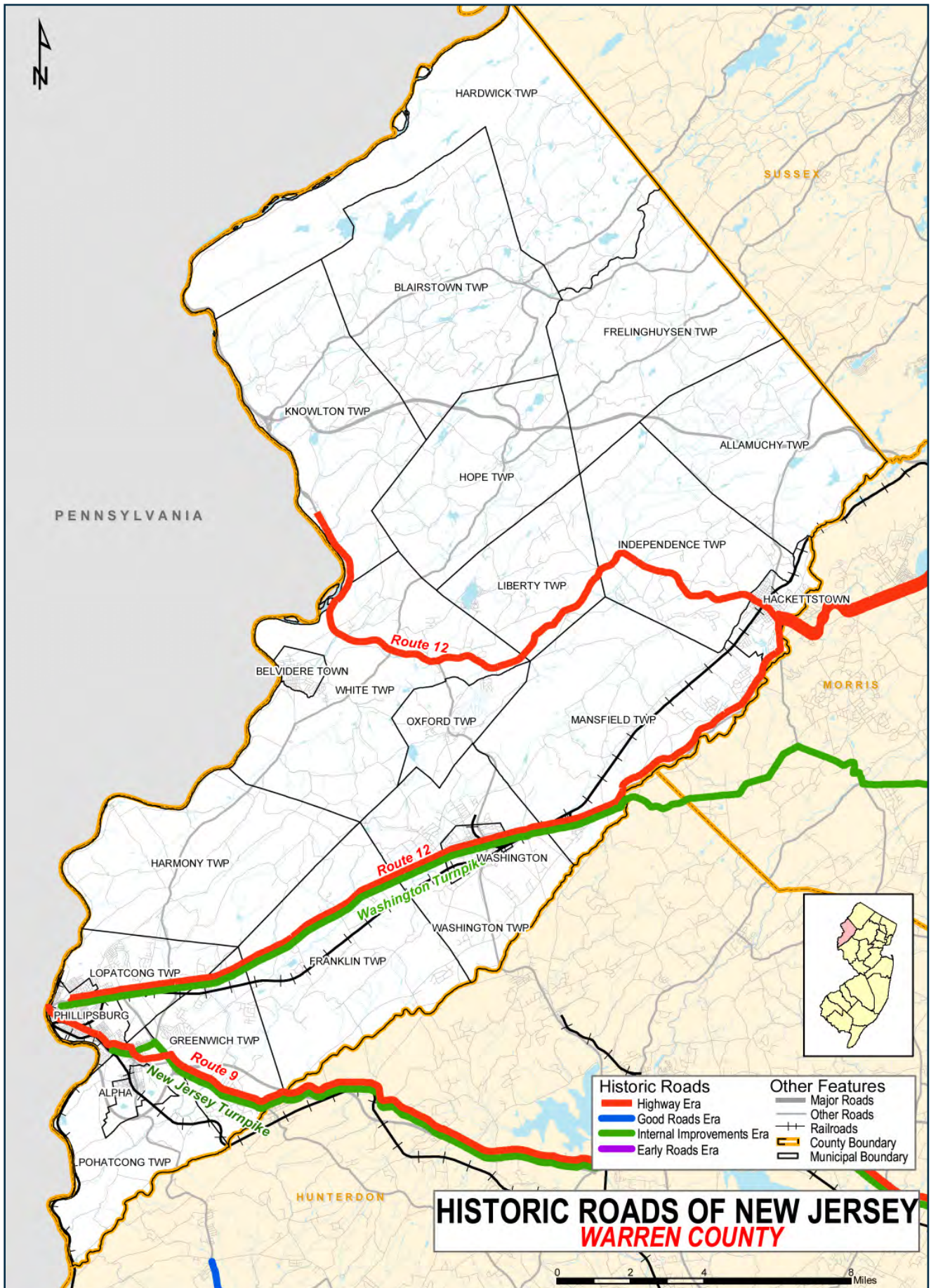














APPENDIX F. AS-BUILT DRAWING ANALYSIS

INTRODUCTION

The *New Jersey Historic Roadway Study* created a context for the historical development of the state's roads, and also identified roadways with statewide significance in four historical periods: the Early Roads Era, Internal Improvements Era, Good Roads Era, and the Highway Era. While the body of this report provides an examination of the history and features of historic roadways in each era, the purpose of this appendix is to further explore the nature of design features implemented over time. Representative one-mile segments of six significant historic roadways were selected for further study:

- New Jersey Turnpike
- Paterson and Hamburg Turnpike
- Kings Highway/Lincoln Highway
- Ocean Highway
- Delaware River Drive
- John D. Rockefeller Memorial Highway

These roads were selected to represent the varied geography, periods of development, and setting types (rural, urban, coastal, and suburban) throughout the state. Engineers at Armand Corporation, Inc. examined “as-built” plans to characterize design features present on “early” as-built drawings, and determined what changes have occurred over time based on “later” drawings. Plans were provided by the New Jersey Department of Transportation (NJDOT), and were selected to represent the earliest and most current as-built drawings on record for the selected roadway segments. Design features examined may include items such as alignment, right-of-way, bridges, shoulders, channelization, medians, travel lanes, sidewalks, landscaping, and others. Select portions of the as-built drawings illustrate this appendix.

SAMPLE ROADWAYS

New Jersey Turnpike

Alternate names: Route 9 Section 1; Route 28 Section 8; Route 173 Section 3A & 4A

Segment: West Portal Road to Union Township Line, Hunterdon County

1921

In May 1921, plans were prepared by the NJDOT for the reconstruction and realignment of what was then known as Route 9 Section 1 in Hunterdon County, one of the first 15 routes of the State Highway System designated in 1917. The route followed portions of the original New Jersey Turnpike, which was founded circa 1805. At that time, the existing road meandered from West Portal to the Union Township Line, and was in certain areas constructed of “earth.” The profile of the existing road was irregular, and this contract eliminated those irregularities. The overall scope of the work for this 11,300 +/- linear foot road project included the following:

- Completion of a new road segment from station 0+3.00 to station 50+00.00 +/- . This segment replaced the earth road portion of this project, bypassing the original roadway in favor of a wider, more regular route (see Figure 1).

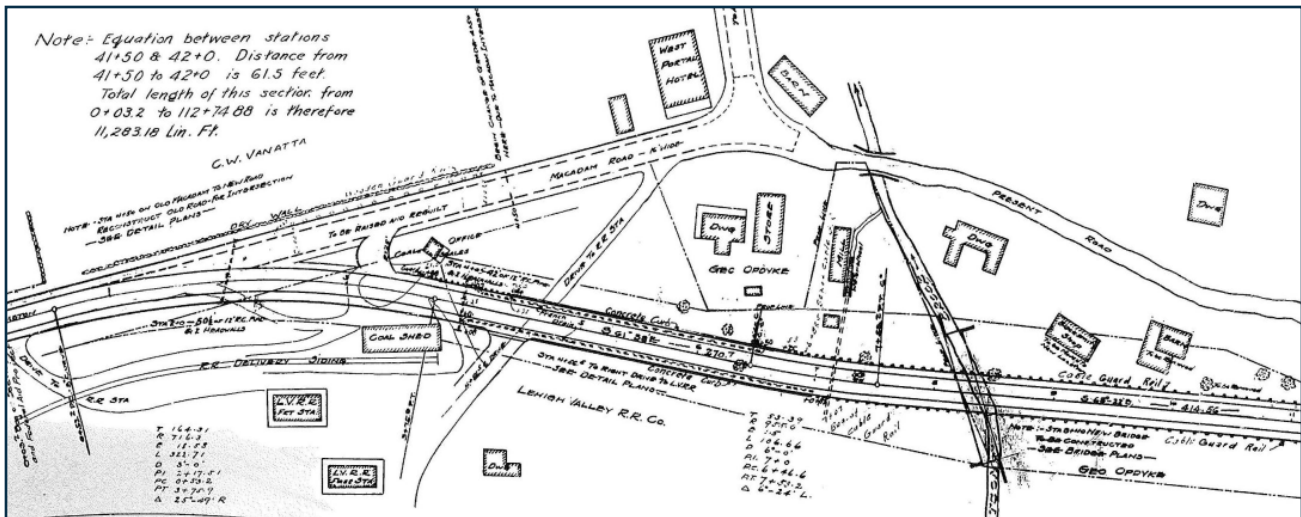


Figure 1. Beginning of new road construction, stations 0+3.00 to 11+00.

- Minor drainage improvements including new reinforced concrete pipe; concrete headwalls; resetting existing pipes; new culverts for the Musconetcong Creek crossing; cable guard rail; concrete curb; french lateral drains; concrete gutters; installation of a 36" x 40" reinforced concrete pipe; and rip rap lined open ditches.
- A significant amount of fill was placed in the area of the crossing of the Musconetcong Creek.
- A "mooning" technique was employed on the construction of the inside pavement edge of the horizontal curves. The "mooning" of the pavement occurs when the inside pavement edge of the roadway is expanded to a wider dimension than the normal travel lane width. In this case it was widened by approximately three feet along the inside edge. This permits an area of pavement where the wheels of a vehicle can traverse without running off the edge of the road while negotiating the curve (see Figure 2).
- "Banking" of the roadway (whereby the outside edge of a curve is higher than the inside edge of a curve creating a tilted or "banked" roadway) was also done on the horizontal curves. It appears that the banking cross section was centered

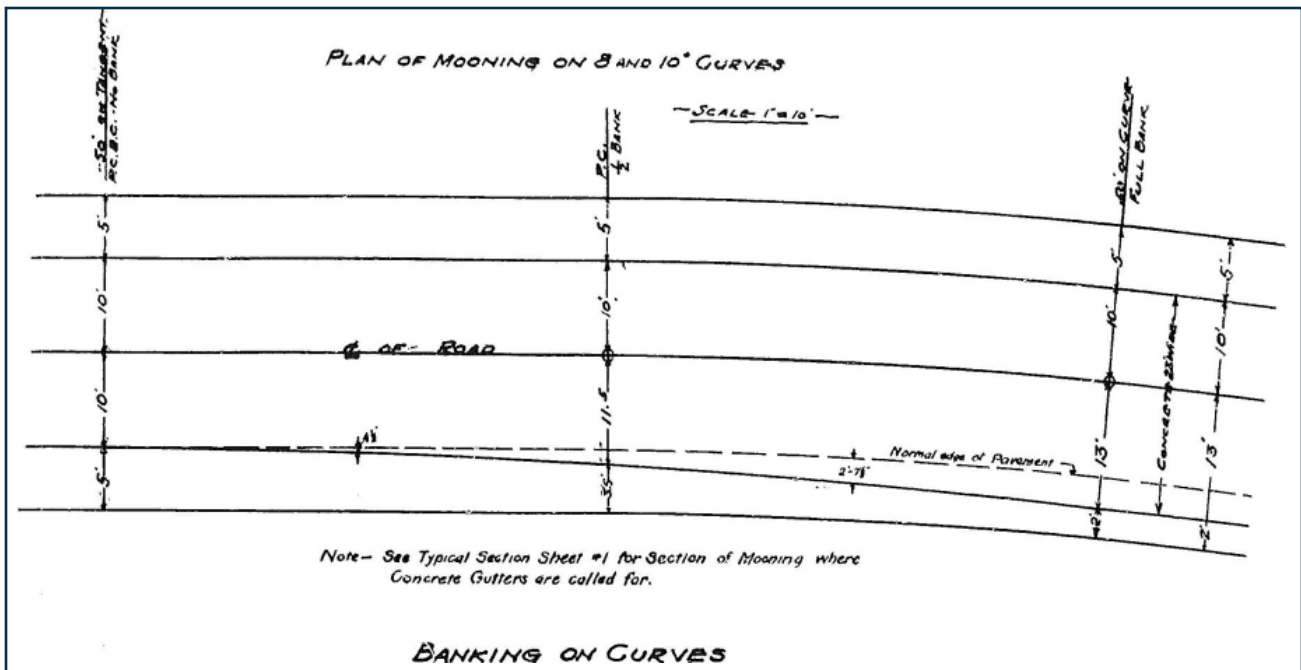


Figure 2. An example of "mooning" on the inside radius of a curve.

on the centerline. The design anticipated a rate of speed of 20 mph. Depending on the degree of curvature of the road a tight curve would require a steeper cross slope.

- Concrete gutters were used in designated areas.
- The cartway for the new road was constructed of concrete, six to eight inches thick, and was generally 20 feet wide, (10 feet in either direction), within a variable width right-of-way. A five-foot shoulder consisting of earth; concrete gutter (up to eight feet in width); or concrete curb adjoined the edge of the concrete pavement.
- Straight sections of the road had a normal crown (center of the road was the high point), and “banked” portions were variably sloped according to the degree of curvature of the horizontal curve and the posted speed of the road.

1949

In March 1949, the NJDOT prepared plans for the upgrade of Route 28 Section 28. (The highway route designation changed from Route 9 to 28 in 1927 as part of an overall expansion of the state highway system.) As noted on the plans, the NJDOT Standard Highway Specifications of 1941 would govern the design and construction. This project was a major widening of the existing two-lane roadway width of 20 feet. Additional right-of-way was obtained where necessary; however, an irregular right-of-way width remained after acquisitions. Within the one-mile study area significant improvements to the roadway were made. These improvements included the following:

- The centerline of the newly widened roadway shifted significantly in some areas from the location of the initial 1921 road construction. This centerline shift was the result of a widening of the overall width of the road from 30 feet (20-foot travel area) to 68.5 feet. Of this 68.5-foot width, 33 feet were reserved in each direction for travel. This widening increased the number of lanes of traffic in both directions and increased the carrying capacity of the road. The superelevation of the road through the curves was increased, with the new cross slope ranging from 3% to 8% (see Figure 3).

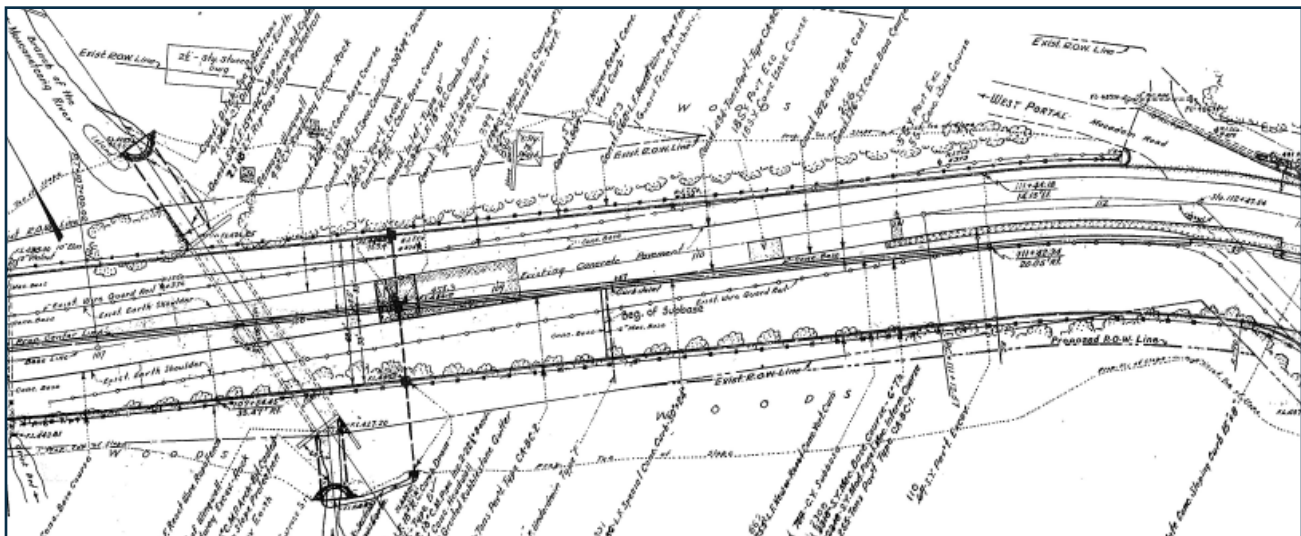


Figure 3. New road alignment shifted to the south, stations 106+00 to 114+00.

