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New Jersey I-80 and I-287 HOV Lane Case Study

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Prepared by

**Texas Transportation Institute
The Texas A&M University System**

and

Parsons Brinckerhoff Quade and Douglas, Inc.

July 2000

Operations Office of Travel Management

New Jersey I-80 and I-287 HOV Lane Case Study

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16. Abstract This report documents the New Jersey I-80 and I-287 high-occupancy vehicle (HOV) lane case study. Information is presented on planning, implementing, operating, and redesignating the HOV lanes on the two freeways. The operation of the lanes is compared with factors frequently associated with successful HOV facilities. The program guidance on HOV operations issued by the Federal Highway Administration (FHWA) in 1999, partially in response to the situation in New Jersey, is discussed. The I-80 HOV lanes were implemented in March 1994 and the I-287 lanes were opened in their entirety in January 1998. Both were concurrent flow HOV lanes, not physically separated from the adjacent general purpose lanes, and both operated with a two-person (2+) vehicle-occupancy requirement during the morning and afternoon peak-periods. Peak-hour vehicle volumes on I-80 averaged between 1,000 and 1,400 vehicles, while I-287 averaged between 330 and 650 vehicles on different sections. The case study assessment indicated that although many of the elements associated with successful HOV projects were present to some extent with the I-80 and I-287 HOV lanes, some critical factors were missing, modified, or not implemented during the course of the projects. These elements focus primarily on the changes in the policy and regulatory environment and the lack of supporting facilities, services, and programs.					
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**Katherine F. Turnbull
Texas Transportation Institute
The Texas A&M University System
College Station, Texas**

**Tony DeJohn
Parsons Brinckerhoff Quade and Douglas, Inc.
Princeton, New Jersey**

July 2000

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CHAPTER ONE—INTRODUCTION

Background

Traffic congestion continues to be a major problem in metropolitan areas throughout the country. Traffic levels are highest during the morning and afternoon peak-periods, but travel demand and congestion are spreading to significant portions of the day. Providing for the safe, efficient, and reliable movement of people and goods is critical to the economic health and the quality of life in these regions. Population and employment growth, the availability of needed right-of-way, limited funding, air quality and environmental concerns, and other issues all hamper the ability to accommodate continued increases in travel demand.

A variety of approaches are being used in metropolitan areas to respond to this problem and to provide adequate levels of mobility and accessibility. Building new roadways, expanding existing facilities, adding high-occupancy vehicle lanes, expanding existing or developing new transit systems — commuter rail, heavy rail, light rail transit (LRT), and buses — encouraging ridesharing, and deploying advanced technologies represent a few of the most common strategies. These approaches represent a combination of adding new capacity and better managing the existing transportation system.

High-occupancy vehicle (HOV) facilities represent one available technique to address these issues. The goals of HOV facilities are to provide travelers in buses, vanpools, and carpools with travel time savings and more predictable trip times to encourage individuals to choose one of these modes rather than driving alone. The person movement capacity of a freeway or roadway increases when more people are carried per vehicle. HOV facilities are not intended to force individuals to make changes against their will. Rather, the objective is to provide a travel alternative that commuters will find attractive enough to change from driving alone to using a higher occupancy mode.

A mix of supporting facilities, services, and policies are frequently used in conjunction with HOV facilities. These additional congestion management strategies provide further incentives for individuals to select HOV travel modes. Express bus services, exclusive or direct HOV access ramps, park-and-ride lots, rideshare programs, HOV bypass lanes at freeway ramp meters, guaranteed ride home programs, incident management efforts, and value pricing programs represent a few examples of supporting activities frequently found with well used HOV lanes.

In addition, many successful HOV facilities represent the coordinated and cooperative efforts of the state departments of transportation, local transit agencies, enforcement personnel, and other agencies. HOV facilities can provide significant benefits on a freeway or in a travel corridor. Even greater benefits may be realized by a systematic region wide approach that is coordinated with other travel modes, congestion management strategies, and system improvements. Experience has indicated that HOV lanes can be a practical, cost-effective, and environmentally friendly strategy

in many metropolitan areas. At the same time, HOV facilities should not be considered as a panacea for reducing traffic congestion in a corridor or an area. HOV lanes represent one of many proven operational strategies to proactively respond to travel demand increases, travel safety concerns, and environmental issues.

Since the opening of the Shirley Highway bus-on-freeway demonstration in 1969, HOV lanes have been implemented in a number of metropolitan areas throughout the country. Currently, approximately 1,200 route-miles or 2,300 lane-miles of HOV lanes are in operation on freeways and in separate rights-of-way in 28 metropolitan regions in North America. HOV lanes and supporting systems and services are major components of the transportation systems in Seattle, the San Francisco Bay area, Southern California, Houston, Dallas, Northern Virginia/Washington, D.C., and other areas.

The surface transportation system in New Jersey includes freeways, parkways, toll roads, local roadways, commuter rail, bus services, and other elements. These components serve the older urban areas, newer suburban developments, small communities, and rural areas. The mature infrastructure found in many parts of the state reflects the early development of these areas.

In response to increasing levels of traffic congestion in the 1990s and projections for further growth in travel demand, HOV lanes were implemented on I-80 and I-287 in Northern New Jersey. The HOV lanes on I-80 were opened in 1994 and the lanes on I-287 were implemented in early 1998. Both facilities were concurrent flow lanes, not physically separated from the adjacent general purpose lanes, and both operated with the HOV designation during the morning and afternoon peak-periods only. The HOV designation on both facilities was removed in November 1998 and the lanes were opened to general purpose traffic.

This case study examines the factors influencing both the development and the termination of the I-80 and I-287 HOV lanes. The elements associated with planning, implementing, and operating the HOV lanes are described. The conditions and the enabling environment at the time the facilities were planned are reviewed and compared to the situation when the lanes were in operation. The factors influencing the decision to terminate the HOV designation are discussed.

Case Study Objectives

This case study was undertaken to assess the factors that influenced planning, implementing, operating, and decommissioning the HOV lanes on I-80 and I-287. Obtaining a better understanding of the elements that contributed to the ultimate decision to remove the HOV designation on both freeways represents the major objective of the project. The insights gained from this assessment provide guidance for transportation professionals and policy makers on the factors that contribute to successful regional HOV systems, individual HOV facilities, and multi-agency programs, as well as those that may limit their effectiveness.

Activities Conducted for the Case Study

A number of activities were conducted to accomplish these objectives. First, reports and available information on planning, implementing, and operating the I-80 and I-287 HOV lanes were reviewed. Information on the authorizing environment, traffic characteristics, supporting components, and other elements was examined and analyzed. Second, newspaper articles and editorials were reviewed to obtain a better perspective on the reaction of the public, press, and policy makers to the lanes. Third, interviews were conducted with representatives from the Federal Highway Administration, the New Jersey Department of Transportation, and the North Jersey Transportation Planning Authority, Inc. to gain additional insights into planning, operating, and decommissioning the two facilities and the factors that influenced decisions at various stages.

Components Contributing to Successful HOV Systems and Programs

Research conducted at the local, state, and national levels has identified factors that may contribute to the successful implementation, management, and operation of regional HOV systems, individual HOV facilities, and multi-agency programs. These include elements related to the planning and decision-making process, the implementation stage, and the ongoing operation of HOV lanes. Although these factors are not present to the same degree with all projects, the elements occur frequently enough to represent features that appear to contribute to the success of HOV facilities.

The following factors have been attributed with planning, developing, and operating regional HOV systems, individual HOV facilities, and multi-agency programs that have met project goals and that enjoy public and policy support. Experience indicates that it is not essential for all these elements to be present. However, the presence of more factors enhances the likelihood of a successful project. (1, 2, 3).

Area Size. Most successful freeway HOV facilities are located in major metropolitan areas. Projects attracting high volumes of users are usually found in urban regions with populations of over 1.5 million and most are within the 20 largest metropolitan areas in North America.

Corridor Characteristics. All successful freeway HOV lanes are located in major travel corridors. Freeways in these corridors are experiencing significant traffic congestion and continued growth in travel demand. In many cases, some type of highway improvement was being considered or underway at the time the HOV alternative was examined. At the same time, plans for a fixed-guideway transit system or other major transit investment were lacking in most corridors.

Project Champion or Champions. One individual, or a small group of individuals, were instrumental in developing, promoting, and supporting most successful HOV facilities. These were individuals, usually within the state department of transportation or transit agency, with the authority and position to influence decisions and to promote projects.

Legislative Direction and Policy Support. Legislative actions, policy directives, and supporting policies influenced the decision to implement HOV facilities in some areas. These policies and directives often promoted or mandated the HOV alternative in the decision-making process and provided ongoing support during implementation and operation of the facility.

Lead Agency. One agency, usually the state department of transportation or a regional transportation authority, has overall responsibility for the majority of successful freeway HOV projects. These agencies provide the authority, funding, and leadership necessary to plan, design, implement, and operate the facilities. Exceptions to this approach include Houston and Dallas where the development and operation of the HOV systems are best described as joint efforts of the Texas Department of Transportation (TxDOT) and the regional transit authority, the Metropolitan Transit Authority of Harris County (METRO) and Dallas Area Rapid Transit (DART).

Multiagency Teams and Interagency Cooperation. Although one agency has overall project responsibility, multiagency management teams are frequently found with successful HOV facilities. In most cases, these teams are formed during the planning process and continue through implementation and ongoing operation. Representatives on these teams come from the state department of transportation, the transit agency, other bus operators, the MPO, state police, local jurisdictions, enforcement agencies, and other groups.

Federal Agency Support. The involvement and support from the Federal Highway Administration (FHWA) and to a slightly lesser degree, the Federal Transit Administration (FTA), represents an important element of most successful HOV projects. These agencies frequently provided funding, technical assistance, and policy guidance, as well as involvement in the multiagency project management team on many projects.

Facility Orientation. Most successful HOV lanes are orientated toward a central business district (CBD) or major activity center with 100,000 or more employees.

Transit Service. Buses represent an important component of many well utilized HOV lanes. Demand for 25 or more buses during the morning peak hour represents a potential success indicator.

Travel Time Savings and Trip Time Reliability. Providing HOVs with travel time savings of 1 to 1.5 minutes per mile or a total of 7.5 to 8 minutes overall appears to be another attribute of successful HOV projects. Although no specific measure has been identified, maintaining trip time reliability for HOVs is also important.

Support Facilities, Services, and Policies. Successful projects usually include more than just an HOV lane. Marketing and public information programs, park-and-ride/park-and-pool

lots, bus services, rideshare and travel demand management (TDM) programs, employer transportation activities, enforcement efforts, and other elements are commonly associated with well used HOV lanes.

Flexibility and Adaptability. Maintaining flexibility and the ability to adapt to changing conditions in both the development and the ongoing operation of an HOV facility is another important attribute of successful projects. For example, operating policies have been modified on many projects in response to changing conditions or unanticipated circumstances.

Organization of Report

The remainder of this report is divided into five chapters. Chapter Two describes the characteristics of the I-80 and the I-287 corridors, the regulatory environment at the time the projects were being planned, the planning process utilized with both HOV projects, and the recommended plan components. Chapter Three summarizes the experience with implementing and operating the HOV lanes on I-80 and Chapter Four describes the experience with the I-287 HOV lanes. The regulatory environment at the time of implementation is highlighted in each chapter and the experience with implementing, operating, and enforcing the lanes is described, along with the status of supporting facilities, services, and programs. The removal of the HOV designation on I-80 and I-287 is described in Chapter Five. The report concludes with an assessment of the factors that appear to have influenced the decision-making process at various stages and compares the situation in Northern New Jersey with the elements associated with successful HOV projects. The references and supporting documents used in the report are also provided.