- The roadway was expanded using concrete as a subbase material. This concrete matched the portion of the existing roadbed that was preserved and not removed under this contract.
- Along the new centerline of the newly designed roadway, a 30-inch by 24-inch special concrete curb was added, separating opposing lanes of traffic, creating what we now call a “divided” highway.

- In portions of the new road where the concrete roadbed existed, the road was constructed utilizing the following cross section, from bottom to top (see Figure 4):
 - o 12-inch concrete subbase
 - o 6-inch macadam base
 - o 3-inch modified penetration macadam intermediate course
 - o 2-inch pavement CA-BC-2²⁵⁶ top course
- The entire project was finished with the CA-BC-2 surface course. A two-inch thickness was placed in bituminous areas, and three inches of CA-BC-2 was placed on top of the existing concrete roadway (see Figure 4).
- Shoulder areas of the roadway were constructed of a lighter cross section, specifically three inches of penetration macadam over four inches of macadam subbase (see Figure 4).
- The existing culvert crossing of the Musconetcong Creek was extended in both directions with a 159-inch by 96-inch corrugated metal arch pipe and terminated with riprap slope protection.

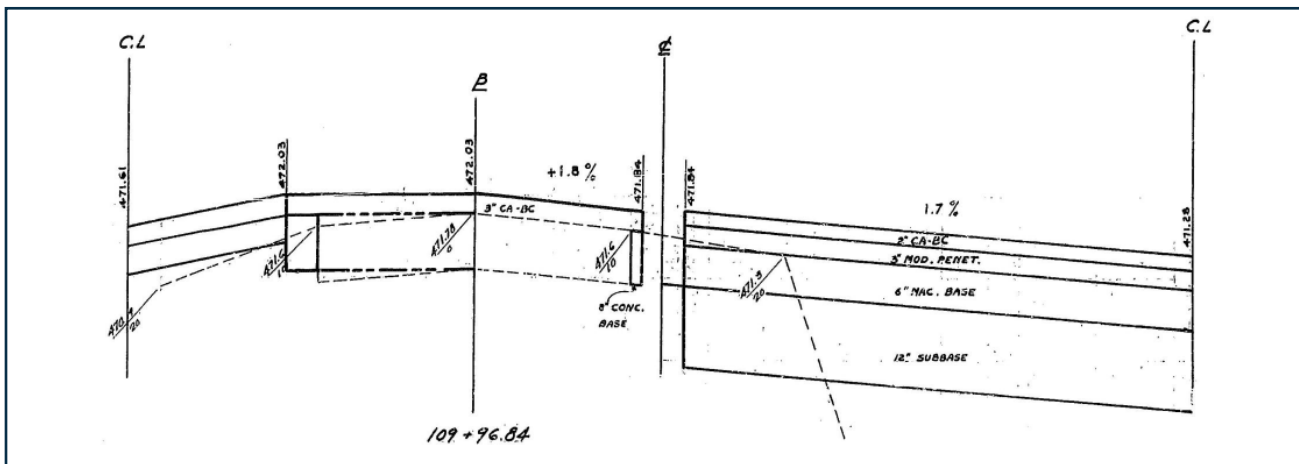


Figure 4. Section of new road alignment and overlay of existing concrete road.

1986

In August of 1986, the NJDOT issued plans for the Resurfacing and Safety Improvements to a portion of this roadway. The project was 2.44 miles long and was completed in March of 1988. The project was designed and constructed in accordance with the Standard Highway specifications of 1983 with all amendments.

The overall alignment of the roadway remained the same for this contract. Changes to the profile and the cross section were made to accommodate the overlay of the road and the modified lane channelization. Of significance under this contract was the removal of the centerline barrier curb and the resultant lane relocations. The curb barrier was removed and a 14 foot wide center turning lane was added to the study area. Two 12 foot wide travel lanes were created in both directions along with an additional 3 foot 3 inches of pavement width along the lane edge.

This contract also upgraded the access driveways along West Portal Road. The old Belgian block curb and railroad tie driveway demarcations were removed and concrete islands installed to define the access driveways.

²⁵⁶CA-BC-2" is an NJDOT construction reference which stands for "coarse aggregate bituminous concrete mix number 2."

Other safety improvements included the following:

- The wire rope fence appears to have been replaced by a beam guard rail at some time previous to this contract and after 1949. The beam guard rail height was adjusted under this contract to accommodate the bituminous road overlay and place the guard rail to the proper design height.
- Upgraded breakaway cable terminals were installed on the guard rail terminal ends.
- New striping was installed near West Portal Road to provide better channelization of traffic heading westbound. In addition, near station 211+00, a left turn lane was created and a striped 14 foot wide tapered painted island from station 206+00 to station 211+00 shifted eastbound traffic to the south (see Figure 5).
- The 14-foot center turning lane runs the entire length of the one-mile study area (see Figure 6).
- Miscellaneous underground drainage improvements were made to this area including additional piping, inlets, and underdrains.
- Additional signage was added.

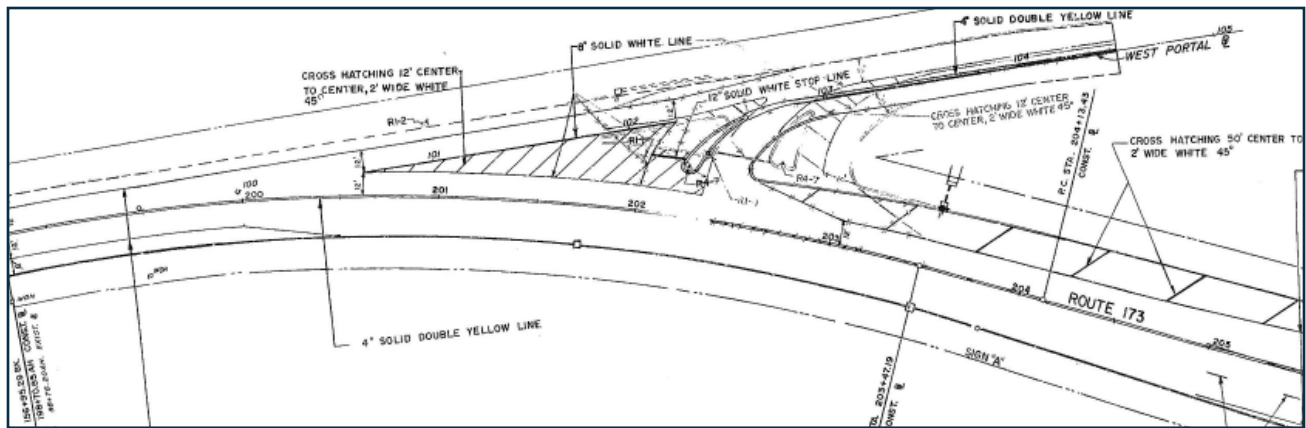


Figure 5. Striping pattern for Route 173 and West Portal Road intersection.

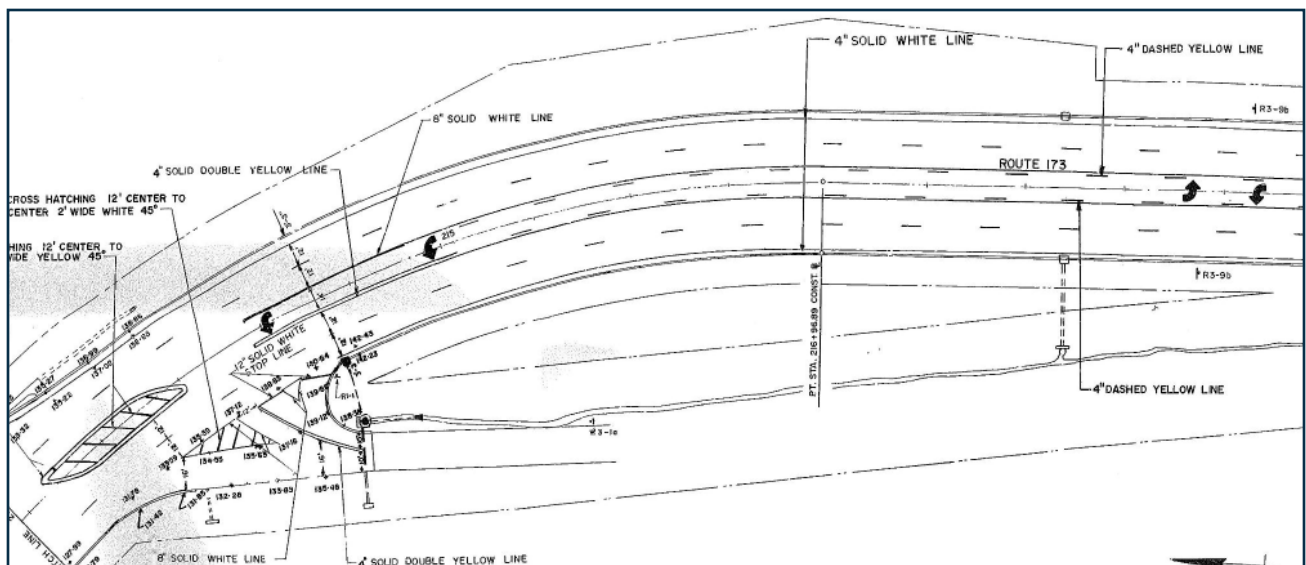


Figure 6. Center turning lane, stations 215+00 to 220+00.

Between the 1920s and 1980s, this segment of the former original New Jersey Turnpike (c. 1805), then Route 9 and Route 28 (now Route 173), was transformed from an earthen roadway to a modern multi-lane highway. While a traffic division was installed and subsequently removed, the traffic management measures and scale of the roadway reflects the character of a thoroughly

modern thoroughfare. Changes made through this period reflect evolving standards of road design, as well as the nature of the traffic and use of the roadway.

Paterson and Hamburg Turnpike

Alternate names: Route 8 Section 8; Route 23 Section 8B

Segment: Sussex to Hamburg, Sussex County

Pre-1927

This roadway segment was part of the Paterson and Hamburg Turnpike, created circa 1805. By 1927 the route between Sussex and Hamburg in Sussex County was a macadam road approximately 20 to 30 feet in width, and was designated as Route 8 Section 8 as part of the State Highway System (1917). Along Main Street in Sussex, near the intersection of Mill Street and East Main Street, the road width was approximately 30 feet. The buildings in this area were very close to the right-of-way line, most within a few feet, with only one barn structure encroaching into the right-of-way. The right-of-way width in this area was 66 feet, and was consistent along the entire road to Hamburg.

Portions of the road had no surface drainage structures, only small diameter pipes running under the road to facilitate drainage flow from one side of the right-of-way to the other. Some noteworthy features of the road include the use of open ditches and cobble gutters. Other characteristics of the existing road included sharp curves that would not meet current highway standards.

1927

In 1926, the NJDOT proposed improvements to Route 8 Section 8 from Sussex to Hamburg. The scope of this work was significant in that it constructed 4.8 miles of new concrete roadway, improved horizontal road alignment, added drainage structures, and installed new culverts and bridges over railroad tracks and streams. The majority of the pavement improvements (see Figure 7) included 20 foot wide cartways (two 10-foot lanes), 30 foot wide cartways (two 15-foot lanes), and a combination 25-foot cartway (one 10-foot lane and one 15-foot lane).

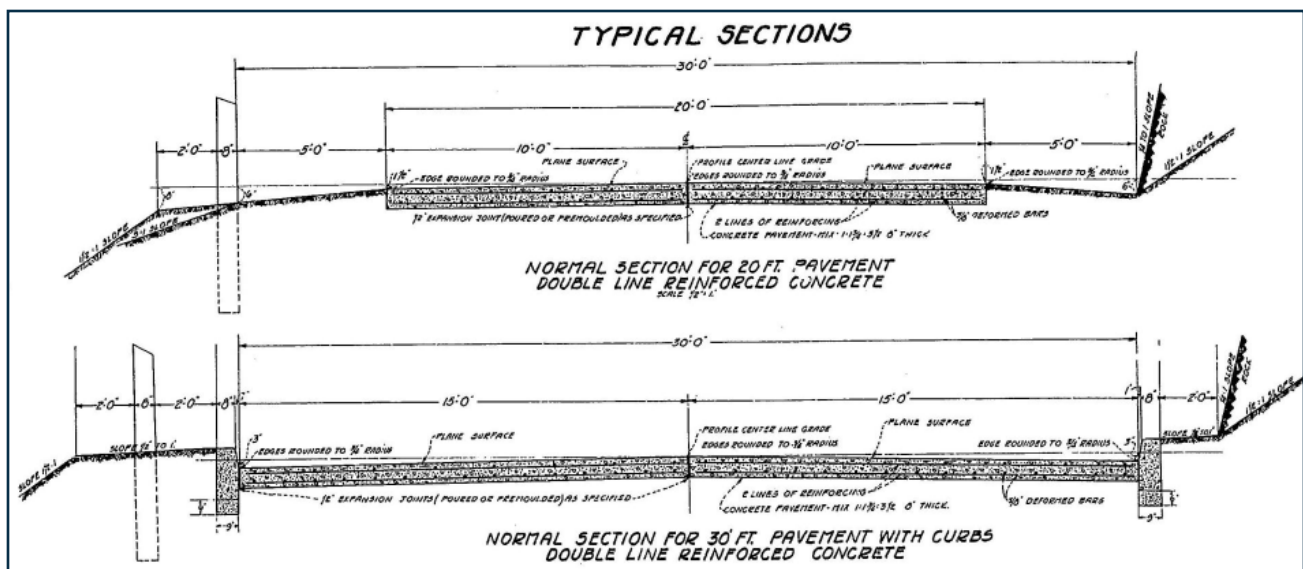


Figure 7. Typical 20 foot and 30 foot wide cartway sections.

The study area selected is the one-mile stretch from east of the beginning point of this contract (which is near the intersection of Main Street in Sussex with the two side streets of Mill Street and East Main Street). The proposed improvements included a pavement cross section through this area of 30 feet, with concrete curb on both sides of the road, new drainage inlets, and underground 12- and 15-inch diameter pipes. Driveway aprons were constructed of concrete. In addition, a significant amount of underdrain was used to capture high groundwater under the roadway (see Figure 8). Roadside ditches were also constructed, along with a wire cable guard rail system.

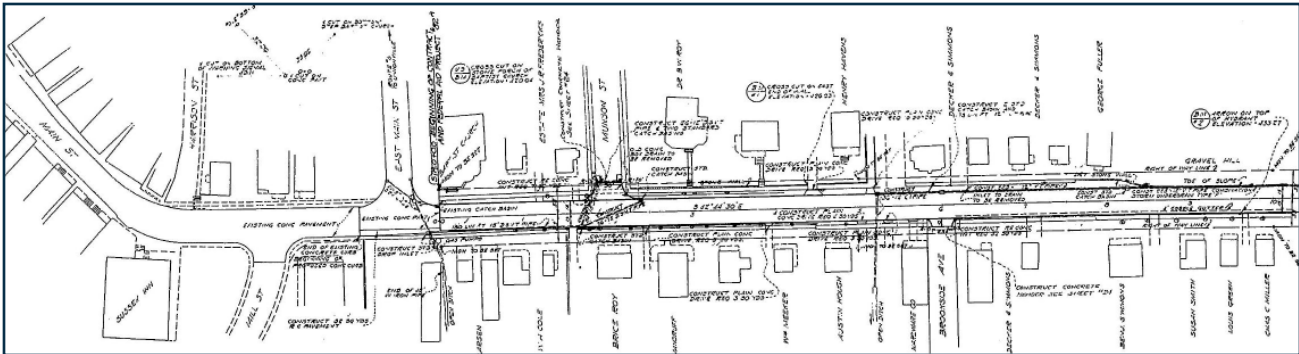


Figure 8. Plan of improvements from stations 0+00 to 10+00 in Sussex.

The roadway construction under this contract stopped at station 25+00. It was at this point where a proposed major realignment of the existing road was to take place. The roadway improvements under this contract picked up again at station 43+00. The roadway realignment would require the construction of two new bridges. One bridge would cross the Lehigh and New England Railroad, and the second bridge would cross the Papamating Creek (see Figure 9). The plans noted that

Construction of the Creek Bridge, R.R. Bridge and approaches between station 25+00 and station 43+00 to be performed in 1927 according to plans to be submitted to and satisfactory to the Bureau of Public roads.

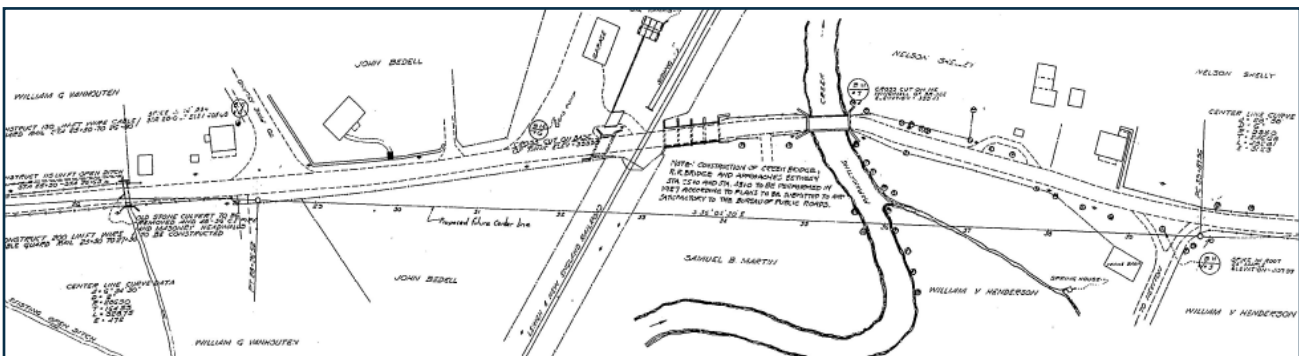


Figure 9. Proposed realignment of Route 8 Section 8, stations 25+00 to 43+00.

These bridges would be located on a new straight alignment from station 25+00 to station 43+00, which is south of the existing current curved alignment (see Figure 9).

The work in the remainder of the study area, station 43+00 to station 53+00 (near the intersection of Old Paterson Turnpike), consisted of the expansion of the roadway width to 20 feet, and then to 25 feet from station 56+00 on. In this section of the roadway, concrete curbing on the south side was installed, along with minor drainage improvements, namely a catch basin and an 18-inch diameter cast iron pipe. The pipe was located under the road, perpendicular to the traveled way, and had stone headwalls at each end (see Figure 10).

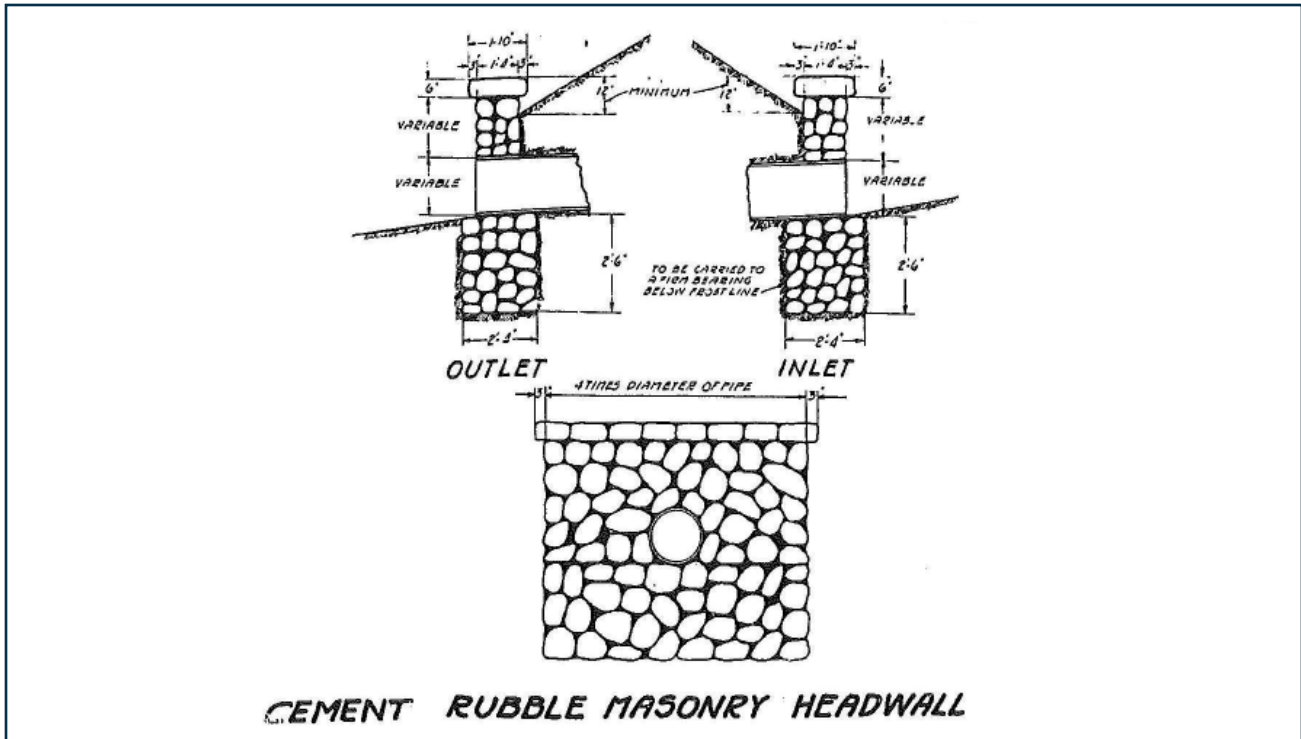


Figure 10. Typical cement rubble masonry headwall.

The roadway through the curve at station 46+00 to station 51+00 was superelevated, and the existing guard rail on the existing curve was removed. Because the road was superelevated, and the change in grade along the side of the road was within acceptable ranges, the guard rail appears to have been deemed unnecessary in this area. Just beyond the study area, however, a wire cable guard was installed as a result of a significant change in elevation (drop-off from the edge of road). To reduce the amount of fill due to the change of grade and to be able to stay within the right-of-way for the roadway, cement rubble retaining walls were used as slope protection (see Figure 11).

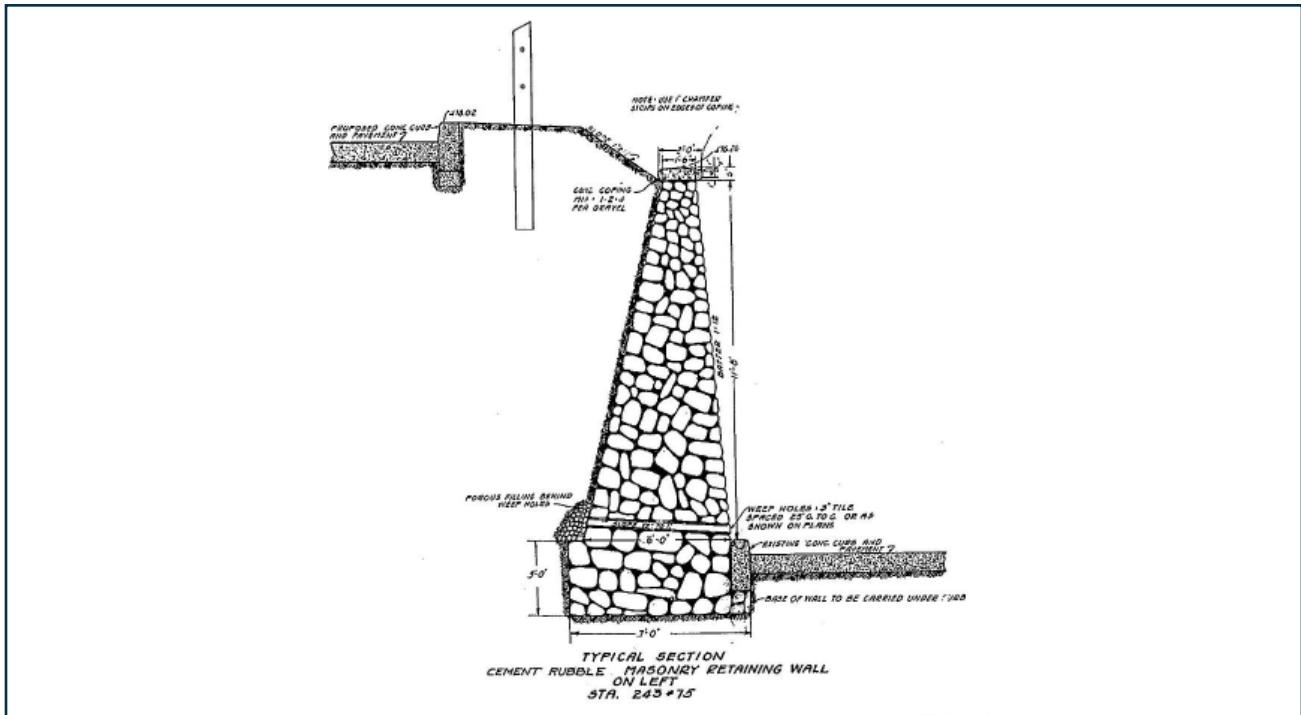


Figure 11. Typical cement rubble masonry retaining wall.

1983

In 1983, major improvements were planned for County Route 565 and its intersection with Route 23 Section 8B (formerly Route 8 Section 8). This project affected the intersection and approximately 1,350 linear feet of roadway along Route 23. In general, the improvements provided for a new signalized intersection, roadway widening, and drainage improvements. This work is located between stations 67+50 and 81+00, which is approximately 1,600 feet east from the work described above completed in 1927.

Prior to construction of these improvements, the roadway in this area consisted of a 38+/- foot wide cartway in a 66 foot wide right-of-way. At station 68+50 the roadway begins the widening transition to a variable width cartway. This variable width is due to the various lane shifts and to accommodate left turn lanes and shoulder lanes. The improvements end at station 79+50 where the new roadway narrows again to meet the existing width of cartway of approximately 38+/- feet.

A left turn lane was added to Route 23 eastbound at its intersection with County Route 565. The roadway was widened by 20 feet to accommodate the lane shift and an 8-foot shoulder area (see Figure 12). The lane shift remains until the cartway meets the existing road at station 79+50. Heading westbound on Route 23, the road begins its widening at station 79+50. The pavement is widened by approximately 13 feet to create a designated right turn lane onto County Route 565 (see Figure 12).

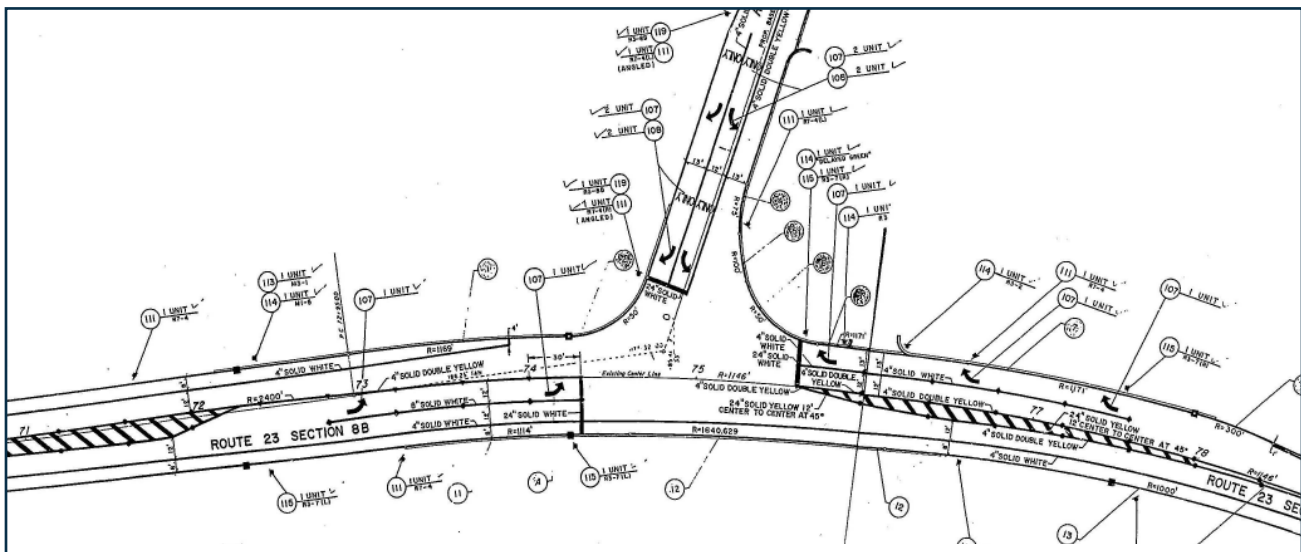


Figure 12. Route 23 and County Route 565 lane configuration.

County Route 565 was also widened to accommodate the new traffic patterns. Vehicular traffic approaching the tee intersection at Route 23 received designated right-hand and left-hand turning lanes. This was accomplished by adding a right-hand turning lane in the westbound direction; increasing the existing pavement width by approximately 12 feet (see Figure 12). Eastbound, the existing edge of pavement remained the same with the exception of the intersection with Route 23 where the white concrete curb radius was increased to accommodate truck vehicles turning onto County Route 565. By doing so, these vehicles would stay in lane during the turning movement onto the 13 foot wide travel lane of eastbound County Route 565 (see Figure 13). Route 23 through this section maintained the superelevation characteristics of the original roadway. The design speed through this intersection was 50 mph, while the posted speed limit was 45 mph (see Figure 14). All paved roadway improvements were made with bituminous concrete material.