CHAPTER TWO—PLANNING FOR THE I-80 AND I-287 HOV LANES

This chapter describes the planning process and the factors contributing to the decision to develop the HOV lanes on I-80 and I-287. The regional setting and the characteristics of both corridors are summarized first. The policy and regulatory environment present at the time the decisions were made to proceed with the HOV lanes are described. The planning process, including the groups involved and the activities conducted, is presented and the recommended plan components area are highlighted.

Regional Setting

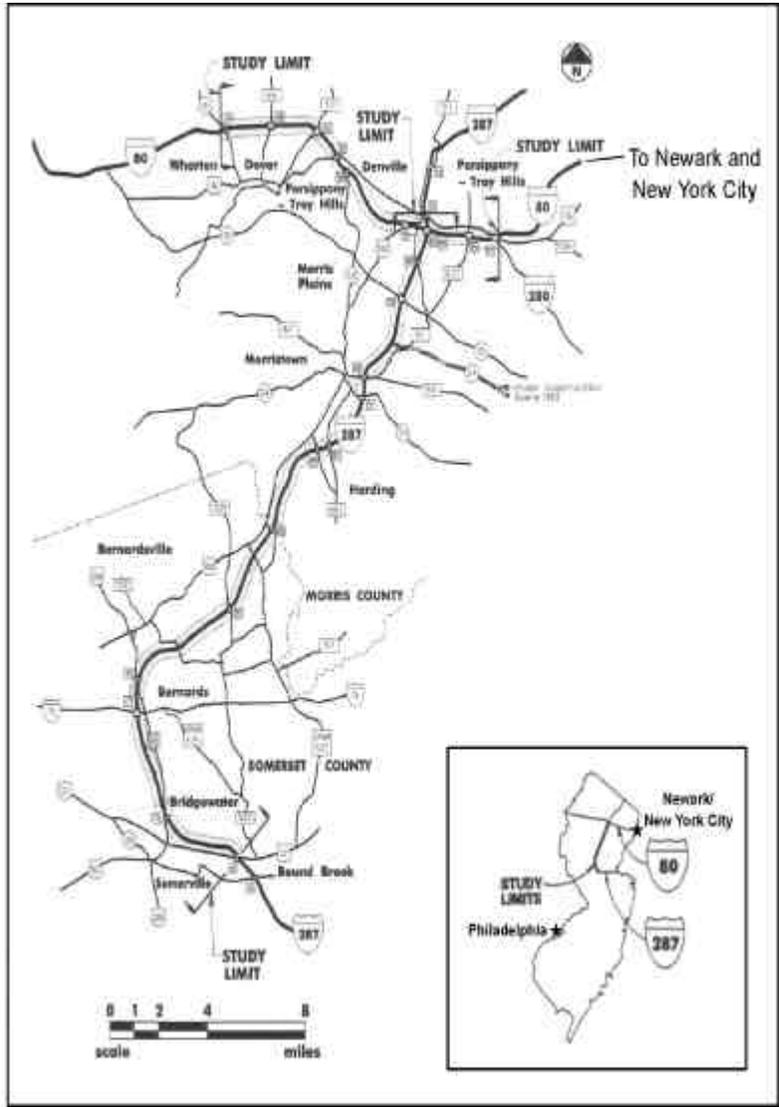
Like other parts of the country, Northern New Jersey experienced significant growth in population, employment, and travel demand in the 1980s and 1990s. These trends resulted in increasing levels of traffic congestion over longer periods of the day on major freeways, including I-80 and I-287. In response to these conditions and projections for continued growth in travel demand, the agencies responsible for the various elements of the transportation system were examining and planning a number of improvements.

Thus, planning for the HOV lanes on I-80 and I-287 did not occur in a vacuum. The planning activities associated with the HOV lanes represented just one of many regional transportation efforts underway at the time. Studies and development activities related to a regional Intelligent Transportation Systems (ITS) plan, the MAGIC incident management system, enhancements to the commuter rail network, the Hudson-Bergan light rail transit (LRT) line, and other roadway, transit, and ridesharing projects were all in progress. Major freeway projects underway included widening sections of I-80, extending I-287 to the north, and extending Route 24.

A variety of public agencies and other groups were involved in planning and developing these projects. These agencies and groups included the New Jersey Department of Transportation, New Jersey Transit, North Jersey Transportation Planning Authority, Inc., New Jersey Turnpike Authority, Federal Highway Administration, Federal Transit Administration, counties, cities, transportation management associations, local groups, and businesses. These efforts were coordinated through ongoing state and metropolitan planning processes, and project specific steering committees. As described later in this chapter, the agencies involved in these projects also participated in planning committees associated with the HOV lanes on I-80 and I-287.

Corridor Characteristics

Figure 1 illustrates the location of the I-80 and I-287 corridors in Northern New Jersey. Both are heavily used freeways serving commuters, travelers, and commercial vehicles. Recurring traffic congestion occurs during the peak-periods and travel demand is projected to increase. The general land use, development, and traffic characteristics for each corridor are summarized next.



(4)
Figure 1. I-80 and I-287 Case Study Corridor Limits.

I-80 Corridor. Interstate 80 (I-80) stretches from New York City to San Francisco. I-80 crosses the northern section of New Jersey from the Hudson River to the Pennsylvania border. The HOV case study focuses on the 11-mile section in Morris County from the I-80/I-280 interchange on the east to the Route 15 interchange on the west.

The I-80 study area is characterized by low density residential, employment, and commercial development. Morris County experienced significant growth during the 1990s, with many new employment centers and residential neighborhoods. Parking at these suburban employment sites is free and relatively plentiful.

The freeway serves a diverse mix of trips and travel purposes. I-80 is a major route for commuters and commercial vehicles entering and leaving the greater New York City metropolitan area. Commute trips originate from communities in Morris County and from areas as far west as Pennsylvania. The freeway also serves the growing employment and commercial developments in Morris County, as well as areas to the south on I-287.

To help address significant recurring traffic congestion during the morning and afternoon peak-periods, a widening program adding a fourth lane in each direction was underway on I-80 at the time the HOV planning study was initiated in 1990. Construction of the fourth lane had actually begun in some sections.

The 1991 a.m. peak hour eastbound traffic volumes on I-80 ranged from 3,200 vehicles west of the Route 15 interchange to 8,700 vehicles (5,050 vehicles in the express lanes and 3,650 in the local lanes) west of the Route I-287 interchange. Approximately 11 percent of all vehicles in the morning peak hour had two or more occupants, while 16 percent of the afternoon peak hour vehicles met this threshold (4).

Approximately 2,500 vehicles entered I-80 eastbound from Route 15 in the a.m. peak hour. Some 2,300 vehicles entered I-80 eastbound from I-287 in the a.m. peak hour and 2,500 vehicles entered eastbound in the p.m. peak hour. In the morning peak hour, 1,200 eastbound vehicles on I-80 exited on the southbound I-287 ramp (4).

Bus service in the I-80 corridor is provided by the private carriers Lakeland Bus Company and Martz Trailways. Service is oriented primarily from communities and park-and-ride lots in the corridor to New York City. In 1991, morning peak-period volumes ranged from 17 buses west of Route 15, to 26 buses on the east end of the corridor. Corresponding p.m. peak-period bus volumes were 40 buses at the eastern end of the study area and 19 buses at the Route 15 interchange. Typically, these buses carried 600 to 900 passengers during each peak-period (4).

Morris County Rides, Inc. (MC Rides), the transportation management association (TMA) in the corridor, provides rideshare matching services in the study area. In addition, some employers offer carpool and vanpool programs, as well as other commute trip assistance activities.

I-287 Corridor. Interstate 287 (I-287) is located in north central New Jersey. It provides a bypass around the greater New York City metropolitan area and serves a growing number of employment centers in the corridor.

The 28-mile HOV case study corridor extends from Route 22 in Somerset County in the south to I-80 in Morris County in the north. The corridor is characterized by low density suburban residential, employment, and commercial developments. During the 1990s a number of corporations located their headquarters in the corridor.

I-287 serves a diverse mix of travel needs. Commuters use I-287 to reach employment centers in the corridor, along I-80, and in the New York City area. Off-peak travel is oriented toward commercial and retail developments. Longer distance trips by both passengers and commercial vehicles use the facility to bypass New York City. This diverse travel mix, coupled with the extension of I-287 to the north, made predicting future trip patterns, congestion levels, bottlenecks, and other factors difficult.

In 1991, I-287 varied from two lanes to four lanes in each direction. South of Morristown, I-287 consisted of primarily two lanes in each direction with a wide, variable-width grass median. A short parallel two-lane section in each direction provided a total of four lanes northbound and southbound between the Route 202/206 and the I-78 interchanges. A more detailed description of the I-287 cross section from south to north is provided next and illustrated in Figure 2 (5). Traffic volumes are heavier in the northern section where fewer lanes are available.

- Two lanes in each direction from Route 22 to South Route 202/206 (3.6 miles).
- Dual-dual roadway section (two 2-lane roadways) totaling four lanes in each direction from South Route 202/206 to I-78 (1 mile).
- Three lanes in each direction from I-78 to North Route 202/206 (1 mile).
- Two lanes in each direction from North Route 202/206 to Madison Avenue/Route 124 (13.7 miles).
- Northbound truck climbing lane (third striped lane within existing outbound shoulder) north of North Route 202/206 interchange (.9 miles) and southbound truck climbing lane south of Harber Road (.5 miles).
- Three lanes in each direction from Madison Avenue to Route 24 (2 miles).
- Four lanes in each direction from Route 24 to Route 10 (1.6 miles).
- Three lanes in each direction from Route 10 to I-80 (2.5 miles).

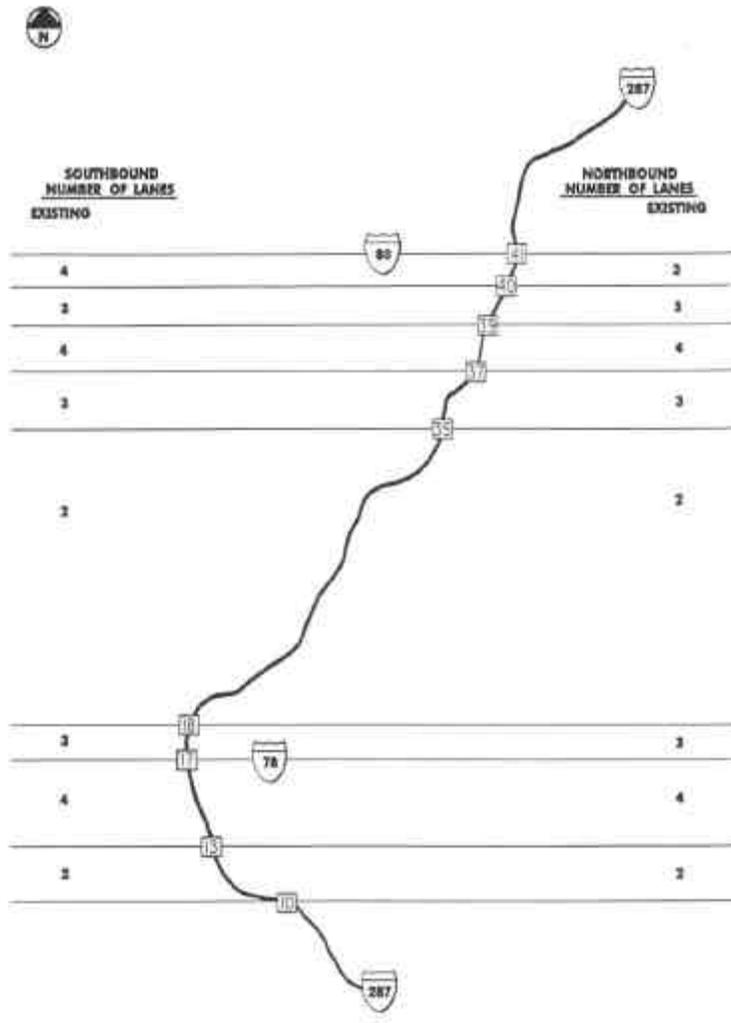


Figure 2. Number of Lanes on I-287 in 1991.

1991 morning peak hour traffic volumes in the northbound direction ranged from 2,800 vehicles on the south end to 5,250 vehicles on the northern section. Morning peak hour volumes in the southbound direction were 2,600 vehicles on the southern section and 6,400 vehicles on the northern segment. The afternoon peak hour volumes were relatively similar, but in the opposite direction of travel. Thus, the freeway sections with only two or three lanes in each direction experienced the highest travel demands, creating bottlenecks resulting in significant levels of traffic congestion.

The directional split of traffic on I-287 varied by time of day and freeway segment. The directional split during the morning peak hour was 60 percent northbound/40 percent southbound in the southern and middle sections and 45 percent northbound/55 percent southbound in the northern section. The afternoon peak hour directional split was 45 percent northbound/55 percent southbound in the southern and middle sections and 55 percent northbound/45 percent southbound in the northern segment.

Vehicle-occupancy counts on I-287 in 1991 indicated that seven to eight percent of all vehicles had two or more occupants in the morning peak-period and 12 to 13 percent of all vehicles in the afternoon peak-period carried two or more people. Few buses operated on I-287 in 1991. Classification counts identified one bus northbound during the a.m. peak-period and 15 buses southbound in the p.m. peak-period. No fixed routed bus service was operated in the corridor. Rideshare services are provided by MC Rides and Ridewise of Raritan Valley, and some employers offer additional programs (5).

Policy and Regulatory Environment

Federal and state policies influenced consideration of the HOV lanes on I-80 and I-287. These included the 1990 Clean Air Act Amendments and the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) at the federal level and the New Jersey Traffic Congestion and Air Pollution Control Act, the New Jersey Employee Trip Reduction Program, and other efforts at the state level. The key elements of these Acts and programs are highlighted next.

1990 Clean Air Act Amendments. The 1990 Clean Air Act Amendments contain a number of transportation-related requirements. The 1990 Amendments strengthen many provisions of the 1970 Clean Air Act and incorporate new measures aimed at reducing air pollution levels, especially in areas not meeting federal air quality standards. A number of requirements address lowering transportation-generated air pollution by reducing vehicle miles of travel (VMT) and increasing vehicle-occupancy levels.

The 1990 Amendments establish the criteria for attaining and maintaining the National Ambient Air Quality Standards for Ozone (O₃), Carbon Monoxide (CO), and small particulate matter (PM₁₀). Metropolitan areas not meeting the standards are classified as extreme, severe, serious, moderate, and marginal in the case of Ozone, or serious and

moderate in the case of CO and PM₁₀, depending on the severity of the air quality problem. The Amendments contain specific requirements and schedules for each non-attainment category. All of New Jersey is classified as an ozone non-attainment area. Northern New Jersey, except Warren County on the Pennsylvania border, is classified as a serious non-attainment area. Warren County falls within the marginal non-attainment category.

The Employer Trip Reduction (ETR) program was one component of the 1990 Amendments, and was further defined in subsequent rules promogated by federal agencies. The ETR program required employers in extreme and severe non-attainment areas with 100 or more employees to develop and implement programs to reduce VMT and to increase vehicle-occupancy levels for employees arriving at work sites between 6:00 a.m. and 10:00 a.m. Specific deadlines for employers to file plans and implement programs were provided. Progress toward meeting the standards was to be monitored annually.

Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. The ISTEA provided funding authorization for federal highway, highway safety, and public transportation programs for the six-year period from 1992 through 1997. It also represented a significant change in the vision, direction, and policies governing the surface transportation system. The ISTEA, and subsequent rules, implemented many of the transportation-related requirements of the 1990 Clean Air Act Amendments.

Provisions of the ISTEA, and subsequent rules, addressed planning and project selection at the metropolitan and the statewide levels. Metropolitan planning organizations (MPOs) were given more responsibilities, and additional requirements were placed on the metropolitan project and development process. The ISTEA reconfirmed the MPO as the agency responsible for preparation of the long-range transportation plan and the transportation improvement program (TIP). The ISTEA included 15 factors to be addressed in the long-range planning process, required that TIPs be financially constrained, and provided new requirements for public involvement and participation. It also created a new category of MPOs, called Transportation Management Areas (TMAs), in metropolitan areas with over 200,000 population.

The ISTEA also influenced the statewide planning and project selection process. It required statewide transportation plans and programs addressing all modes. Ten factors were identified for consideration in the long-range plan and the state implementation plan (SIP), which were to be coordinated with metropolitan plans. The ISTEA also contained additional requirements for public participation in the statewide planning process. Further, it required the development and implementation of management systems addressing the six areas of pavements, bridges, highway safety, congestion, public transportation facilities and equipment, and intermodal facilities and systems. These six management systems, along with a highway traffic monitoring system, were to be implemented by 1995.

New and modified programs included the National Highway System (NHS), the Surface Transportation Program (STP), and the Congestion Mitigation and Air Quality Improvement (CMAQ) program. The CMAQ program directed funding to transportation projects addressing air quality issues in ozone and carbon monoxide non-attainment areas.

New Jersey Traffic Congestion and Air Pollution Control Act. This Act, passed in 1993, was aimed at addressing traffic and air quality issues in the state. Many of the provisions included in the Act reflected programs and policies contained in the 1990 Clean Air Act Amendments and the 1991 ISTEA.

The New Jersey Employee Trip Reduction Program was one of these elements. Modeled after the federal ETR program, it required employers in the state with 100 or more employees to develop plans and programs to reduce work trips and VMT. A schedule for the demonstration and the implementation of plans was outlined.

Employers in New Jersey with over 100 employees developed ETR plans in the early 1990s in response to these requirements. The planning process included surveys of workers, assessments of alternatives, and identifying action steps to accomplish the target goals.

New Jersey Transportation Executive Council. This group was formed in the late 1980s to examine mobility issues in various parts of the state. The Council was comprised of representatives from state agencies, local jurisdictions, businesses, and other groups. The Council reflected an interest on the part of the Governor to address traffic and mobility concerns. A 1990 report from the Council supported the need to move more people, not more vehicles, and encouraged consideration of public transit and HOV lanes on freeways, including I-80 and I-287 (6).

The requirements in these Acts and policies were used in the planning process to help estimate demand for the HOV lanes on I-80 and I-287. Many of these policies and regulations were relaxed, modified, or changed in subsequent years. For example, the ETR program requirements were changed from mandatory to voluntary at both the federal and the state levels, the management systems initially mandated in the ISTEA became optional, and the metropolitan and statewide planning factors were modified in subsequent legislation. These changes in the policy and regulatory environment, which are described more fully in Chapter Four, lowered the potential use of the HOV lanes.

Planning Process

The HOV lane feasibility studies on I-80 and I-287 were undertaken by NJDOT in response to increasing levels of traffic congestion, limited resources, air quality considerations, and direction from the New Jersey Transportation Executive Council. The planning process used in both corridors followed similar steps, although there were a few differences. The I-80 study was conducted first and focused on assessing if the lanes under construction on I-80 should be reserved for buses,

vanpools, and carpools during peak commuting periods. The I-287 feasibility study followed and examined whether the additional lanes being considered should be dedicated to HOVs during the morning and afternoon peak-periods.

Both studies used a multiagency Steering Committee to provide oversight and direction. The I-80 Steering Committee included representatives from NJDOT, Federal Highway Administration (FHWA), New Jersey Turnpike Authority (NJTA), New Jersey Transit (NJT), New Jersey State Police, North Jersey Transportation Coordinating Council, Morris and Somerset Counties, and Morris County Rides, Inc. The I-287 Steering Committee was comprised of representatives from NJDOT, FHWA, NJTA, NJT, New Jersey State Police, North Jersey Transportation Coordinating Council, Morris and Somerset Counties, Morris County Rides, Ridewise of Raritan Valley, and AT&T.

A four step planning process was used on both the I-80 and the I-287 HOV feasibility studies. The major elements included in each stage — preliminary concept viability, alternative identification, development of recommended alternatives, and project documentation — are highlighted next.

Preliminary Concept Viability. The first step in both studies was an initial assessment of the viability of an HOV lane using a fatal flaw or concept viability analysis technique. Table 1 highlights the 14 criteria in the I-80 study and the 15 criteria in the I-287 analysis. NJDOT staff members and the steering committees discussed and agreed on these criteria.

The I-287 criteria were slightly different from those used in the I-80 study. As shown in Table 1, five primary criteria were applied rather than two. In addition to the two criteria of congestion and travel time savings used in the I-80 analysis, two secondary criteria – person throughput and vehicle throughput – were moved up to the primary category and a new criteria of fundability/environmental issues was added. Some minor modifications were also made in the remaining ten criteria. In addition, the I-80 assessment applied these criteria to the full study area, while they were examined for the north, middle, and south sections of I-287 based on the differences in cross sections and travel characteristics in the corridor.

A variety of data was collected and examined to support the concept viability screening. Traffic data included automated traffic recorder (ATR) counts, manual occupancy and vehicle classification counts at key mainline and ramp locations, and turning movement counts at major intersections along parallel routes. Other activities included origin-destination studies at selected locations, public attitude surveys, and interviews with key policy makers and executives. Information from these sources was used in both the initial concept viability assessment and the more detailed examination of alternatives in stages two and three.

Table 1. HOV Lane Concept Viability Criteria.

I-80 HOV Lane Feasibility Study	I-287 HOV Lane Feasibility Study
<u>Primary Planning Criteria</u>	<u>Primary Planning Criteria</u>
1. Congestion	1. Congestion
2. Travel Time Savings	2. Travel Time Savings
	3. Person Throughput
	4. Vehicle Throughput
	5. Fundability/Environmental Issues (if applicable)
<u>Secondary Planning Criteria</u>	<u>Secondary Planning Criteria</u>
3. Person Throughput	6. Facility Orientation
4. Vehicle Throughput	7. Local Agency and Public Support
5. Facility Orientation	8. Enforceability
6. Local Agency and Public Support	9. Effectiveness
7. Enforceability	10. Roadway Characteristics
8. Cost Effectiveness	
9. Physical Roadway Characteristics	
<u>Supportive Planning Criteria</u>	<u>Supportive Planning Criteria</u>
10. Support Facilities	11. Support Facilities and Programs
11. Bottleneck Bypasses ¹	12. Bottleneck Bypasses ¹
12. System Development ¹	13. System Development ¹
13. Staging Improvements	14. Staging Improvements
14. Environmental Issues	15. Environmental Issues

(4, 5)

¹ Criteria specific to selected sites or segments.