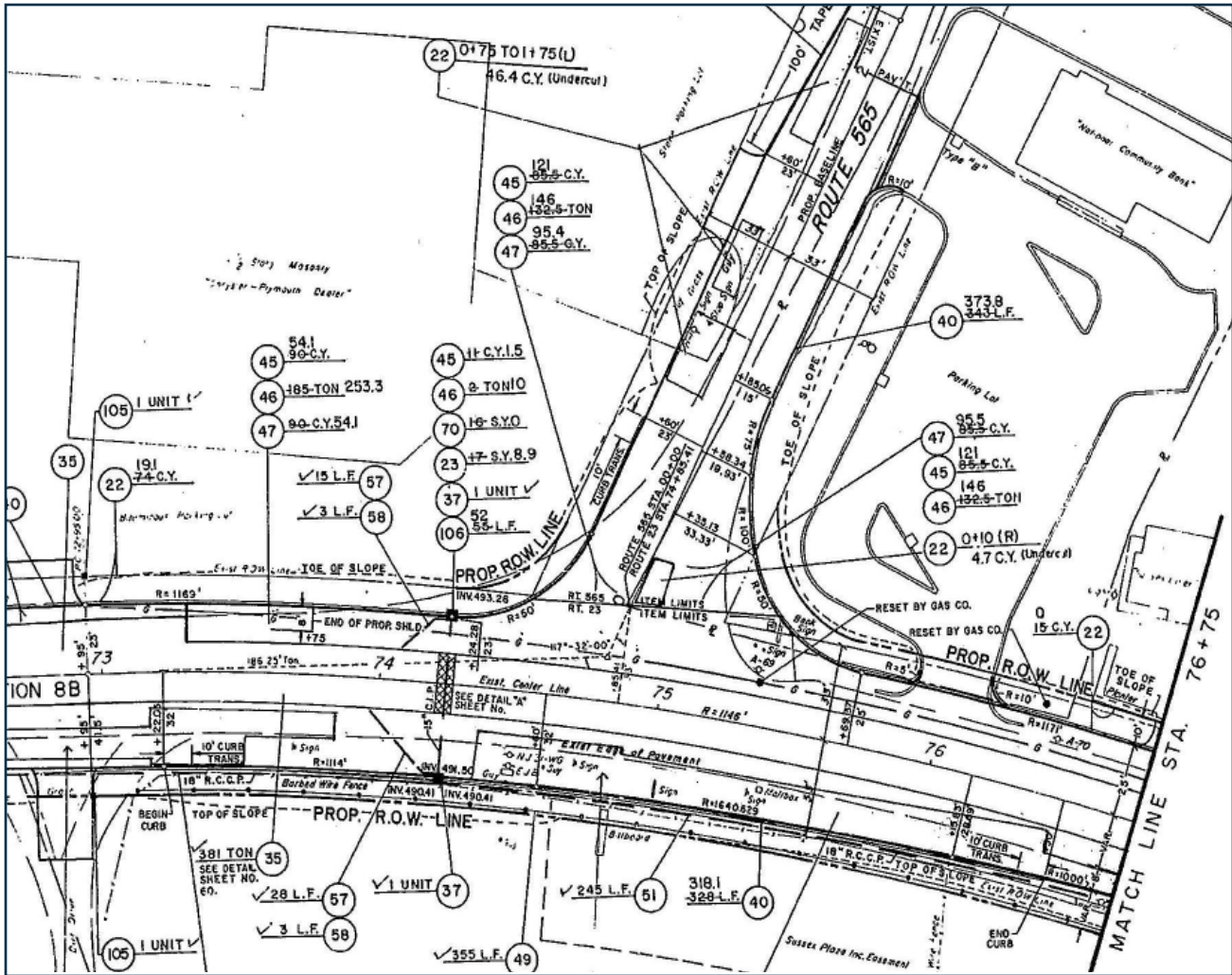


Figure 13. Road widening of County Route 565.

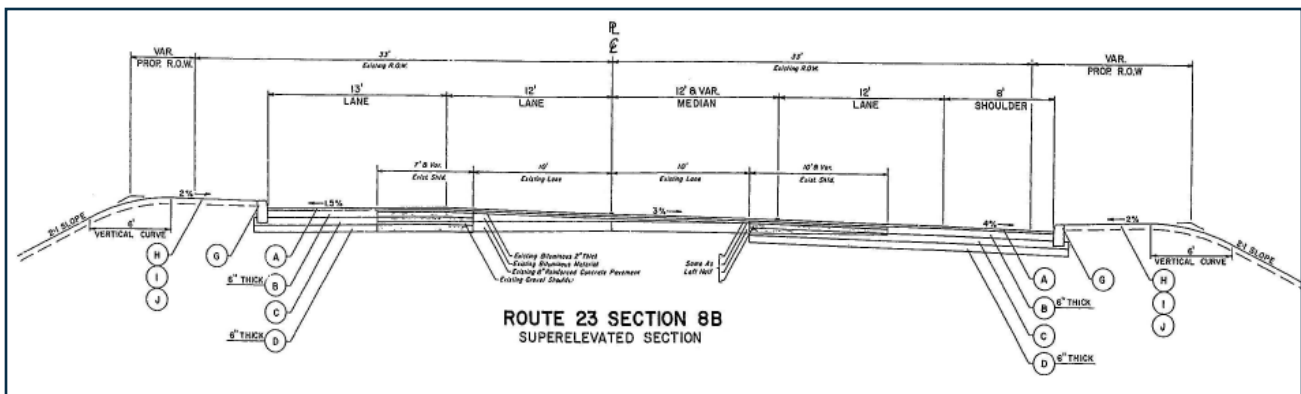


Figure 14. Superelevation section for Route 23.

As previously noted, the intersection became fully signalized during this project. All traffic control devices (signal lights, aluminum signal poles, signage, controls, striping, symbols, reflective lane markers, etc.) conform to the Manual on Uniform Traffic Control Devices. In addition, new high-pressure sodium lighting was added to the intersection on the County Route 565 portion of the intersection (see Figure 15).

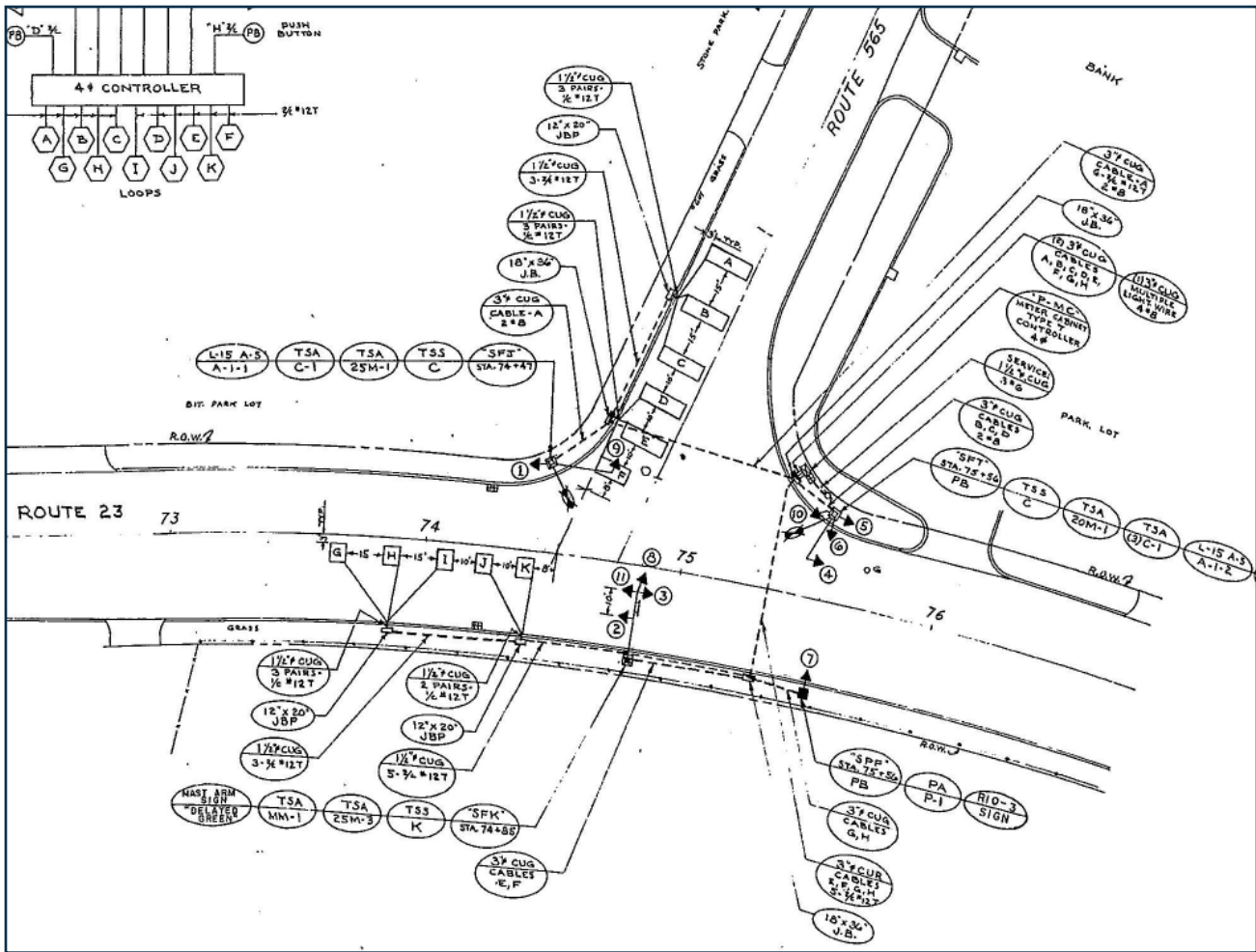


Figure 15. Route 23 and Route 565 intersection signal and lighting plan.

Drainage improvements encompassed the entire length of the project. Starting at station 69+00, new precast concrete inlets were installed on either side of the cartway, and an 18-inch reinforced concrete trunkline pipe ran along the southerly curb line of Route 23. Two additional sets of inlets were installed crossing Route 23, and the trunkline continued through the intersection following the southerly curb line. The 18-inch trunkline eventually crossed over Route 23 to the northerly side via a 20-inch cast iron pipe and then changed direction to follow the northerly curb line to its discharge point at an existing headwall at station 80+50 (see Figure 16). No additional drainage structures were added to County Route 565, as this road slopes away from the state highway. All improvements would conform to the NJDOT's Standard Specifications for Road and Bridge Construction of 1961 with all amendments

Kings Highway/Lincoln Highway

Alternate names: Route 27; Nassau Street

Segment: Route 206 to Harrison Avenue

This roadway segment is located in the heart of Princeton, Mercer County. The cartway is bounded by parking lanes, sidewalks, and buildings beyond.

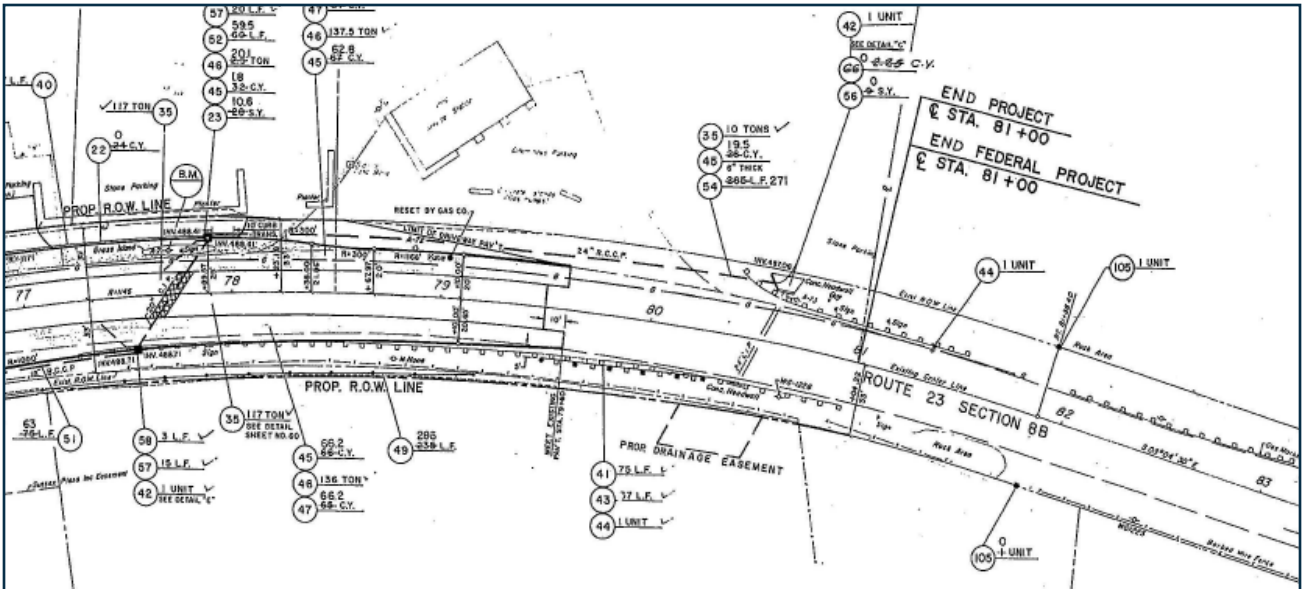


Figure 16. Route 23 drainage discharge point.

1937

In 1937, a drainage project was undertaken adding new storm drain lines to Nassau Street from Linden Lane to Harrison Avenue, then down along Ewing Street to its point of discharge (see Figure 17). Up to this point, the existing drainage system along Nassau Street relied on overland and gutter flow. All of the new drainage work was done in the sidewalk area on the north side of Nassau Street. No work was done to alter Nassau Street with the exception of a minor drainage crossing.

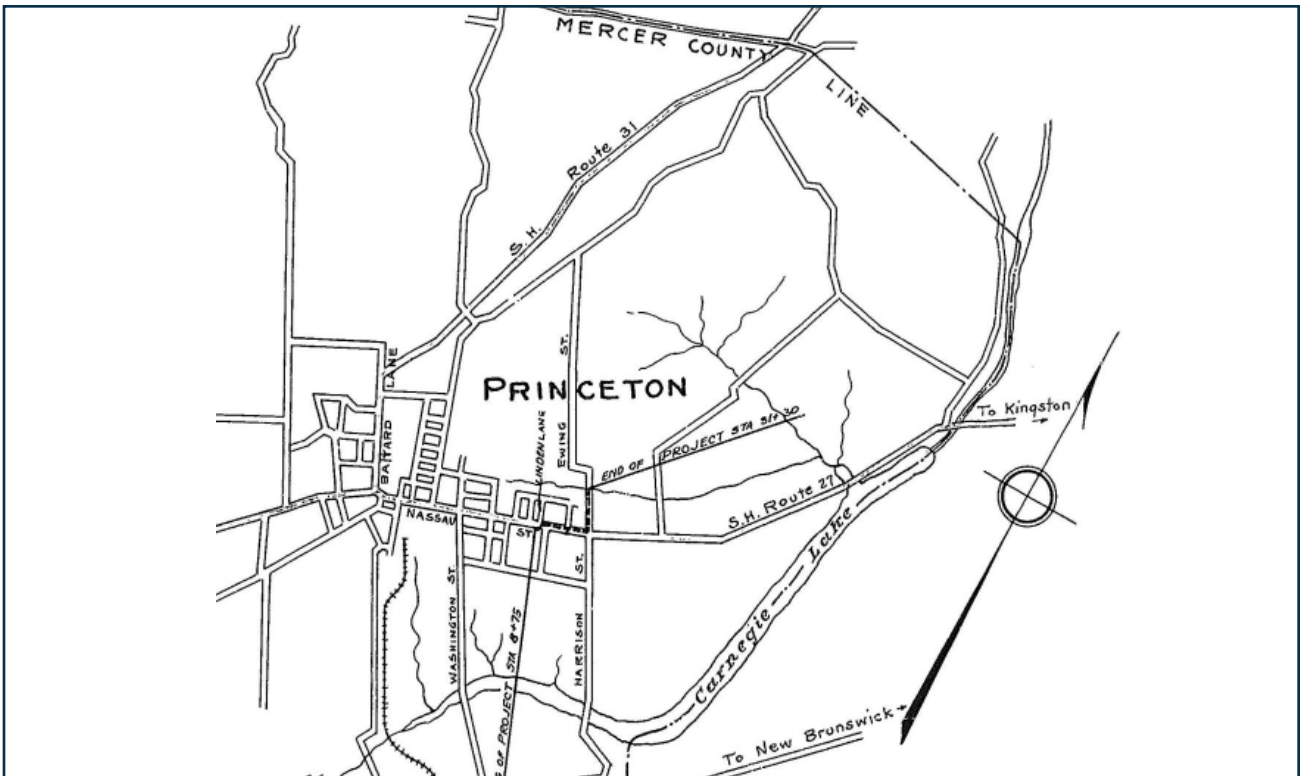


Figure 17. Nassau Street location map.