HOV lanes were found to be viable concepts for more detailed consideration on I-80 and for some segments of I-287. Twelve of the 14 criteria were met on I-80, with support facilities, system development, and environmental issues identified as needing further study before a final assessment was possible. On I-287, the southern segment from Route 22 to I-78 did not meet any of the five primary criteria and was dropped from further consideration. The middle segment from I-78 to Route 24 met nine criteria, conditionally met three criteria, did not meet one criteria and part of another, and one criteria required additional analysis. The northern segment from Route 24 to I-80 met all of the criteria except support facilities/programs and staging improvements, which were identified as requiring further examination.

Alternative Identification. The development and evaluation of HOV lane alternatives occurred in this step. Line haul, queue bypass, and metered freeway entrance ramp options were all considered. The exact alternatives varied slightly between the two corridors. The project limits, operating characteristics, supporting facilities and services, enforcement techniques, and other elements were also identified and evaluated.

Staff from NJDOT and the Steering Committees reviewed the detailed analysis, and the most feasible options were selected. In the I-80 study two HOV alternatives emerged from this analysis. These were concurrent flow HOV lanes operating in the peak-periods/peak direction of travel, and isolated HOV queue bypass lanes operating on selected ramps at the I-80/I-287 interchange during the peak-periods. A two person (2+) vehicle occupancy requirement was recommended with both alternatives.

The I-287 study recommended peak-period concurrent flow HOV lanes (2+ occupancy requirement) in the section between I-78 and I-80, interim HOV queue bypasses on selected ramps at the I-80/I-287 interchange, future HOV direct flyover ramps between the two freeways, and access improvements at the I-78/I-287 interchange. The HOV queue bypasses within the I-80/I-287 interchange included widening the eastbound I-80 to southbound I-287 ramp and the northbound I-287 to westbound I-80 ramp. The envisioned flyover ramp would serve movements from eastbound I-80 to southbound I-287 and northbound I-287 to westbound I-80. Additional recommendations to improve the flow of both general purpose and HOV traffic included reconstructing and extending the northbound truck climbing lane from Route 202/206 to Mt. Airy Road and adding a general purpose lane in each direction between Route 22 and I-78.

Development of Recommended Alternatives. A more detailed refinement and analysis of the recommended alternatives was conducted in this step. Design elements, operating strategies, public information and education programs, and supporting elements were considered. The recommended plan was finalized for presentation to the NJDOT Commissioner. The specific elements of the recommended plans for I-80 and I-287 are described in the next section.

Project Documentation. Reports documenting the results of the previous three steps and presenting the recommended plan components were prepared on both projects in the final step. The reports were transmitted to the NJDOT Commissioner for concurrence and action.

As noted above, the preliminary concept viability stage included interviews with 23 business leaders and community representatives, and a telephone survey of 1,201 adults living in the I-80 and I-287 study corridors in May and June 1991. These activities were undertaken to assess attitudes regarding traffic congestion levels and HOV alternatives in the two corridors, to heighten awareness of HOV treatments, and to identify opportunities to build community awareness and support for HOV options. Participants in the telephone survey were selected randomly and the sample size was statistically representative of the population at a 95 percent confidence level. The major findings from the surveys and interviews are highlighted next.

- Traffic congestion was identified as a problem on I-80 by residents and executives. Sixty-one percent of the respondents considered I-80 extremely congested during peak hours and most executives voiced similar opinions.
- Telephone respondents indicated that travel time savings of at least 20 minutes would be necessary to encourage commuters to use an HOV lane. Individuals voicing opposition to an HOV alternative indicated they would consider changing modes only if the travel time savings were 30 minutes or more. Executives generally supported a 15 to 20 minute travel time difference for a successful HOV lanes.
- A 2+ occupancy requirement and a peak-period operating period were supported by all but three of the executives. Preferences on vehicle occupancy levels and operating hours were not addressed in the telephone survey.
- Executives viewed enforcement as a critical element to the successful operation of an HOV facility. Fines in the \$25 to \$75 range were supported by most executives.
- Overall, residents and executives reflected positive attitudes about HOV lanes. Seventy-two percent of the telephone respondents “favor strongly or favor somewhat” building HOV lanes, 65 percent indicated HOV lanes are “very or fairly effective” at easing traffic congestion, and 53 percent “favored strongly or favored somewhat” construction of HOV lanes on I-80.
- Sixty percent of the telephone respondents preferred allocating funding to improvements that benefit everyone, and fewer than 25 percent were completely convinced that HOV lanes relieve traffic congestion for all travelers.

- Fifty-eight percent of those surveyed had not heard of ramp metering. After an explanation of the concept, 54 percent expressed opposition to ramp metering on freeways.
- There was general support among executives and residents for park-and-ride lots and bus services.
- Although there were slight differences in the responses from Morris and Somerset County residents, the programs and incentives rated as most likely to encourage bus or carpool use were; financial bonus to leave car at home, substantially reduced commute time, free or lower trip costs, more predictable travel times, access to an automobile at work, parking and bus service close to home, and preferential parking at work.
- Executives voiced the need to take a regional perspective with HOV facilities and other strategies and to identify how these techniques fit into the overall transportation vision for the area.
- Survey respondents voiced strong agreement that using the bus saves energy. There was less agreement that riding the bus or carpooling saves money, uses time more productively, or avoids having to buy another car.
- Executives identified the dispersed travel patterns in the region as a potential problem for transit services, carpools, and HOV facilities. This concern was supported by the survey respondents, who listed a diverse mix of origins and work trip destinations.
- The need for ongoing public education and outreach activities to explain and promote HOV facilities was identified as important by both the survey respondents and the executives.
- Increasing the number of lanes was perceived to be the most effective traffic management option by survey respondents. Other strategies in order of perceived effectiveness were public transportation, encouraging carpooling, faster bus or rail service, building special lanes, and employer tax breaks.

Recommended HOV Lane Plan Components

The results from the planning process on both I-80 and I-287 recommended the implementation of concurrent flow HOV lanes, with a 2+ vehicle-occupancy requirement. The HOV designation was recommended for the morning and afternoon peak-periods, with the lanes open to general-purpose traffic at other times. In addition to the HOV lanes, both plans outlined needed

supporting facilities, services, programs, and policies. The major elements contained in the two plans are described in this section.

Recommended I-80 HOV Lane Plan. The I-80 plan recommended reserving the fourth lane under construction in each direction for HOVs during the morning and afternoon peak-periods in the peak direction of travel. The new inside lane would be opened to buses, vanpools, and 2+ carpools from Route 15 to just east of the I-280 interchange in late 1994, upon completion of the I-80 widening project. The plan estimated that 900 to 1,100 eligible vehicles carrying 2,250 to 2,750 passengers would use the HOV lane in the eastbound direction during the morning peak hour and 1,300 to 1,500 vehicles with 3,250 to 3,750 passengers would use it in the westbound direction in the afternoon peak hour. Travel time savings of 12 to 14 minutes per trip were estimated.

HOV queue bypasses were recommended for the I-287 northbound to I-80 eastbound and the I-80 westbound to I-287 southbound movements at the I-80/I-287 interchange. These improvements were estimated to provide HOVs with travel time savings of 5 to 10 minutes. Between 220 and 360 HOVs were anticipated to use these bypasses during the peak hours.

Supporting facilities and services were recommended in the plan, although these were not defined in great detail. In most cases, the plan identified the general scope of these elements and recommend more detailed studies. The following supporting elements were included in the plan.

- **Park-and-Ride Facilities.** Adding new small park-and-ride lots, with 20 to 30 spaces, in the western part of the corridor and expanding existing lots currently at capacity were recommended. The trip origins of potential carpools were identified, but no specific recommendations were included on new lots or expanding existing facilities.
- **Marketing and Public Information Program.** Developing and implementing a strategic marketing plan for the I-80 HOV lanes was recommended. Issues identified to be addressed in the marketing plan included the diverse trip patterns of potential users, possible negative perceptions based on the experience with the Garden State Parkway HOV demonstration, and promoting the HOV lane as part of the larger vision for transportation improvements in the area. A general schedule with key milestones for developing and implementing a marketing program was provided in the plan.
- **Enforcement.** The plan identified the need for extra enforcement personnel to patrol the HOV lanes, especially during the first months of operation. Funding of \$450,000 for the first year of operation and \$400,000 in subsequent years was included in the plan, but no specific enforcement techniques were outlined.

- **Monitoring Program.** An ongoing data collection and analysis program was recommended during the implementation and full operation of the HOV lanes. The program was targeted to provide information to help ensure the safe and efficient operation of the I-80 HOV lanes and to assist with planning other facilities in the state.

The plan also addressed additional corridor and areawide issues. These included conducting a regional HOV system planning effort, improving incident management, regulating commercial vehicles, enhancing motorist information, considering ramp metering, and utilizing TMAs to help promote ridesharing, TDM, and other programs. Issues identified for continuous monitoring during the initial operation of the project included operating hours, enforcement levels, supporting facilities, funding, and strategies at the I-80/I-287 interchange.

Recommended I-287 HOV Lane Plan. The *I-287 HOV Lane Feasibility Study* recommended line haul HOV treatments, HOV ramps at the I-80/I-287 interchange, access improvements at the I-78/I-287 interchange, and supporting components. The plan elements reflected design limitations, physical constraints, and travel characteristics in different parts of the corridor.

The plan recommended reserving the new lanes on I-287 between I-78 and I-80 for HOVs during the peak-periods. The hours of HOV operation were northbound from 6:00 a.m. to 9:00 a.m. from I-78 to Morristown and from 6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 7:00 p.m. between Morristown and I-80, and southbound from 6:00 a.m. to 9:00 a.m. and 3:00 to 7:00 p.m. between I-80 and Morristown and 3:00 p.m. to 7:00 p.m. between Morristown and I-78. Approximately 600 to 1,200 vehicles were projected to use the lane during the peak hour, and up to 12 minutes in travel time savings were estimated for users.

The recommendations for the I-80/I-287 interchange built on those contained in the *I-80 HOV Lane Feasibility Study*. Plan elements included an interim ramp widening with a permanent flyover ramp for northbound I-287 to eastbound I-80, ramp widening for westbound I-80 to southbound I-287, and a flyover ramp for eastbound I-80 to southbound I-287. Access improvements for general purpose traffic were recommended for the eastbound I-78 to northbound I-287 movement at the I-78/I-287 interchange.

The plan presented a staged construction program for the northbound and southbound lanes. The northbound lane from the Passaic River to I-80 and the northbound I-287 to eastbound I-80 interim ramp widening were scheduled first, followed by the northbound lane from the Passaic River to I-78. The southbound lane from I-80 to I-78 and the westbound I-80 to southbound I-287 ramp widening were scheduled next, and the last segment was the westbound I-80/I-287 queue bypass flyovers.

The plan identified the following elements for further analysis and development.

- A major public education and marketing program was recommended. This effort was viewed as especially important because of the initial low HOV volumes estimated in some sections.
- The plan identified the need for park-and-ride facilities to encourage carpool and vanpool use. A more detailed market area analysis was recommended to better define possible locations for these facilities.
- Providing support for TMAs, employers, and other groups was also highlighted.
- Identify and commit funds for dedicated police patrols to monitor the HOV lanes.
- Ongoing and monitoring and evaluation program and for reassessing operating requirements based on experience.

CHAPTER THREE—IMPLEMENTATION AND OPERATION OF THE I-80 HOV LANES

The fourth lane on I-80 from Route 15 to I-287 was opened with a peak-period 2+ HOV designation in March 1994. This chapter summarizes the policy and regulatory environment in New Jersey at that time, the public information and marketing efforts undertaken to promote use of the HOV lanes, and the experience with implementing, operating, and enforcing the lanes. The status of supporting facilities, services, and policies is also highlighted.

Policy and Regulatory Environment

The policy and regulatory environment in New Jersey in late 1993 and early 1994 focused on implementing the major provisions of the Clean Air Act Amendments, the ISTEA, and the New Jersey Traffic Congestion and Air Pollution Control Act. Employers with 100 or more employees were completing ETR plans, identifying how they would meet the required 25 percent reduction in employee generated VMT. Environmental issues and support for ETR, TDM, and transit programs were priorities of the Governor. These priorities were reflected in policies pursued by the NJDOT Commissioner and programs undertaken by the Department. NJDOT's Bureau of Suburban Mobility in the Division of Transportation Assistance provided marketing for ridesharing efforts, a statewide toll-free ridematching service, training and funding for TMAs and local rideshare agencies, vanpool leasing, and promotion of bicycling and pedestrian activities. Statewide marketing efforts promoting transportation alternatives included public service campaigns in conjunction with utility and cable television companies, brochures, posters, fliers, rideshare displays, rideshare month, and other activities.

Public Information and Marketing

A variety of public information and marketing activities were used to introduce the I-80 HOV lanes and to promote carpooling, vanpooling, and riding the bus. The campaign included radio and newspaper advertisements, direct mail flyers, and other techniques.

Press coverage was generally positive during the operation of I-80 from 1994 through 1998. The travel time savings realized by carpoolers and bus riders were highlighted in periodic articles. Trucks traveling in the third lane and the lane changes required between the interchanges and the HOV lane were the two issues most frequently highlighted in the media. Concerns raised by motorists in letters to the editor and correspondence with NJDOT focused on not being able to use the HOV lane when it was underutilized and paid for by tax dollars.

Implementation

As noted previously, consideration of HOV lanes on I-80 was initiated after the decision had been made to add a fourth lane. Construction of the additional lanes was approaching completion prior to the recommendation to reserve them for HOVs during the peak-period. Funding for the new lanes came from the state's allocation under the Federal-Aid Highway Program. Although the fourth lane in each direction was completed in sections, significant steps were taken by NJDOT and the contractors to prevent traffic from using the new lanes until the full length was opened. These measures included placing cones and other traffic control devices to block access to the lanes and deferring the final pavement overlay to the very end of the construction phase.

Operation

The I-80 HOV lanes were open to traffic on March 7, 1994. The new fourth lane between Route 15 and I-280 was reserved for buses, vanpools, and 2+ carpools in the peak-periods, peak-direction of travel. The HOV authorization was in effect eastbound from 6:00 a.m. to 9:00 a.m. and westbound from 3:00 p.m. to 7:00 p.m. on weekdays. The lanes were open to general purpose traffic at other times.

No buffer separated the completed HOV lanes from the adjacent travel lanes, and HOV traffic was able to enter and exit the lane at any point. The HOV lane pavement was marked with the diamond symbol. Overhead and ground mounted signs provided information of the HOV designation, operating hours, and occupancy requirements.

Travel time savings for individuals using the HOV lanes averaged approximately three minutes in both the morning and the afternoon peak hours. Greater time savings were observed or recorded on a number of days, however, due to accidents or incidents in the general-purpose lanes. Informal interviews with a few bus operators and vanpool drivers indicated perceived travel time savings of 15 to 20 minutes (7).

Morning peak hour volumes in the I-80 HOV lane averaged 960 vehicles during the first few weeks after the facility was opened in March 1994. Utilization levels declined slightly over the next two years, with morning peak hour volumes averaging between 860 and 900 vehicles, before increasing again. Some 870 vehicles used the HOV lane in the afternoon peak hour immediately after opening. After a slight decline during the first year of operation, afternoon use levels increased in the second year to an average of 890 vehicles. Utilization levels continued to increase over time, with afternoon peak hour counts ranging from 1,000 to 1,400 vehicles (7, 8).

The percentage of vehicles with two or more occupants on I-80 during the morning peak-period increased during the first two years of operation. The percent of 2+ carpools in the a.m. peak-period increased from 10.2 percent to 13.4 percent in the morning eastbound direction and from 14.6 percent to 16.9 percent in the afternoon westbound direction. The average vehicle occupancy

(AVO) for the full freeway – HOV and general-purpose lanes – increased slightly from 1.23 to 1.25 in the a.m. peak hour and from 1.23 to 1.26 in the p.m. peak hour following the opening of the HOV lanes. The AVO for both the morning and afternoon peak hours averaged 1.30 over the life of the project, although variations in counts ranged from 1.23 to 1.38 (8).

The I-80 HOV lanes were generally well received by the public. Use levels exceeded the forecasted volumes. The 1,000 to 1,400 vehicles using the lane in the p.m. peak hour were in line with those found on the better utilized HOV lanes in North America and approximated the operation capacity of the lane. As noted next, ongoing enforcement activities kept violation rates relatively low. Overall, the HOV lanes on I-80 operated well, experienced high use levels, and enjoyed general public support.

Enforcement

As noted in the previous chapter, enforcement was considered in planning and designing the I-80 HOV lanes. The cross-section for the I-80 HOV lanes included a nine foot inside shoulder. Enforcement areas for New Jersey State Police to observe traffic and stop violators were provided every three to four miles by widening the shoulder and adding continuous illumination.

Extra enforcement was provided by the State Police during the first seven months of operation. Troopers assigned to I-80 during the morning and afternoon peak-periods stopped vehicles traveling in the HOV lane without two people. Only warnings were issued during the first two weeks of operation. After this two-week grace period, a \$60 traffic ticket and two infraction points on the driver's record were issued.

In October 1994, enforcement levels were reduced from daily to three days a week. The enforcement program was modified to three random mornings and three random afternoons with four patrol cars in February 1995. A further change was made in July 1995 with three patrol cars monitoring the lanes during four a.m. random and four p.m. random periods. This final change was made to spread the same personnel resource over four days rather than three.

As shown in Table 2, violation rates on the I-80 HOV lanes ranged from a low of 4.7 percent to a high of 21.5 percent. Violation rates over the first seven months averaged approximately seven percent in the morning and six percent in the afternoon peak-periods. The number of violators increased significantly, especially in the p.m. peak-period, when the three-day enforcement set enforcement schedule was in use. Drivers seeing no State Police vehicles in the morning would use the lane in the afternoon knowing that extra enforcement would not be present. Violation rates declined with the implementation of the random enforcement.

Supporting Facilities, Services, and Programs

Information examined in the *I-80 HOV Lane Evaluation Study* on the use of park-and-ride lots, bus services, and ridership levels is summarized in this section. The number of vehicles parked at 10 park-and-ride lots in the corridor was monitored before implementation of the I-80 HOV lanes, after one year of operation, and after two years. A new park-and-ride lot was opened in 1994, with use levels recorded during the second year of HOV lane operation.

A total of 1,241 parking spaces were available at these lots. As highlighted in Table 3, the largest lot contained 246 spaces, while the smallest provided space for 46 automobiles. Use of the park-and-ride lots in the corridor increased by 57 vehicles, or 12 percent, over the two-year period. Overall, utilization increased from 41 percent before the HOV lanes were opened to 44 percent two years later. Use levels grew at six lots, while the number of vehicles parked at five lots declined or remained the same. Only the Blue Heron lot was over capacity two years after the lanes were opened.

Table 2. Violation Rates on the I-80 HOV Lanes.

Enforcement Technique	Dates	Average Number of Violators (percentage²) A.M. Peak Period	Average Number of Violators (percentage²) P.M. Peak Period
Five Days A Week	March-September 1994	165 (6.9%)	190 (6.0%)
Three Days a Week	October 1994-January 1995	210 (9.7%)	525 (21.5%)
Six Random Peak-Periods a Week	February-June 1995	80 (4.7%)	125 (5.6%)
Eight Random Peak-Periods a Week	June 1995-	175 (7.5%)	205 (6.9%)

¹Vehicles not meeting the two-person occupancy requirement.

²Percentages are violation rates of total HOV lanes volumes (7).

Table 3. Park-and-Ride Lot Use in the I-80 Corridor.

Park-and-Ride Facility	Capacity	Occupancy		
		Before	After One Year	After Two Years
Blue Heron	50	33	48	52
Byram	40	29	30	26
Denville	130	37	33	37
Hope	46	27	31	36
Netcong	246	157	158	160
Rockaway Borough	90	31	26	26
Sparta Municipal Building	95	37	22	18
Rockaway Townsquare Mall	200	63	73	82
Sterli Court*	50	–	–	30
Washington Township	94	13	22	20
Newton	200	56	56	53
Total Utilization	1,241	483	499	540
Percent Utilization	–	41%	42%	44%

*Sterli Court opened in November 1994.

(7)

Bus use of the I-80 HOV lanes was also monitored as part of the initial evaluation. The number of buses operating on the freeway before the lanes were open and the number on the HOV lane after opening were recorded during the field data collection. Additional telephone interviews were conducted with bus operators to obtain additional information on service and passenger levels. The number of transit and school buses operating on the freeway in the morning peak-period increased from 33 before the HOV lanes were open to 57 after the lanes were completed. In the afternoon peak-period, bus volumes increased from 42 to 66.

CHAPTER FOUR—IMPLEMENTATION AND OPERATION OF THE I-287 HOV LANES

The I-287 HOV lanes opened in their entirety in January 1998. The experience implementing and operating the I-287 HOV is discussed in this chapter. As highlighted, policy and regulatory environment in 1998 was different than the situation in 1994 when the I-80 HOV lanes were open. Also as described, problems were encountered during the implementation phase and utilization levels after the lanes opened were lower than projected.

Policy and Regulatory Environment

The federal and state policy and regulatory environment in 1998 reflected different priorities from those earlier in the decade. At the federal level, the ETR program was changed from mandatory to voluntary in 1996. The New Jersey program followed suit in 1996. Most employers backed off planned programs to promote transportation alternatives. As a result, few efforts were underway to encourage ridesharing when the I-287 HOV lanes were opened. The Transportation Equity Act for the 21st Century (TEA-21) was passed by Congress and signed by the President in June 1998. Although maintaining most elements contained in the ISTEA, TEA-21 altered provisions relating to the metropolitan and statewide planning factors. This legislation specified the exact limitations of the project and that funds could only be used for constructing HOV lanes. Changes in state government also occurred between opening of the I-80 HOV lanes and the I-287 facilities.