1945

Shortly thereafter, in 1945, the resurfacing of Nassau Street was completed, based on the NJDOT Standards of 1941. The project encompassed approximately one mile of roadway. The contract included the removal of the existing pavement surface identified as “asphalt block and cement sand cushion,” installation of monolithic concrete curb and gutter combination, and completion of a new asphalt paved surface along Nassau Street. The limit of this curb work was approximately from station 2+00 to station 8+50 on both sides of the street. According to the plans, Nassau Street varied in width throughout the project area, from 51 feet from Bayard Lane to Palmer Square East; 53.7 feet from Witherspoon Street to 59.7 feet at Vandeventner; 55.6 feet from just north of Vandeventner tapering to approximately 46 feet wide at Moore Street (see Figure 18); then 35 feet wide from Charlton Street to 30 feet wide at the Harrison Street intersection. The reduction in road width generally coincides with the change in the character of the roadway from a commercial area and Princeton University south of the Vandeventner intersection to the residential area north of the Vandeventner intersection.

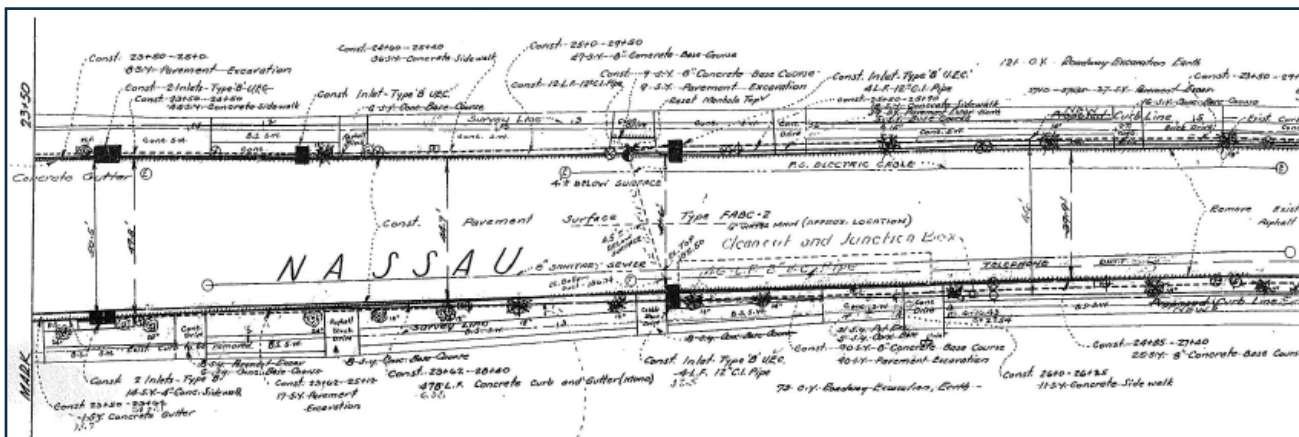


Figure 18. Nassau Street north of the Vandeventner intersection.

1992

Another resurfacing project was completed in June of 1992. The total length of the resurfacing project was approximately 6,121 linear feet and followed the 1989 Standard Specifications for Road and Bridge Construction. Along with the curb-to-curb asphalt resurfacing of the street was select curb removal and replacement with curb consisting of either concrete or slate curb (see Figure 19). Slate was likely used to remain consistent with the historic character of Princeton. No widening of the road was completed.

Ocean Highway

Alternate names: Route 4 Section 43; Route 9 Section 1

Segment: Tuckahoe Road to Pleasant Avenue

In August of 1939, a major reconstruction of Route 4 Section 43 Marmora to Beesley's Point in Cape May County was completed. Designated Route 4 in 1917, the route was previously known as Ocean Highway – the first state maintained route in New Jersey. The total length of the 1939 reconstruction project was 1.92 miles, and it ran from Roosevelt Boulevard north to the approach to the bridge over Great Egg Harbor Bay near Somers Point. In general, the improvements included roadway reconstruction, drainage improvements and sidewalk and curbing in selected areas. The study area for Route 4 included the one-mile segment from the Tuckahoe Road intersection north to the Pleasant Avenue intersection, which corresponds to station 288+00 to station 341+00.

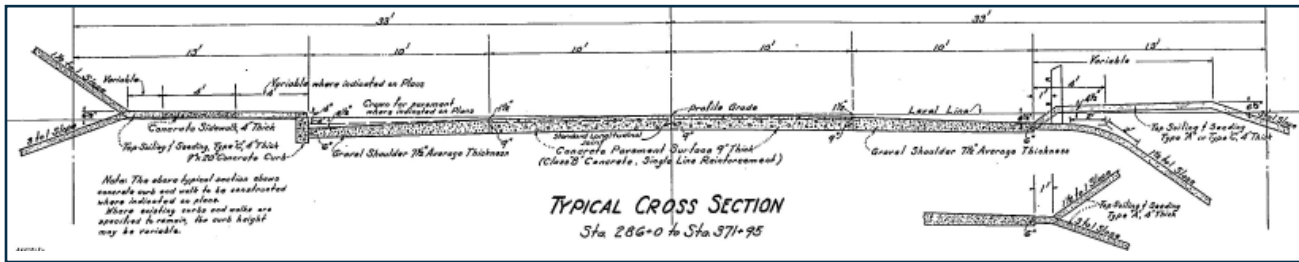


Figure 20. Typical roadway section for Ocean Highway.

The study area designated certain portions of concrete curb to be removed and replaced and certain portions of existing sidewalk to remain (i.e. station 310-311). Other areas received new concrete curb and sidewalk (i.e. station 312-314). Any driveways that fronted on Route 4 were reconstructed with gravel to match the newly constructed road elevations and cross section (see Figure 21).

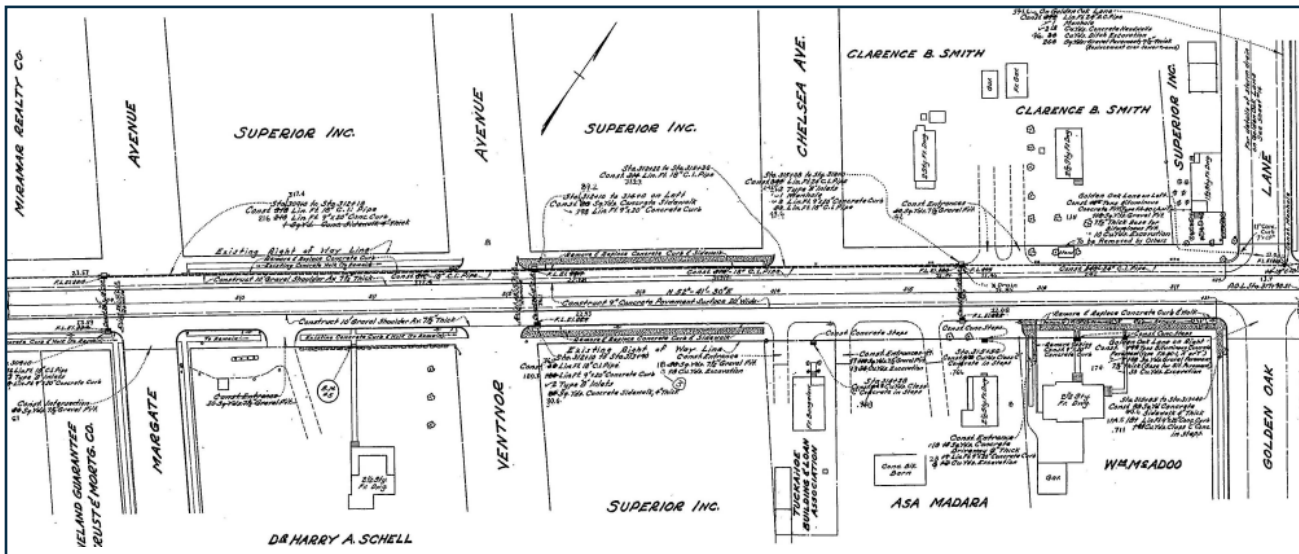


Figure 21. Plan of Ocean Highway improvements, stations 307+00 to 318+00.

New drainage inlets and underground pipes were installed. Specifically, at station 309-318 and down Golden Oak Lane, and another system between stations 336-348 where a new line was constructed down a narrow right-of-way designated as Spencer Avenue on the plans. In the first segment, station 309-318, the pipe material was 18-inch and 24-inch diameter cast iron pipe within the right-of-way of Route 4. Once in the right-of-way of Golden Oak Lane, the pipe material switched to a 24-inch diameter reinforced concrete pipe. The drainage line in Route 4 was relatively shallow, so the stronger cast iron material was the material of choice. In the second drainage segment, stations 336 to 348, the drainage system was constructed of 18-inch diameter reinforced concrete pipe. All pipes that crossed Route 4 perpendicular to the traveled way and connected two drainage inlets on each side of the cartway were made of 18-inch diameter cast iron pipe. All drainage inlets installed on this project were Type "B" inlets and were constructed of Class "C" concrete with a cast iron curb piece, head-frame and grate. Standard manholes, when used, were made of brick on a Class "D" concrete base and channel. Ladder rungs were provided in the manhole and were spaced at 18 inches on center and made of iron bar stock (see Figure 22).

The roadway cartway was constructed of Class "B" reinforced concrete slabs. Each slab was approximately 56 feet in length and approximately 10 feet wide. Reinforcement was primarily 3/8 inch diameter rebar with approximately 10 feet of 3/4 inch diameter rebar along the longitudinal edge of the slab at each corner.

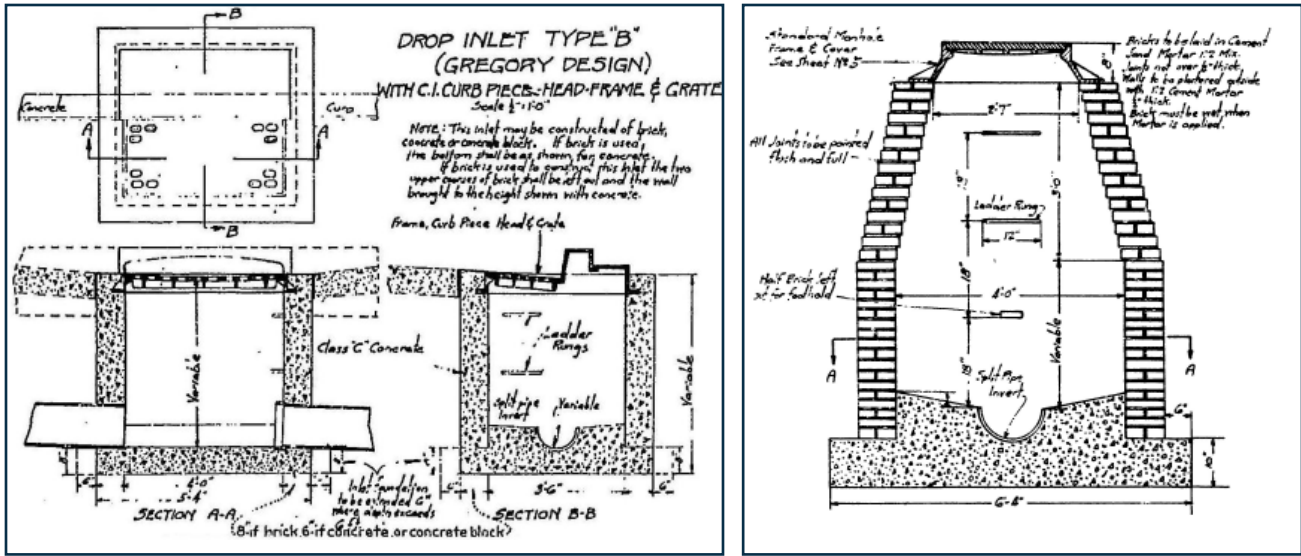


Figure 22. Typical NJDOT drainage inlet and brick manhole.

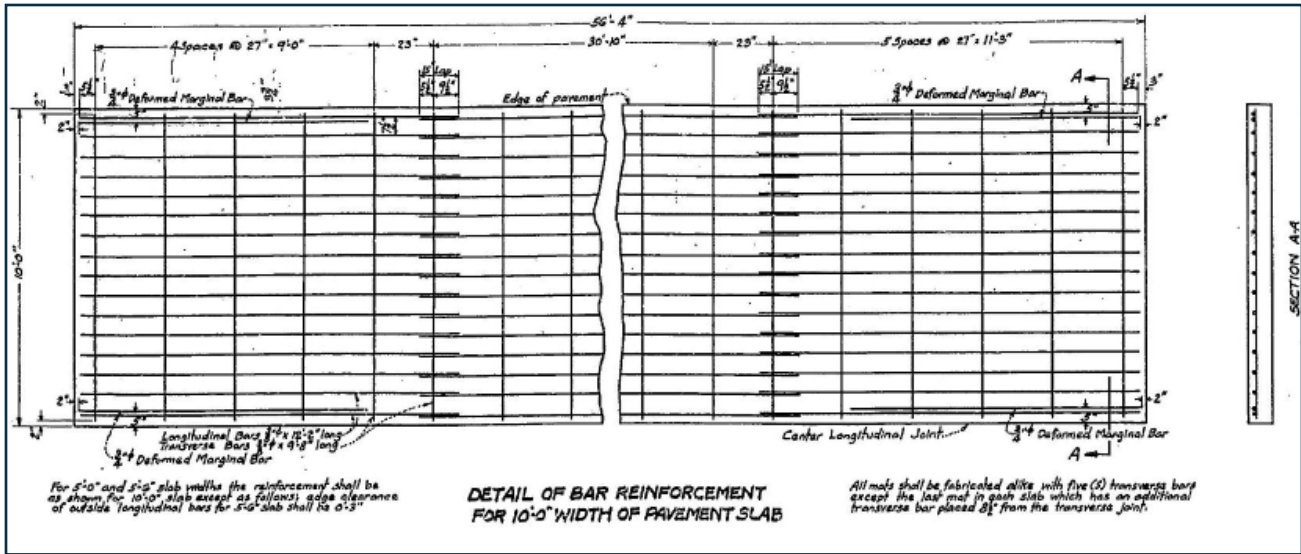


Figure 23. NJDOT 10 foot wide slab design per 1935 Standard Specifications.

No decorative landscaping was proposed under this reconstruction contract. Some topsoiling, fertilizing, seeding, and mulching of areas disturbed by construction was completed along with the removal and relocation of certain fences, hedges, and block walls and steps.

The right-of-way width, materials, roadway realignment, landscaping, and other features found on the 1939 plans were consistent with the design features of New Jersey's early state roads. The width of the right-of-way and cartway in 1939 is consistent with design changes to other portions of Route 4 during this period.

Delaware River Drive

Alternate names: Route 29 Freeway, Section 13B; River Drive
Segment: Aberfeldy Drive to Parkside Avenue

Delaware River Drive, along the Delaware River in central New Jersey, was designated a state highway in 1911, one of the first routes to be so designated. It was excluded from the original state highway system in 1917, but was included in the expanded version of 1927 when it was designated Route 29.