Public Information and Marketing

An extensive public information and marketing program was used to promote use of the I-287 HOV lanes. The slogans “The Diamond Express Lanes” and “HOV, A Smart Move” provided the focus for the campaign. The marketing program included newspaper advertisements, radio spots, and cable television support. Information materials were provided to the TMAs and other groups in the corridor. Coffee mugs, t-shirts, and other promotional items were also distributed in a limited way. The radio spots won a state-wide marketing award in 1998.

Implementation

Funding for the new HOV lanes on I-287 was provided through an earmark in the annual federal transportation appropriations. Thus, unlike the lanes on I-80, which were funded through the state’s normal allocation of Federal-aid funds, the HOV lanes on I-287 were specifically identified in federal legislation.

Construction of the HOV lanes on I-287 occurred in stages over a six year period. The HOV designation was initially applied as segments of the new northbound lanes were completed. The central northbound section, from North Maple Avenue to South Street, opened in December 1995,

followed by the northern section from South Street to I-80 in August 1996. Construction on the southbound HOV lane from I-80 to North Maple Avenue was underway in 1996, with the final northbound and southbound sections from I-78 to North Maple Avenue to follow. Construction of the new general purpose lane in each direction from Route 22 to I-78 was also underway in late 1996.

Due to concerns related to the impact of construction activities through the corridor on traffic flow in all lanes, the HOV lane designation on the northbound segments was temporarily suspended and general purpose traffic was allowed to use the lane. The suspension was in effect from September 1997 to January 1998 when the HOV lanes in both directions were opened. It appears that motorists may have felt that the HOV lanes were causing additional congestion during construction. The temporary suspension allowed all vehicles to use the northbound lane for a five month period.

Operation

The carpool designation and operating schedule recommended in the feasibility study was implemented when the full HOV lanes were opened in January 1998. A 2+ vehicle-occupancy requirement was used during the following HOV operating hours.

- 6:00 a.m. to 9:00 a.m. – Northbound from I-78 to I-80.
- 6:00 a.m. to 9:00 a.m. – Southbound I-80 to Morristown.\
- 3:00 p.m. to 7:00 p.m. – Southbound I-80 to I-78.
- 3:00 p.m. to 7:00 p.m. – Northbound Morristown to I-80.

As illustrated in Figure 3, these operating hours served two general markets. The first approach served peak-direction travel during the morning peak hours in the northbound direction and in the southbound direction in the afternoon peak hours for the full 20 miles from I-80 to I-78. The HOV designation on the northern section served HOVs using I-80 with destinations in the Morristown area. The HOV designation was in effect from I-80 to Morristown in the “reverse direction” from 6:00 a.m. to 9:00 a.m. southbound and 3:00 p.m. to 7:00 p.m. northbound.

Overall utilization of the I-287 HOV lanes during the full operation ranged from 330 to 650 vehicles. During the morning peak hour, some 330 vehicles used the HOV lanes northbound at Route 24. These figures reflect the concurrent flow operating period. In the afternoon, this location represented the northbound opposing-flow operation. Some 650 vehicles used the lane during the p.m. peak hour. Use levels in both directions increased slightly from the initial partial opening of the lane. In the a.m. peak hour the increase was from 230 to 330 vehicles and for the p.m. peak hour the growth was from 500 to 650 vehicles (8). These levels were below the estimate of some 700 vehicles during the peak hour.

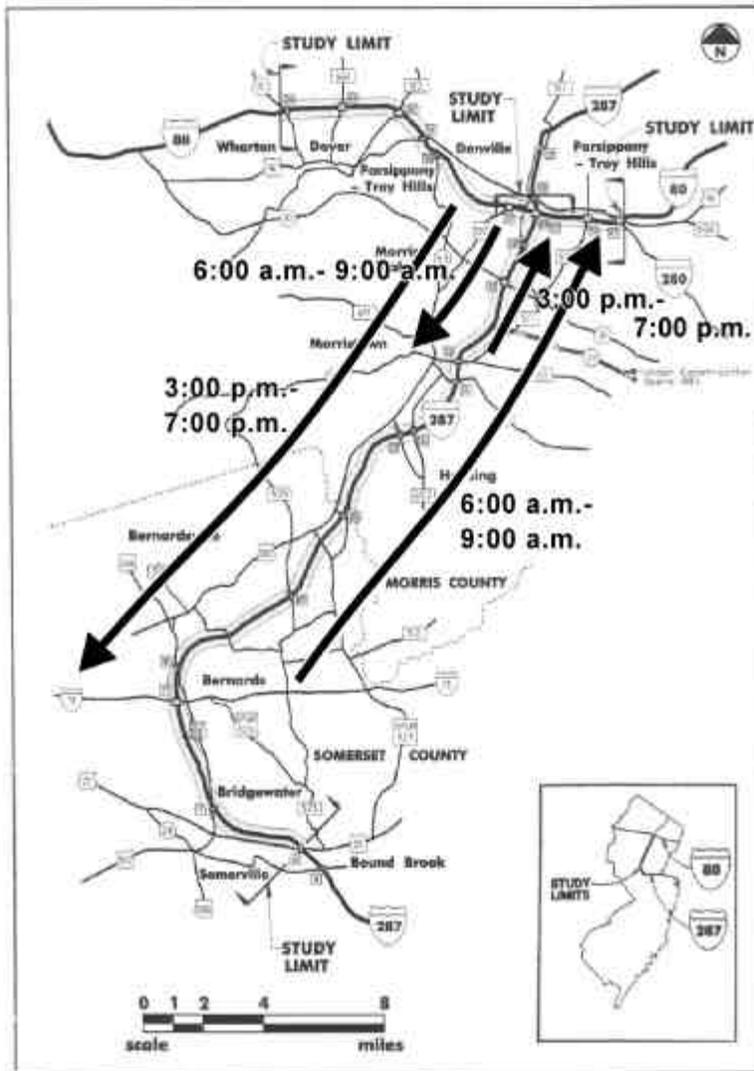


Figure 3. I-287 HOV Operations.

- The average vehicle occupancy (AVO) for the full freeway – HOV and general purpose lanes – increased after the opening of HOV lanes in January 1998. The AVO during the morning peak hour increased from approximately 1.1 to 1.2, with a high AVO of 1.3 at the opening, and from approximately 1.16 to 1.30 in the p.m. peak hour, with a high AVO of 1.36 three months after opening. The assessment conducted by the consultants indicated that the increase in HOV volumes was consistent with the overall growth in traffic with the opening of the lanes. They also concluded that the growth in HOV and AVO was a result of spatial shift rather than mode shift. Rather than encouraging the formation of new carpools, the lanes appear to simply have encouraged carpools to move from adjacent facilities (8).

Enforcement

Enforcement was identified as an important element during the planning process. Enforcement areas were incorporated into the design of the I-287 HOV Lanes and the New Jersey State Police provided extra enforcement during the HOV operating periods. Violation rates on the I-287 HOV lanes varied over the 11 months of operation. In general, violation levels were much higher on I-287 than on I-80. Violation rates over the first few months of operation in 1998 averaged between five percent and 75 percent. The number of violators varied by location and by time of day. The presence and visibility of enforcement personnel also appears to have influenced violation levels. The media reported the high number of violators and the problem was used as one of the arguments for terminating the HOV restrictions.

Supporting Facilities, Services, and Programs

Few supporting facilities and services were implemented with the I-287 HOV lanes. This situation occurred due to the change in national and state policies described previously, the short duration of the project, and the diverse travel patterns in the corridor. Although further planning was conducted, no appropriate locations for park-and-ride lots in the corridor were identified. As a result, no park-and-ride lots had been developed. The proposed transit shuttle service was in the planning stage and was not yet implemented when the decision to redesignate the lanes was made. The diverse origins and destinations of travelers in the corridor made implementing these and other supporting services difficult. The HOV connections at the I-80/I-287 interchange were moving forward from design to bidding when the decision to terminate the HOV lanes was made. The emergency service patrols represents one element that was implemented and in operation when the HOV lanes were opened. Further, the Magic System and other ITS components were under development and initial operation.

CHAPTER FIVE—REDESIGNATION OF THE I-80 AND I-287 HOV LANES

The events that culminated in the redesignation of the HOV lanes on I-80 and I-287 are highlighted in this Chapter. Overall, 11 months elapsed from the opening of the completed I-287 HOV lanes to the termination of the HOV designation on both facilities. The major activities and the decision to redesignate the lanes occurred over a four month period from June to September. The media coverage and the process followed by the state, including the legislative activities and the assessment conducted by NJDOT, are discussed.

Media Coverage

The opening of the I-80 HOV lanes in 1994 received generally favorable coverage in the news media. Newspaper articles and radio and television reports remained mostly positive during the ongoing operation of the I-80 HOV lanes. Media coverage became less supportive after the opening of the initial HOV lane segments on I-287 and changed dramatically with implementation of the completed HOV lanes.

Media coverage of the opening and ongoing operation of the I-80 HOV lanes was generally positive. Articles and stories focused on the travel time savings realized by carpoolers and bus riders, and the fact that use levels were meeting and exceeding projections. A few articles and letters to the editor raised concerns about violation levels, congestion around the Route 15 interchange, and commuters not able to use the lanes due to job or home responsibilities.

The phased construction on I-287 and the opening of the initial segments of the HOV lanes drew more vocal responses from commuters and critical press coverage. Construction of the additional lane exerbated the already congested conditions on the freeway, especially during the peak periods. Although these conditions would have occurred to some extent regardless of the future lane designation – HOV or general purpose – the perception on the part of many motorists was that the HOV requirement caused the congestion. This perception was reinforced by the low utilization of the initial segments, as drivers in general purpose lanes crawled along next to the relatively empty HOV lane.

Media and public response became strongly critical shortly after the opening of the completed I-287 HOV lanes in January 1998. It is difficult to tell if the public fueled the press reaction or the press influenced the public response. In either case, the print media played a major role in keeping the HOV lanes in front of the public and promoting rescinding the HOV designation.

A March 1998 editorial in the Sunday edition of *The Star Ledger* started the extensive print media coverage of the HOV lanes (9). The editorial, *HOV Lanes: Paved with Good Intentions but Impractical*, highlighted the low utilization levels and the high violation rates on the I-287 HOV lanes. It also included the results of a public opinion poll conducted by the newspaper. Of the 802 residents participating in the statewide poll, 148 respondents regularly traveled on freeways with

HOV lanes. Fifty-one percent of these individuals favored opening the HOV lanes to all traffic. The editorial suggested HOV lanes were a wonderful idea in theory, but not in practice, belonged to the past, and called for rescinding the HOV designation.

The editorial was followed in June by a series of four prominently featured columns called *Lanes of Pain*. These columns reviewed the experience with other terminated HOV lanes, including the Santa Monica diamond lanes in California and the Garden State Parkway in New Jersey, and the status of the I-80 and I-287 HOV lanes. The columns were openly critical of the HOV lanes. The paper promoted the articles with side bars highlighting the topics covered each day. The first *fired the opening salvo of the columnist anti-HOV campaign*, the second explained how New Jersey *got stuck with the HOV lanes – and who the culprits are*, the third urged commuters to get involved and highlighted the activities of the *sHOVe it* group and other commuters, and the fourth explained how the State could get *rid of the HOV designation and not have to repay the federal funds* used on the two projects (10, 11, 12,13). Drivers were encouraged to *Honk if you hate HOV* and to write, e-mail, or call with complaints.

New Jersey Department of Transportation and other groups responded with featured articles containing additional information on the use and benefits of the HOV lanes. These responses were unable to turn the tide of the press and public sentiment. The *Lanes of Pain* columns continued through the fall of 1998, and included a *HOV to LOV* byline and a *HOV elimination check list*. In addition to the newspaper columns, the *sHOVe it* group developed and maintained a Web Site to promote termination of the HOV lanes, and other groups undertook related efforts.

The newspaper columns and articles, the *sHOVe it* Web Site, and activities of other anti-HOV groups kept the issue very visible. These efforts put ongoing pressure on policy-makers to take action to rescind the HOV designation. Even policy-makers who initially supported the HOV lanes were left with few reasons to continue their support. The legislative and political activities undertaken to formally request rescinding the HOV designation are highlighted in the next section.

Redesignation Process

The process to terminate the HOV lane occupancy requirement started shortly after the first newspaper articles in 1998. The NJDOT initiated a review of the lanes using information collected from the ongoing monitoring and evaluation program and additional data analysis efforts. The review focused on determining if the HOV lanes met the three objectives of 1) inducing people to carpool, 2) maintaining use levels of at least 700 vehicles per hour while carrying as many people in the HOV lanes as in the average of the general-purpose lanes, and 3) reducing, or at least maintaining, the present level of congestion in the corridor. Initially anticipated to take a year, the study was accelerated based on state and federal legislative efforts.

The analysis performed by the NJDOT found that only the HOV use levels on I-80 had been met. Neither HOV lane had resulted in mode shifts to carpools, rather the HOV volumes

represented spatial shifts from adjacent facilities. The analysis also concluded that opening the lanes to general purpose traffic would not adversely influence air quality levels in the region on a short-term basis. The I-80 HOV lanes had been included in the previously approved air quality conformity analysis. As a result, the air quality conformity analysis was rerun without the I-80 lanes to demonstrate continued conformity (15).

The I-80 HOV lanes were constructed using funding from Federal-aid highway programs that did not contain any limitations on roadway capacity expansion or mandates associated HOV lanes. As a result, the New Jersey FHWA Division Administrator had the authority to approve an operational change from HOV to general purpose use, based on the study and documentation prepared by the NJDOT, that the HOV designation was not meeting its intended objectives. Since I-287 was funded through a Congressional action, redesignation could only occur through another Congressional action to avoid requiring the payback of any funds used to design and construct these facilities. Thus, the redesignation process focused on legislative efforts at the state and federal level.

At the state level, legislation was introduced to change the HOV operating hours to less congested times of the day, allowing general purpose traffic use during peak commuting periods. The bill would also have required legislative approval of any new HOV lanes in the state.

A Congressional fact finding forum was held in July. The forum was hosted by Representative Bob Franks (R-NJ), Senator Frank Lautenberg (D-NJ), and Representative Rod Frelinghuysen (R-NJ). Representatives from NJDOT, FHWA, the Environmental Protection Agency (EPA), and the New Jersey State Legislature were among those who testified. Information on the current use of the lanes, potential air quality impacts of removing the HOV restrictions, and issues concerning repaying federal funds if the lanes were opened to general traffic was presented.

In August, an amendment to the Transportation Appropriations Bill was introduced in Congress to waive repayment of federal funds for the I-287 lanes if the state found that the lanes were ineffective at reducing congestion or improving air quality and this determination was acceptable to the U.S. Secretary of Transportation. The amendment was included in the final bill, and in October Governor Christine Whitman officially informed U.S. Secretary of Transportation Rodney Slater that the state would act upon the federal budget provision and would eliminate the HOV designation on I-287 and I-80. The Governor's Request was based on the NJDOT study that concluded the HOV lanes had not met the three project objectives noted previously (14). As a result, the HOV requirement was officially removed on November 30, 1998.

Future Activities

Starting November 30, 1998, general purpose traffic began using the lanes during the previously restricted morning and afternoon peak-periods. Traffic flow improved initially on both freeways, although congestion still occurs during the peak hours and at specific locations. On I-80, congestion still occurs. Motorists experience good days with little congestion and bad days with

rolling queues. The HOV lane acted as a meter. With the change to general purpose use, vehicles get to exits quicker, causing longer queues at exit ramps along the corridor. Congestion still occurs at Route 15 as it did before the HOV lane was implemented and while it was in operation. Congestion also occurs on I-287 at some ramps that were problems before the new lanes were added and at other selected spots.

Traffic volumes have increased on both freeways since late 1998, and growth in VMT is projected to continue. I-80 is forecasted to reach a failure point during the morning and afternoon peak hours in five years. The northern section of I-287 in the northbound direction is projected to fail during the peak hour within the next year. Other sections of I-287 are projected to be undesirable within 10 years, and reach a failure point in 20 years.

A number of activities and projects are being pursued by NJDOT and other groups to help address traffic congestion in the two corridors. These efforts include continuing the emergency service patrols, expanding existing park-and-ride lots and developing new facilities, and promoting ridesharing, transit, and travel demand management (TDM) strategies. One innovative technique being considered is travel blending, which uses household travel surveys to help people identify ways to combine or chain trips to reduce overall VMT.

CHAPTER SIX—ASSESSMENT

This report documents the experience with the HOV lanes on I-80 and I-287 in New Jersey. Information on the planning, implementing, and operating the lanes is discussed. The regulatory environment during the planning and operating stages is described, along with the anticipated and actual supporting facilities, services, and program. The process followed to remove the HOV designation is also presented.

The low utilization of the I-287 HOV lanes, combined with the lack of mode shift on either facility, resulted in pressures from the public and the press to terminate the HOV requirement. The factors contributing to the lower than projected HOV volumes, and the spatial rather than mode shift, are explored in this chapter. As highlighted in Table 4, while many of the elements associated with successful HOV projects were present to some extent with the I-80 and I-287 HOV lanes, some critical factors were missing, modified, or not implemented during the course of the projects. These elements focus primarily on changes in the regulatory environment and the lack of supporting facilities, services, and programs.

Examples of elements contributing to the potential success of the I-80 and I-287 HOV lanes include the multi-agency teams, the lead agency, federal support, and to some extent, the travel time savings experienced by users. Multi-agency project teams, comprised of representatives from key agencies and groups, guided the planning and implementation process on both projects. As the lead agency, NJDOT had the authority and responsibility for moving the projects forward, and FHWA provided strong federal support on both facilities. The actual travel time savings realized by users on the I-80 HOV lanes was within the 7.5 to 8 minutes guideline, although I-287 did not meet this benchmark. The congestion levels on I-287 varied, and in some places the travel time differential between general purpose lanes and the HOV lanes was not significant enough to encourage use of the HOV lanes.

The following factors contributed to the lower than projected use levels and the lack of mode shifts in both corridors. Elements highlighted include changes in the regulatory environment, area and corridor characteristics, and lack of supporting facilities, services, and programs.

Change in Regulatory Environment. Major changes occurred in the regulatory or authorizing environment over the course of the projects. The federal requirements contained in the 1990 Clean Air Act Amendments and the 1991 ISTEA, as well as New Jersey Traffic Congestion and Air Pollution Control Act and the activities of the New Jersey Transportation Executive Council, mandated or supported HOV facilities, TDM strategies, and other measures to reduce VMT and to address air quality concerns. States, MPOs, TMAs, private businesses, and other groups were moving forward with Employer Trip Reduction programs and other activities to meet the requirements of these Acts and Regulations during the planning process on both projects. The regulatory environment was dramatically different when the I-80 and I-287 HOV lanes were in operation. Congress had changed the mandatory

Table 4. Comparison of I-80 and I-287 HOV Operations and Attributes Contributing to Successful HOV Facilities

	I-80	I-287
Area Size	Q	Q
Corridor Characteristics	!	!
Project Champion(s)	!	!
Legislative Direction/Policy Support ¹	"1	"1
Lead Agency	!	!
Multiagency Team/Interagency Cooperation	!	!
Federal Agency Support	!	!
Facility Orientation	!	"
Transit Service	Q	"
Travel Time Savings/Trip Time Reliability	Q	"
Support Facilities, Services, and Policies	Q	"
Flexibility and Adaptability	Q	Q

! Strongly Present

Q Somewhat Present

" Not Present

¹ There was very strong legislative and policy support during the planning process, but due to changes in federal and state legislation this support was not present when the lanes were in operation.

Employee Trip Reduction Program to a voluntary effort and a similar change was made in the state program. As a result, employers backed off of planned programs and no major efforts were undertaken to support transit, ridesharing, or other activities in the two corridors. Additionally, when the projections were made for HOV use of the I-287 lanes, the mandatory Employee Trip Reduction Program was expected to create a mode shift from driving alone to carpooling, vanpooling, or riding a bus in the corridor.

A change in the Governor's office also occurred during the course of implementing the HOV lanes. The election of a new Governor resulted in changes in policies and heads of state agencies. A new NJDOT Commissioner was appointed and the focus of the agency reflected the priorities of the new administration. Three NJDOT Commissioners served over the time period of planning, designing, implementing, and operating the HOV lanes on I-80 and I-287. These changes influenced the direction, focus, and priorities of the Agency. HOV facilities were relatively high priorities with the Commissioner during the planning process, but were lower priorities with the Commissioners during the implementation and operation phases. Given these changes, a project champion at a high level was not present throughout the life of the projects. Further, the North Jersey Transportation Planning Authority, Inc. did not take a position on the HOV lanes during the redesignation debate as it was felt that the operation of existing facilities under state jurisdiction was a state matter.

Area and Corridor Characteristic. I-80 and I-287 are located in a major metropolitan region and both are congested major travel corridors. The orientation of trips using the two freeways, especially I-287, is diverse, however. While commuters traveling on I-80 into and out the New York City area were logical candidates for HOV lane carpoolers and bus riders, the diverse origins and destination of trips on I-287 and the low density suburban developments in the corridor made sharing a ride or taking the bus more difficult. Promoting HOV use in the absence of a major employment center is hard, and the I-287 HOV lane suffered from the lack of concerted origins and destinations.

Lack of Supporting Facilities, Services, and Programs. The need for transit services, park-and-ride lots, rideshare programs, marketing and public information programs, enforcement, and other activities encouraging HOV use was identified during the planning process. Implementation of these elements was mixed, however. Marketing and public information efforts were implemented to introduce both projects to the traveling public and to promote use of the lanes. The two TMAs in the area provided ride matching services and undertook other outreach activities. The New Jersey State Police assigned extra enforcement personnel during the early operating phases of both HOV facilities and maintained a visible ongoing presence in the corridors.

A number of key supporting elements were not implemented, however, especially on I-287. Only one new park-and-ride lot, with 50 spaces, was developed in the I-80 corridor. No park-and-ride facilities were implemented along I-287. Bus service did increase slightly in

the I-80 corridor, but no service was implemented on the I-287. Only one of the recommended improvements to the I-80/I287 interchange was completed. The direct HOV connection between I-80 eastbound and I-287 southbound, which would have provided HOVs with significant travel time savings, was not implemented.

All of these factors contributed to the lower than projected use levels on I-287 and the lack of mode shift on both I-80 and I-287. When combined, these elements resulted in low vehicle volumes during much of the HOV operating period. With traffic congestion in the adjacent general purpose lanes, the strong and negative public and press reaction influenced the political process to rescind the HOV designation.