In 1955, the NJDOT designed a major expansion to Route 29 through Trenton and Ewing Township. While Route 29 is considered a north/south route, this section runs roughly east/west. This project encompassed approximately 1.33 miles of new roadway and related improvements. These improvements were completed by the summer of 1957. Shortly thereafter, in the fall of 1957, the landscaping of this project was completed under a separate contract.

Pre-1955

Prior to the 1955-57 major expansion of the roadway system, vehicular traffic travelling south along the Delaware River from Aberfeldy Drive to a point just east of Sullivan Way (the study area), proceeded east and westbound along Sanhican Drive. In this area, Sanhican Drive was a two-lane 30 to 40 foot wide roadway. Sanhican Drive was one lane in each direction until the 1955-1957 Route 29 improvements were completed. River Drive, which was a narrow two-way, two-lane street approximately 25 feet wide, was located south of Sanhican Drive, between Sanhican Drive and the Delaware River. Prior to the 1955 expansion, only the Water Power ditch lay between River Drive and the Delaware River.

River Drive, which was only approximately 1,000 feet long, primarily served the residences along its frontage, while Sanhican Drive to the north served more as a collector road. Travelling eastbound on Sanhican Drive, at a point just east of Aberfeldy Drive (see Figure 24) these roadways diverged and ran parallel until they converged approximately 1,000 feet east where they intersected

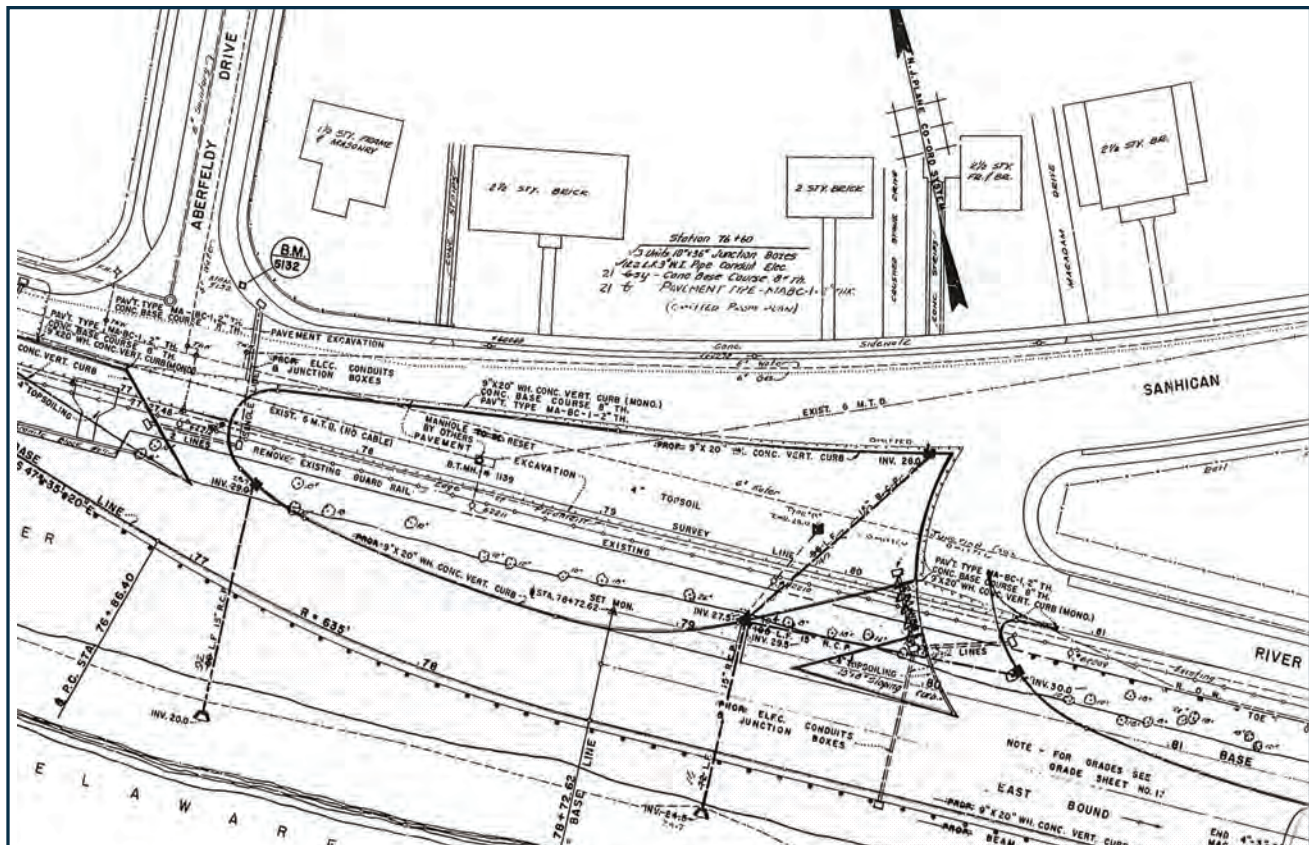


Figure 24. New eastbound Route 29 constructed south of River Drive. Note the locations of existing Sanhican, River, and Aberfeldy drives. The shaded area indicates the location of the Water Power Channel.

with Morningside Drive near Abernethy Drive (see Figure 25). At this location, River Drive ended and all traffic along Sanhican Drive (east and westbound traffic, approximately 45 feet wide) continued past Sullivan Way.

As previously noted, River Drive was situated immediately north of the “Water Power” designated area. This area is in a low-lying area approximately 10 to 15 feet in depth and approximately 85 feet in width. This existing lowland waterway connected to the Delaware River near the area where River, Sanhican, and Morningside drives converged. Discharge was controlled by a discharge weir (dam).

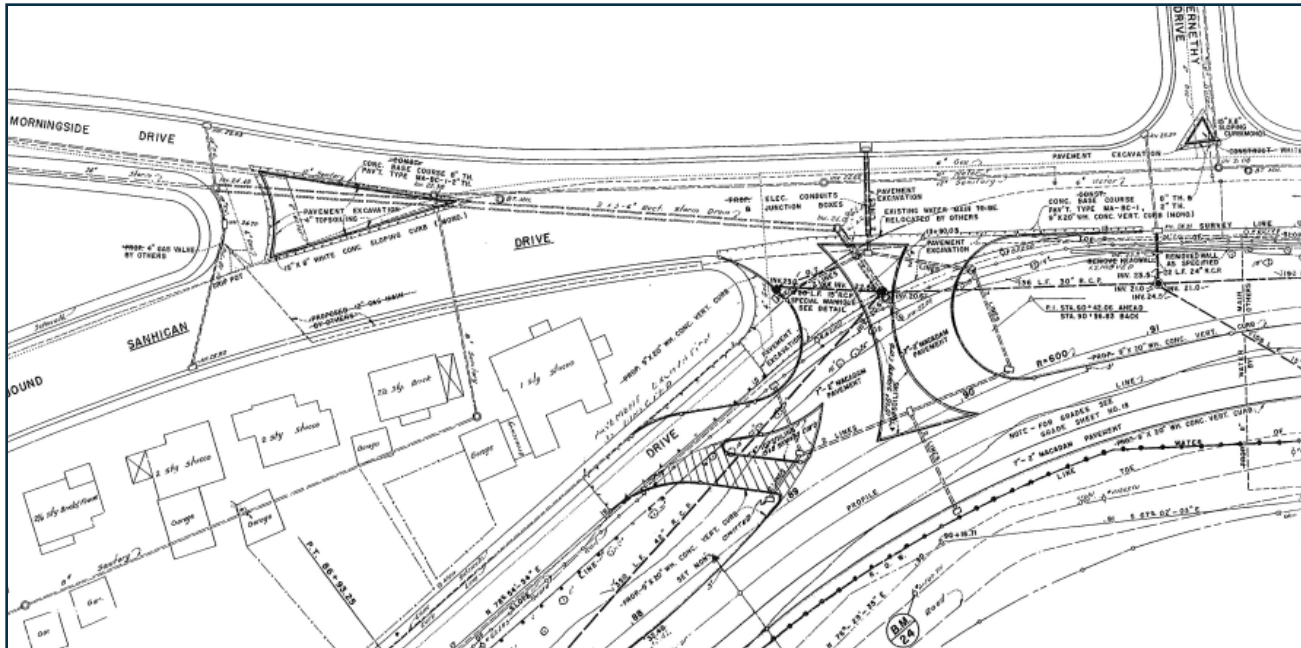


Figure 25. New intersection for Morningside, Sanhican, and Abernethy drives and Route 29.

A pedestrian bridge spanning the Water Power channel existed near the intersection of Rogers Avenue and Clearfield Avenue. Clearfield Avenue is a road to the south of the Water Power channel that provided access to the Brookville Apartments and served as an access road to the weir discharge previously mentioned.

1955

A major expansion of Route 29, primarily consisting of the completely new construction of east and westbound lanes for Route 29, was completed by the fall of 1957 for the 1.33 miles under this contract. The construction began approximately 400 feet east of the LaBarre Avenue intersection with Sanhican Drive. The new eastbound section of Route 29 turned to the south into the Water Power channel area (see Figure 24). As part of the construction of this segment of Route 29, Sanhican then became a two-lane, one-way (westbound) roadway in this segment.

The cross section of Route 29 eastbound transitioned into two lanes with a right shoulder as follows: 10 foot wide shoulder on the right, 12 foot wide center lane, and 13-foot left lane with a concrete curb along the inside edge of the curve/pavement. Through the curve, the pavement was superelevated. Various channelized ramps were created to permit traffic from Aberfeldy Drive and Sanhican Drive to merge onto Route 29 eastbound, and traffic to exit from Route 29 eastbound onto River Drive (see Figure 24). It was in this area where the Water Power channel began to be filled in by this project (see Figure 26).

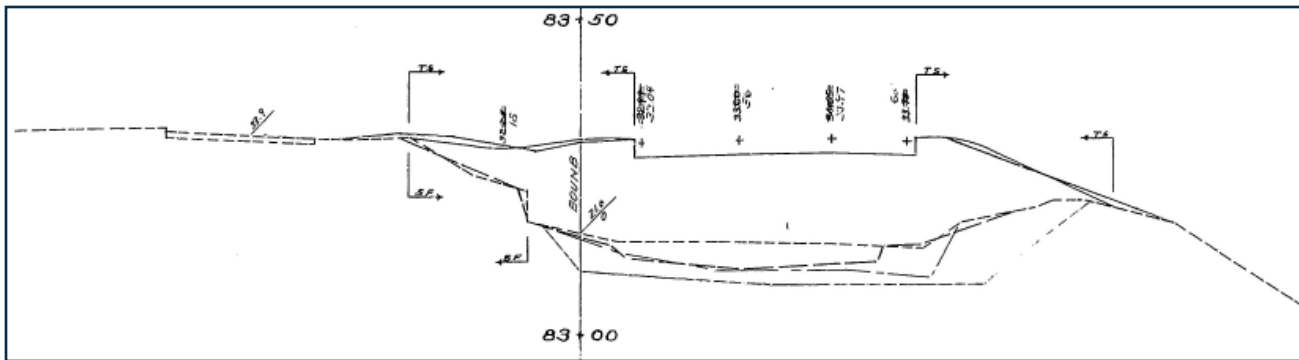


Figure 26. Section of new Route 29 eastbound in the Water Power channel.

The Route 29 eastbound roadway continued to parallel the general alignment of River Drive to the convergence of River, Sanhican (westbound), Morningside, and Abernethy drives. To accommodate the change in traffic patterns, a channelized island was created at the intersection of Morningside Drive and Sanhican Drive (westbound). Eastbound traffic on Morningside turned right onto Sanhican Drive and traffic from Sanhican Drive westbound used a slip ramp to travel to Morningside Drive westbound (see Figure 25).

River Drive appears to remain a one-way minor road under this contract, continuing to serve only the residential units along its frontage, and restricting traffic movement to an eastbound direction. The end of River Drive was changed and a new ramp from River Drive was constructed to access Route 29 eastbound, and a channelized island used to direct traffic onto Sanhican Drive and Morningside. At this intersection, westbound traffic on Sanhican also accessed Route 29 eastbound via the channelized island (immediately adjacent to the Route 29/Sanhican channelized ramp). Lastly, Abernethy Drive was restricted to a right-only turn onto Sanhican Drive westbound, and vehicles travelling west on Sanhican could still exit onto Abernethy. The new Route 29 continued the same roadway cross section through this area (10-foot shoulder, 12 and 13 foot wide paved lanes).

Because the Water Power channel was filled in under this contract, an extensive system of inlets and underground drainage pipes connected to the area where the Delaware River previously connected to the Water Power waterway.

As eastbound Route 29 approached Rogers Avenue to the south, an exit ramp was constructed so vehicles could exit Route 29 and access Clearfield Avenue (Clearfield runs parallel to Route 29 to the south) and Rogers Avenue. Immediately past this new ramp, the existing pedestrian bridge that spanned the Water Power waterway was removed because the roadbed of Route 29 was raised in this area. In its place, with what appears to be an “at grade” pedestrian crossing was created with concrete sidewalks and concrete stairs down to Clearfield Avenue (see Figure 27), although no pavement striping, signage, or signalization appeared to have been contemplated here. Lastly, a u-turn lane was created to permit eastbound Route 29 traffic to access Sanhican Drive westbound traffic. In this general area, only minor drainage work was done to Sanhican Drive and the cross section of Route 29 eastbound remained the same.

The next major intersection change occurred at the intersection of Sullivan Way, Sanhican Drive westbound, Route 29 eastbound, Clearfield Drive, and Route 29 westbound. Sullivan Way connected directly to Mount Vernon Avenue by crossing Sanhican Drive westbound, Route 29 eastbound and Clearfield Drive. Immediately east of this connection, Sanhican Drive resumes eastbound traffic flow. Therefore a ramp from Route 29 eastbound traffic was constructed that crossed Route 29 westbound. East of this ramp, Route 29 east and westbound travel lanes converged so that they ran parallel and were separated by an 8 foot wide island

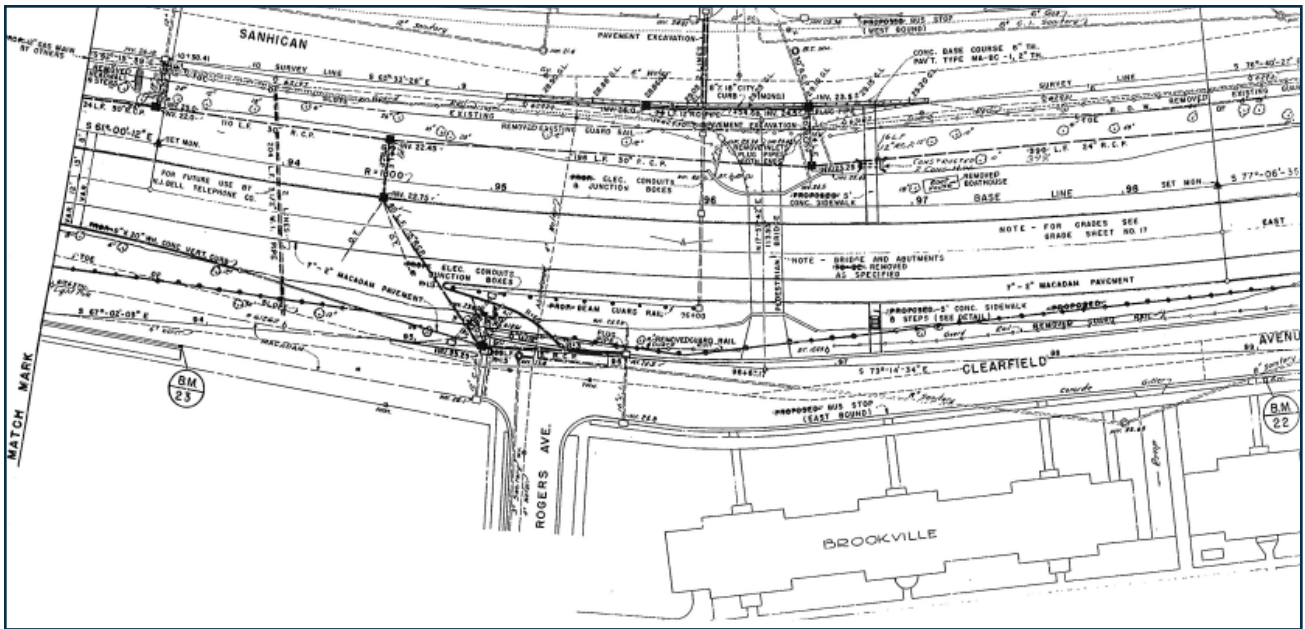


Figure 27. Route 29 and Clearfield Avenue ramp.

area. Both the Route 29 east and westbound cartways were 43 feet wide as follows: 10 foot wide shoulder on the right, 12-foot center travel lane, and a 13-foot travel lane, and 8 feet of island area (see Figure 28). Extensive drainage improvements were made and a new piping network was installed to handle the increased drainage runoff from the roadway improvements.

After the roadway improvements were completed in the summer of 1957, the NJDOT issued a landscaping contract. Landscaping was completed in the early fall of 1957. The entire length of this project was landscaped. Of particular note is that the island

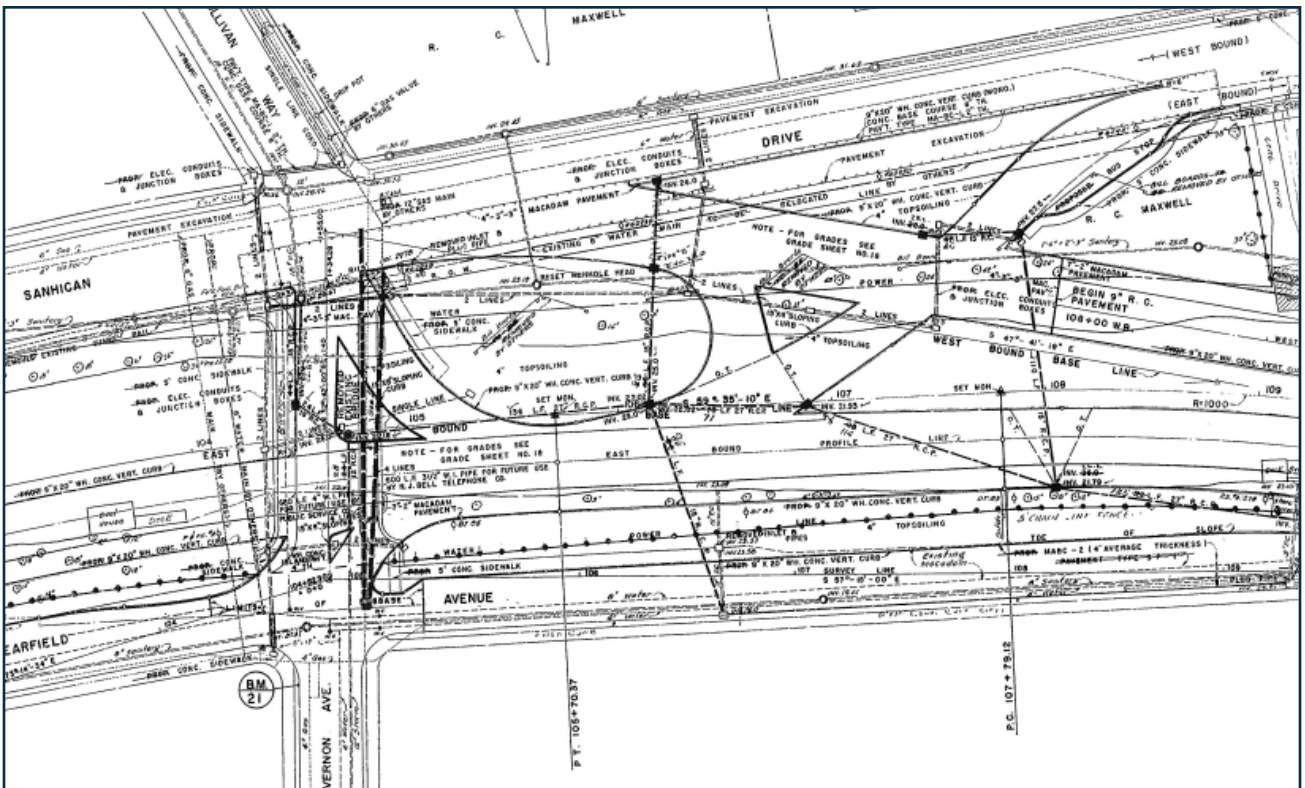


Figure 28. Sullivan Way intersection with Route 29.

between Route 29 eastbound and the residences on River Drive was landscaped, screening the houses from the traffic on Route 29 eastbound (see Figure 29).

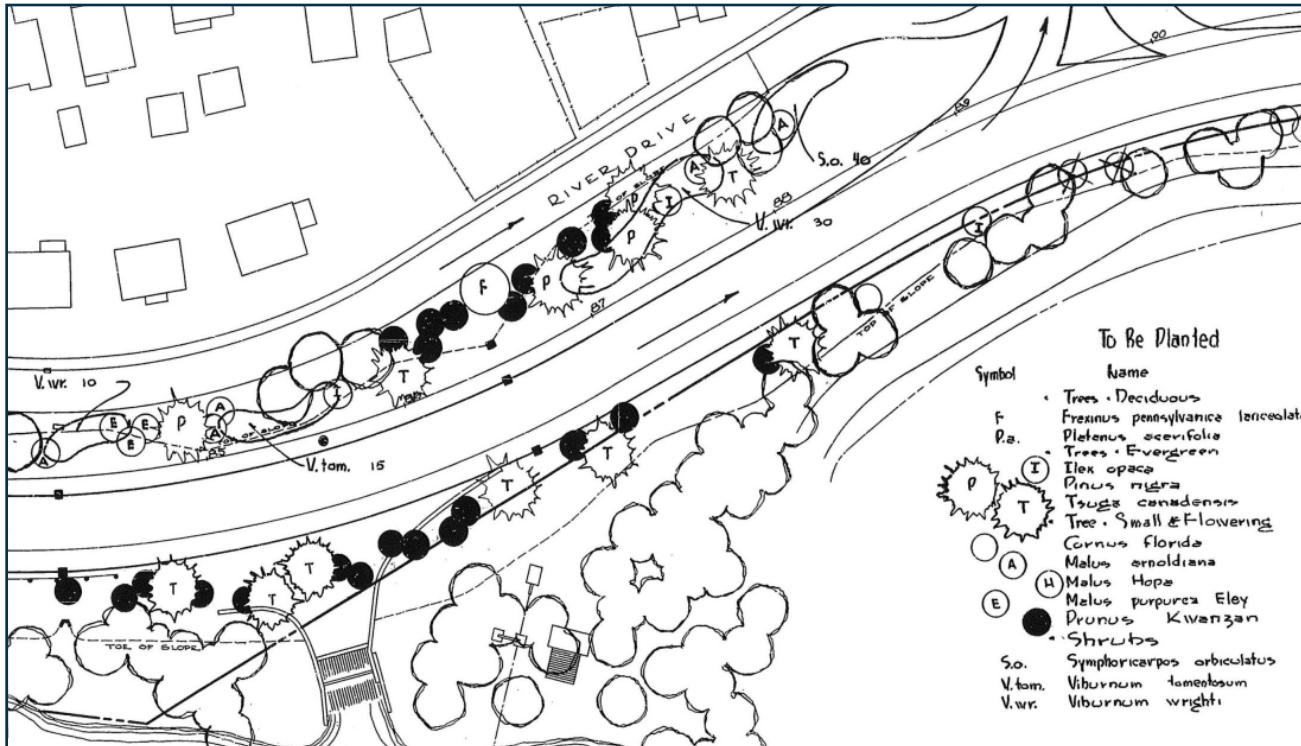


Figure 29. Typical landscaping along River Drive.

In addition, the south side (Delaware River side of Route 29 eastbound) also received landscaping, as well as the area between Route 29 eastbound and the residences on Clearfield Drive. Conversely, it is noted that where various ramps were created to cross over other roads, these areas were not landscaped so that sight distance could be maximized (see Figure 30).

The right-of-way width, materials, roadway realignment, landscaping, and other features found on the 1955 plans were consistent with the design features of New Jersey's state highways at that time. The realignment of the right-of-way and cartway in 1955 is consistent with design changes to other portions of Route 29 during the period 1950-1960.

John Davison Rockefeller Memorial Highway

Alternate names: Route 40 Section 6; Route 70

Segment: Buddtown-Four Mile Road to the Ocean County Line, milepost 28-29.

1931

In 1927, the NJDOT prepared plans for the construction of a new section of roadway in Burlington County designated "Route 40 Section 6." This portion of roadway began at Buddtown-Four Mile Road and proceeded east to the Burlington/Ocean County Line. The total length of this project was approximately 7.2 miles and had received Federal Aid as designated project 104-B. Construction was completed in 1931.

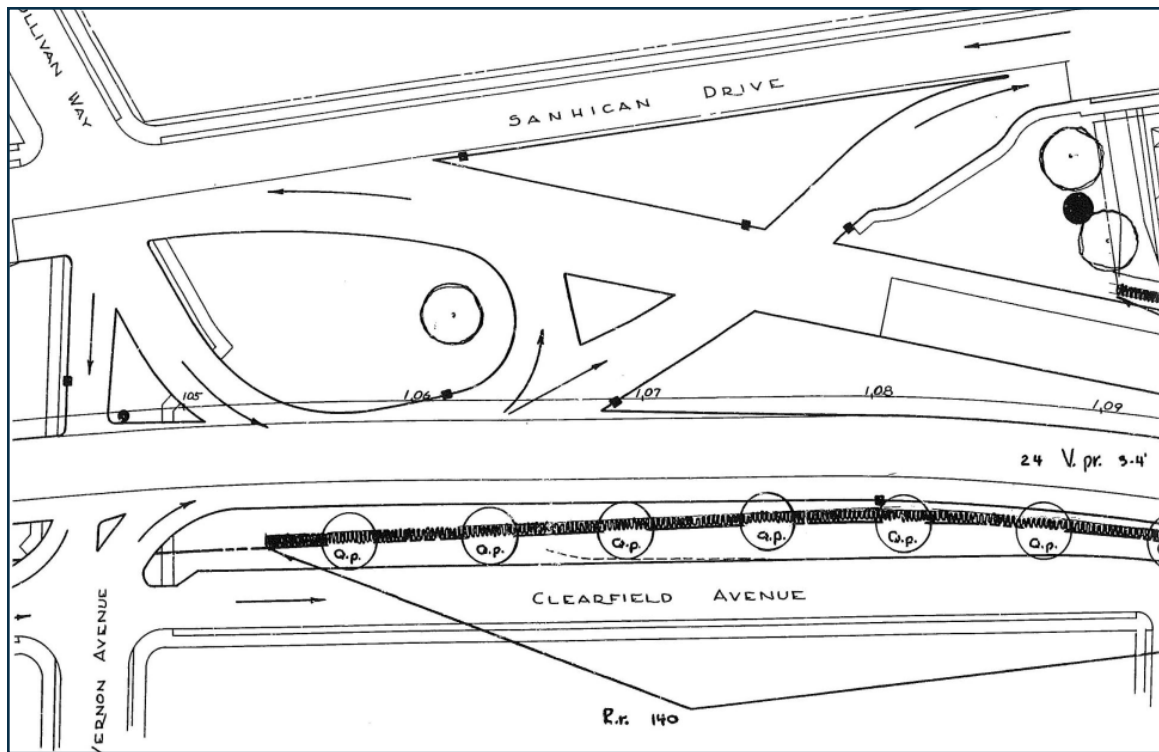


Figure 30. Example of limited landscaping at intersections.

The overall scope of this project generally included the following:

- The construction of a new traffic circle on Buddtown-Four Mile Road (near New Lisbon Road) and related roadway abandonment and realignment
- The construction of approximately seven miles of a new concrete road within an 80-foot right-of-way
- The construction of three culvert type bridges (a railroad bridge was to be constructed under a separate contract for this project)
- Installation of various roadway drainage systems in select areas
- Installation of wire rope railing in select areas
- Installation of concrete curb and sidewalk in select areas

A one-mile section of the 7.2 mile overall roadway was selected for study here, specifically, a section from station 1583+00 to approximately station 1638+00, which is a straight portion of the overall project. At the conclusion of construction in 1931, this portion of the road consisted of a 20-foot cartway (one 10 foot wide lane in each direction) and two 15-foot gravel shoulders (six inches thick) for a combined total of 50 feet in width. The right-of way width in this portion of the roadway was 80 feet. A significant amount of fill was placed in the vicinity of stations 1583+00 to 1598+00 to accommodate the crossing of Bispham's Mill Creek (flows south to north). One of the three bridges under the overall contract was constructed in this location, and it measured approximately 22 feet wide by 65 feet long (scaled).

Wire rope railing was also constructed in this portion of the roadway as a guard rail (Figure 31). The posts and struts (10 feet on center) were specified as locust, oak, and white or red cedar. Intermediate posts were to be a minimum of seven inches in diameter (six inches square) and end posts 10 inches in diameter (nine inches square). A special end treatment was provided that included a diagonal wire made up of 12 strands of #8 galvanized wire (see Figure 31).

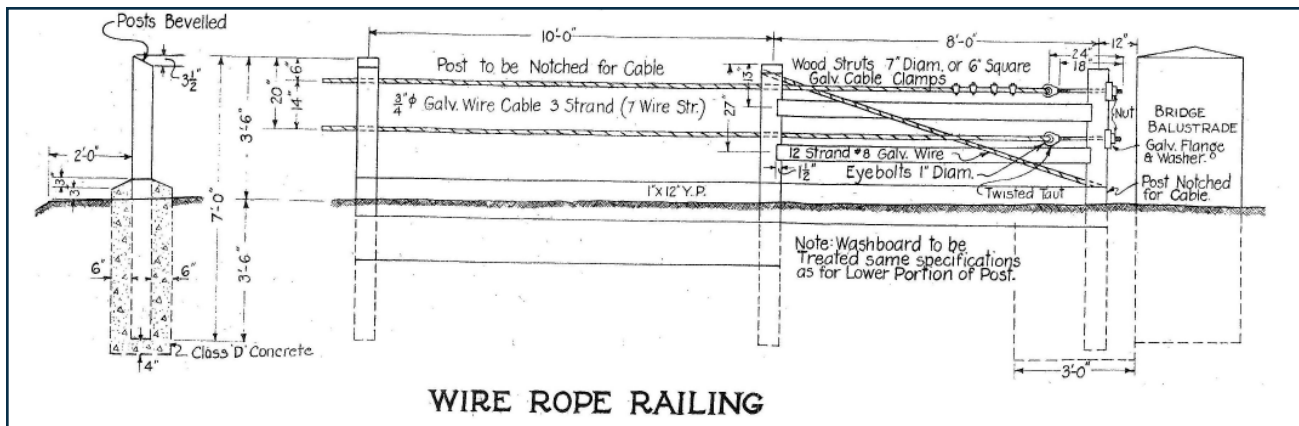


Figure 31. Detail of wire rope railing.

The profile grade through this one-mile section varied from 2.4% to level. Vertical curve lengths used were designed for state highway speeds consistent with 1931 Standards and good sight distance as follows:

- 200-foot vertical curve for a change of grade of less than 1%
- 400-foot vertical curve for a change of grade of less than 2.5%
- 1,000-foot vertical curve at a high point with a grade change of less than 1.75%

The material for the highway roadway consisted of reinforced concrete slabs 10 feet wide and 34 feet 4 inches in length. The slabs in each lane are joined, end-to-end, at the transverse joint with $\frac{3}{4}$ -inch diameter 20 inch long steel dowels. No dowels are located in the longitudinal joint.

Drainage along the roadway was generally handled by overland flow. Water that drained to the low point at the Bispham's Mill Creek crossing was collected into a series of cast iron flume inlets (Figure 32). A 1-inch by 12-inch washboard was placed in front of the wooden posts that support the wire rope railing. The cast iron flume inlet (30-inch wide opening) was mounted to the washboard, and by design, angled down the sideslope of the roadway via a 12-inch corrugated metal drainage pipe.

In addition to controlling stormwater runoff and minimizing soil erosion through the use of the cast iron flumes, a cement bag revetment system was used. One hundred pound cement bags (cement to sand ratio of 1:5) were placed on the sideslopes where water in the streams/brook came in contact with the embankment of the roadway. This occurred not only on Bispham's Mill Creek, but also on other stream crossings or where wet areas adjacent to the roadway were encountered along the entire length of the project. Approximately 12 bags were used per square yard of embankment slope (Figure 33).

No landscaping was included in this section of the roadway as the entire area of construction was either woods or swamp.

1931-1991

Plans for Maintenance Resurfacing Contract 422 were prepared in May 1991 by the NJDOT. The entire project encompassed 4.3 miles of roadway resurfacing and began to the east of the Four Mile Circle constructed in 1931, ending near the Mount Misery Brook crossing. Based on a review of these drawings in the one-mile study area, the following differences are noted as existing, which differ from the 1931 as-built plans:

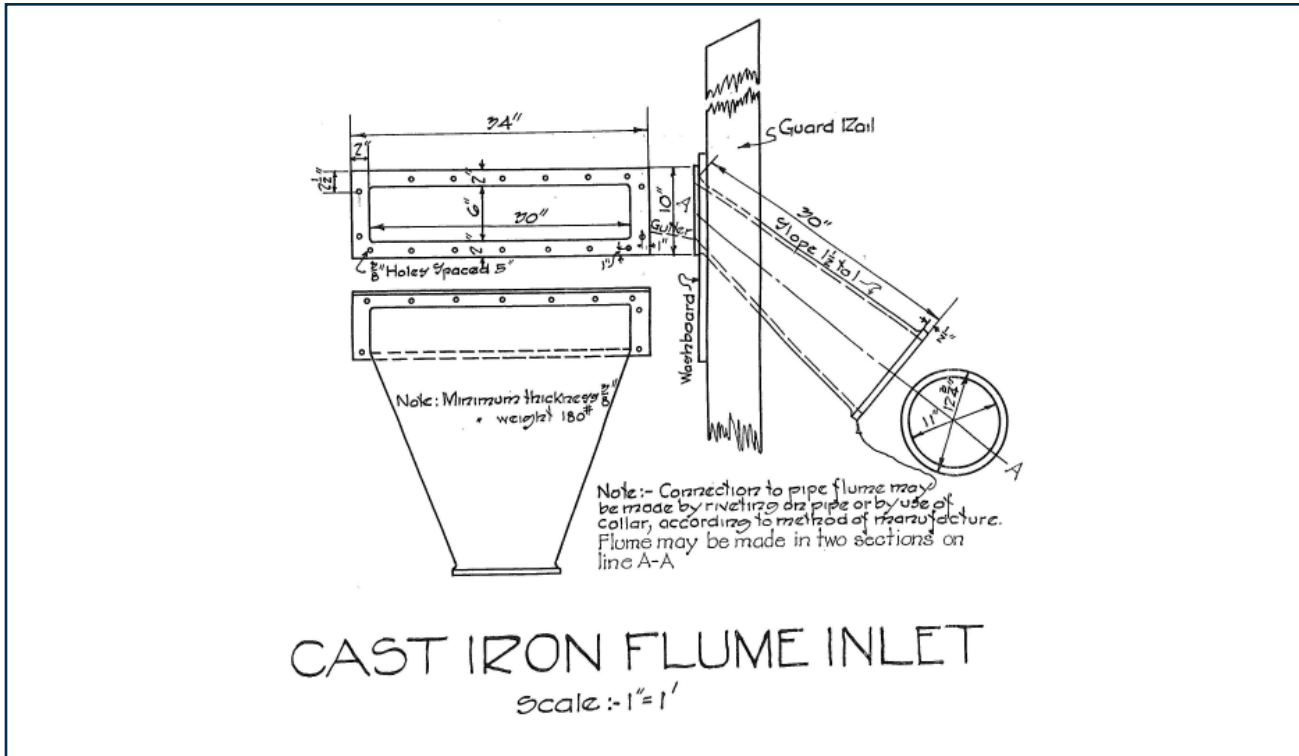


Figure 32. Detail of a cast iron flume inlet.

- A roadway widening and bituminous concrete overlay occurred between 1931-1991. Whereas the bituminous concrete paved cartway width is shown as 40 feet in 1991, the 1931 plans indicated a concrete cartway of 20 feet with 15-foot gravel shoulders on either side.
- A new intersection with Washington and Forrest roads with Route 70 is noted. (The road was designated Route 70 in the state highway system in 1953.)
- The bituminous concrete paved cartway of Route 70 widened as it approached the intersection of Washington and Forrest roads (see Figure 34). Approximately 300 feet before the intersection, in both directions, the pavement of Route 70 widened to 43 feet and then to 46 feet as one approached the intersection. This widening was generally done to accommodate acceleration and deceleration lanes on Route 70.
- The remainder of the roadway is indicated to be a bituminous concrete paved 40-foot cartway.

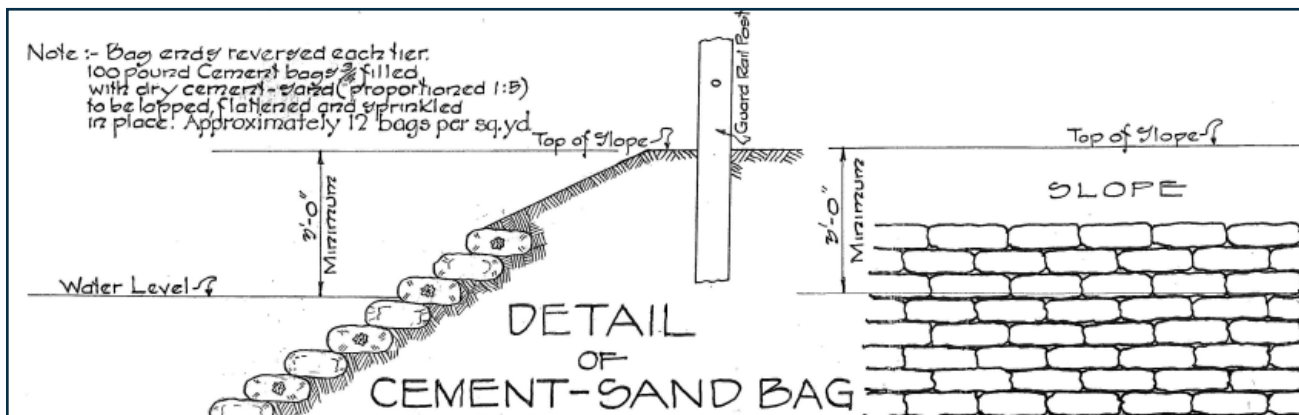


Figure 33. Detail of cement sandbag slope stabilization.

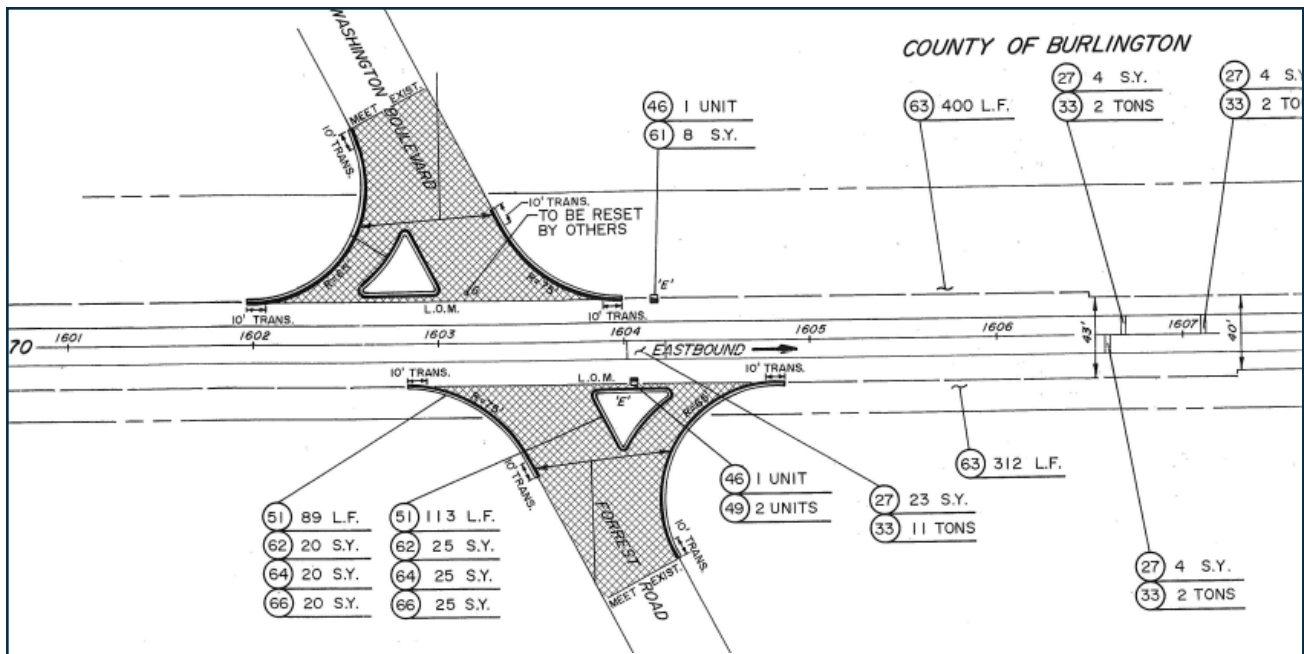


Figure 34. Intersection of Washington/Forrest Roads with Route 70.

1991

New work for the Maintenance Resurfacing Contract in this one-mile section of roadway included the following new items:

- Removal of the previously installed bituminous concrete overlay that was constructed over the concrete roadway completed in 1931. Note that in practice, the concrete slabs would have remained in place and asphalt bituminous base course and bituminous top course would have been constructed to abut the concrete slabs, thus widening the paved road to 40 feet.
- Concrete deck repair of the bridge that crossed the Bispham's Mill Creek and subsequent membrane waterproofing for approximately 145 linear feet.
- Replacement of the bituminous stabilized base course and bituminous concrete surface course over the entire road under this contract.
- Intersection improvements for the Washington/Forrest Road connection to Route 70. Sixty-five foot and 75-foot curb returns were installed including channelized right hand turn lanes. Milling and repairing of the approach to Route 70 on both Washington and Forrest roads was also completed (see Figure 34).
- Inlet castings were replaced along Route 70 to accommodate parallel bar grates.
- Route 70 roadway alignment and profile remained the same in this one-mile segment.

The right-of-way width, materials, wire and post guard rails, and other features found on the 1931 plans were consistent with the design features of New Jersey's early state highways. The widening of the cartway in the period from 1931-1991 reflects design changes to then Route 40 upon designation of the road as John Davison Rockefeller Memorial Highway in 1937. The resulting highway was a limited-access, scenic route with little roadside development, a natural setting, and a relatively flat, straight or gently curving route. The improvements designed in 1991 maintained the overall dimension and aesthetic of the roadway while making safety improvements and general upgrades to the road's design elements.

CONCLUSION

This examination of historic road plans illuminates certain trends in the design of New Jersey's roadways, especially highways, during the twentieth century. This timeframe saw the transformation of roadways in terms of alignments, materials, and overall design in a way that had until this point been unheard of. From dirt roads and oiled gravel roads to dualized paved highways, these drawings demonstrate several of these important trends.

Certain changes appear to be common on New Jersey's roadways as the twentieth century progressed. The alteration of horizontal and vertical roadway geometry reflected evolving roadway design standards, which in turn responded to the increasing speed and capabilities of automobiles and drivers. Horizontal curves were eliminated or flattened where possible to straighten out roads, and vertical curves at high points of roads were also flattened to improve sight distances and minimize blind hills. Changes to roadway materials were implemented as previous surfaces reached the end of their useful life and new materials proved to last longer and provide a quieter and safer riding surface under the stress of increased traffic and harsh weather conditions. Traffic control devices (signage, pavement markings and symbols, and traffic signals) became increasingly common as traffic volumes and speed increased. Although the installation of designated turn lanes, additional channelization measures, guard rail adjustments, and other measures served to protect motorists and adjacent pedestrians and property, these changes also contributed to altering the historic character of many state roadways, which were being designed to be the major corridors for moving high volumes of traffic.

APPENDIX G: STATE AND FEDERAL HIGHWAY NUMBERS: 1955 RENUMBERING

<u>1955 Number</u>	<u>1927 Number</u>	<u>1955 Number</u>	<u>1927 Number</u>
US 1 US 1B	25, 26, 26 EXT & S 26	50	50
US 1 & 9	1 & 25	53	5N
US 1 & 9T	25 T	54	54
3	3 & S 3	57	S 24
4	4	58	25 A
5	5	62	S 6
7	7	63	S 1
US 9	4 & 35	67	S 1 A
US 9 W	1	68	S 39
10	10	31	30
12	12	70	34, 40
15	6A	71	4 N
17	17	72	S 40
18	S 28	73	S 41
20	3	77	46
21	21	79	4 ALT.
US 22, 22 A	24, 28, 28 A, 29, 9 (1917)	82	S 24
23	23	88	35
24	24	91	26 A
27	27	93	S 5
28	28	94	8 & 31
29	29, 29 A	US 130	25, 25 M, 44, 45 (p/o 2 in 1917)
US 30	25, 43, 56	153	3 X
33	33	155	S 41 N
34	34 & 4 ALT.	156	
35	4, 4 N, 35, 37	161	
36	36	168	
37	37	172	
38	38	US 202	29, S 29, 31, 32
US 40	45, 47, 48	US 206	16, 27, 31, S 31, 37, 39 (p/o 2 in 1917)
41	41	208	S 4 B
42	42	US 322	42, S 44, 47, 51
45	45	439	S 24 & 28
US 46	6	US 440	1 & S 4
47	47 & S 49	444	Parkway

Note: All highway numbers above are New Jersey state routes; those with "US" are also federally designated routes.

Federal Aid Interstate (FAI) System

New	Old
78	102
80	101
95	103
278	107
280	105
287	104
295	108
76 (80-S)	109
495	105
(680) 676	110