Partially in response to the issues raised during the redesignation of the HOV lanes on I-80 and I-287, FHWA issued a *Program Guidance on HOV Operations* in May 1999. The Program Guidance, which is provided in Appendix A, identifies the circumstances under which federal action is required to initiate changes in the operation of an HOV facility, and the federal review process and requirements to be used in these situations. The Program Guidance is available on the FHWA Web Site at <http://www.fhwa.dot.gov/legsregs/directives/policy/index.htm>.

Federal action is required when significant changes are proposed to existing HOV facilities constructed with federal funds. Significant changes include major alterations in operating hours and converting an HOV lane to general purpose use. Minor modifications in operating hours and changing from different multi-person occupancy levels (from 3+ to 2+, for example) do not require federal approval. The Program Guidance further outlines the federal review requirements related to air quality conformity, the state implementation plan, the congestion management system, the National Environmental Policy Act (NEPA) process, and other issues.

The Program Guidance and other available documents support the need to examine HOV systems on a regional, not just individual project, basis. Elements in this approach include a multi-year regional HOV system strategic plan which is integrated into the metropolitan area long-range plan, and a multi-agency program to manage implementation of the system plan and to support day-to-day operation of HOV facilities and supporting services. This approach allows for the long-term regional commitment for infrastructure improvements, the careful phasing of operating segments, and coordinating the development and operation of supporting services, facilities, and policies.

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**APPENDIX A—FEDERAL HIGHWAY ADMINISTRATION PROGRAM GUIDANCE
ON HIGH-OCCUPANCY VEHICLE LANES**

FHWA Policy Memorandums - Operations Core Business Unit

Memorandum

U.S. Department of Transportation
Federal Highway Administration

Subject: INFORMATION: Program Guidance on High Occupancy Vehicle Lanes
Date: May 13, 1999
From: Christine M. Johnson
Program Manager, Operations
Director, ITS Joint Program Office

Reply to HOTM
Attn. of:

To: Core Business Unit Program Managers Service Business Unit Directors
Resource Center Directors
Division Administrators
State Directors
Federal lands Highway Division Engineers

Attached is program guidance on high occupancy vehicle (HOV) operations. The purpose of this guidance is to identify the review process and FHWA actions that may be required for proposals to significantly change the operations of HOV lanes or convert them to general purpose lanes. This program guidance was developed to address issues that have been raised by a number of locations around the country that are considering efforts to significantly change the hours of operation or convert HOV lanes to general purpose lanes.

While decisions to change the operating characteristics of HOV facilities rest with the State or local agency, it is possible that FHWA actions will be required for proposals to significantly change the existing HOV lanes. This guidance recognizes that conditions change over time, and makes provisions to address these situations. The review process described in this guidance focuses on consistency with the Federal-aid highway program provisions identified in Title 23 of the United States Code (USC), as well as provisions specified in 49 USC for coordination with the Federal Transit Administration. This review assesses: the original approvals granted and commitments made that assumed the HOV lanes would remain in place; the impacts of the proposed change on operational, safety and environmental issues; and consistency with existing transportation air quality conformity determinations.

If you have any questions on this guidance, please contact Jon Obenberger (JOBENBERGER) at (202) 366-2221.

/signed by Christine Johnson /

Attachment

Federal-Aid Highway Program Guidance on High Occupancy Vehicle (HOV) Lanes

This guidance is presented in 3 general sections. The first part provides background and the Federal position regarding HOV lanes, and identifies when a Federal review to change the operation of HOV lanes is needed. The next section describes the Federal review and the applicable requirements and regulations. Last is a list of the definitions used in this guidance.

Purpose:

In accepting Federal-aid funds, agencies have agreed to manage, operate, and maintain HOV lanes as they were originally planned, designed, constructed and approved. However, conditions change over time, and this guidance includes provisions to address these situations. The purpose of this guidance is to identify when a detailed review of a proposal to significantly change the operation of existing HOV lanes is needed, and the Federal actions that may be required.

Changes to the minimum number of people to be in a vehicle in order to use HOV lanes (for example, from 3 occupants to 2), or small adjustments to when HOV restrictions begin or end, are not significant changes and are not causes for further Federal review. However, a proposal to significantly adjust the hours of operation or to convert an HOV lane to a general purpose lane is considered a significant change in the original project design concept or scope and would require further Federal review. Federal interests for seeking further review include consistency with the provisions of Title 23 of the United States Code (23 USC), operational commitments made during the National Environmental Policy Act (NEPA) process as described in Title 23 Code of Federal Regulation, Part 771 (23 CFR 771), in project agreements, transportation planning requirements, and transportation conformity requirements under the Clean Air Act (40 CFR part 51).

The questions and answers on the following pages provide more detail about:

- what is to be included in the initial proposal from an operating agency wishing to change the operation of its HOV lanes;
- what circumstances require a more detailed review for Federal actions;
- and what should be reviewed relative to the various Federal requirements.

Section 1 – Federal Position and Need for Federal Review

What is FHWA's position on high occupancy vehicle (HOV) lanes?

The Federal Highway Administration (FHWA) strongly supports HOV lanes as a cost-effective and environmentally friendly option to help move people along congested city and suburban routes. As part of an overall approach to handle the demand for travel and to address the impacts of traffic congestion, HOV lanes can be a practical option to adding more lanes. The FHWA encourages the installation of HOV lanes as an important part of an areawide approach to help metropolitan areas address the needs they have identified for mobility, safety, productivity, environmental, and quality of life. Significant changes to the operation of an HOV lane, or efforts to convert an HOV lane into a general purpose lane, should be considered only after all the relevant factors, interests and consequences have been evaluated.

Are HOV lanes always a good idea?

HOV lanes are not appropriate in every location or for every situation. Even after they are installed, changes happen in land use, the kinds of trips people take, the times people travel, and the levels of traffic congestion that may warrant adjustment in the operation of the HOV lanes.

Does an agency have to get Federal approval to change how it operates its HOV lanes?

In general, no. Agencies that own and operate the HOV lanes have the authority and the responsibility to decide how they are operated. Some examples of these operating decisions are changing the number of people needed in a vehicle to use the lanes or adjusting the times when HOV restrictions begin or end. But, as described in more detail later, there are situations when proposals to significantly change the operation of HOV lanes (e.g., the conversion of HOV lanes to general purpose lanes) will require some Federal action.

What are FHWA's interests and role related to the operation of HOV lanes?

Agencies that own and operate HOV lanes are encouraged to involve the FHWA Division Office to develop programs to monitor how well the lanes are functioning, assess their effectiveness in improving efficiency, or analyze the impacts of any significant changes to the operation of HOV lanes. Converting HOV lanes to general purpose lanes is considered a significant change to the original project's design concept or scope. Such changes have the potential to adversely affect the area's flow of traffic, roadway and traveler safety, and the environment. To assure consistency with the Federal-aid program provisions of 23 USC and 49 USC, a review of the important issues and possible impacts of any significant changes is needed to determine if any Federal approval is required. FHWA Division Offices, with input as appropriate from the Federal Transit Administration (FTA), are responsible for reviewing proposals to significantly change the operation of HOV lanes.

When would Federal actions be needed related to the operation of HOV lanes?

FHWA must be consulted if a significant change is proposed on HOV lanes that were funded or approved by FHWA. Applicable federal interests include consistency with the provisions of 23 USC,

other commitments made during the National Environmental Policy Act (NEPA) process as described in Title 23 Code of Federal Regulation, Part 771 (23 CFR 771), in project agreements, transportation planning requirements, and transportation conformity requirements under the Clean Air Act (40 CFR part 51).

Agencies should provide the FHWA Division Office with a brief proposal describing the proposed change to the operation of their HOV lanes. This proposal should describe:

- the specific proposed change in operations and the reason for it;
- the affected roadways and the geographic extent of the proposed change;
- the category or source of any Federal funding that has been used for the HOV lanes; and any discussions with other affected agencies, e.g., planning organizations and neighboring operating agencies.

What are the specific circumstances that require Federal action?

On a case-by-case basis, a review of proposals to change the original design concept, scope, or operation of the HOV lanes will determine if Federal approval is required or if any other actions may be necessary before the proposed changes occur. Federal approval is required if:

- particular categories of Federal-aid funding were used to acquire right-of-way, design, or construct the HOV lanes;
- commitments involving the operation of the HOV lanes were made during the review process required by the National Environmental Policy Act;
- the HOV lane conversion is located in an air quality non-attainment or maintenance area; or a significant change in hours of operation of the HOV lanes could affect the transportation plan conformity determination.

The details and expected impacts resulting from the proposed agency action must be analyzed and submitted to the appropriate FHWA Division Office to initiate this review.

What is the purpose of the Federal review?

The review determines if other Federal actions or approvals are needed, as well as what those actions are and when they should happen. This review will assess: (1) the original approvals granted and commitments made that assumed the HOV lanes would remain in place; (2) the impacts of the proposed change on operational, safety, and environmental issues; and (3) consistency with existing transportation conformity determinations.

What information should be part of a Federal review?

The following information, along with any additional data or analysis that an agency believes justifies a significant change in HOV lane operation or conversion, will serve as the basis for the FHWA review:

1. Original HOV lane studies, plans and project agreements, including sources and amounts of funding;
2. Commitments made in the environmental processing and project approval;
3. An operational assessment of existing HOV lanes (i.e., traffic characteristics, HOV usage, people transported, etc.), support programs and services (i.e., park-and-ride lots, carpool and vanpool initiatives, marketing, etc.) and other agency initiatives to improve the efficiency of the HOV lanes;
4. An analysis of predicted facility operation without the HOV lane (i.e., impact of the proposal on facility, HOV system, corridor and regional transportation system performance; air quality conformity; other environmental impacts; safety features and design standards);
5. An assessment of the predicted performance of alternate lane management strategies in place of, or in addition to, the existing HOV lane, such as value pricing, express, transit and truck lanes; and
6. Identification of the non-attainment or maintenance area, if applicable. If the HOV lane is located in such areas, provide the date of the latest conformity determination for the transportation plan and the Transportation Improvement Program (TIP).

Section 2 – Federal Review Requirements

The following section highlights the requirements that should be considered in reviewing agency proposals to significantly adjust the HOV lane hours of operation or convert HOV lanes into general purpose travel lanes.

What are the requirements for the minimum number of people to be an HOV?

23 USC 102(a)(1) says that a “State highway department shall establish the occupancy requirements of vehicles operating in high occupancy vehicle lanes; except that no fewer than 2 occupants per vehicle may be required.”

Are any exceptions to the 2 persons per vehicle minimum allowed?

23 USC 102(a)(1) notes that “motorcycles and bicycles shall not be considered single occupant vehicles.” Also, 23 USC 102(a)(2) notes that “...a State may permit a vehicle with fewer than 2 occupants to operate in high occupancy vehicle lanes if the vehicle is certified as an Inherently Low-Emission Vehicle.” And Section 1216(a)(5) of the Transportation Equity Act for the 21st Century (TEA-21) notes that “...a State may permit vehicles with fewer than 2 occupants to operate in high occupancy vehicle lanes if the vehicles are part of a value pricing pilot program...”

Why is the Federal government interested in how a locality operates its HOV lanes after they have been built?

In accepting Federal funds to acquire right-of-way, and to design or construct HOV lanes, agencies agree to manage, operate and maintain the HOV lanes in a safe and efficient manner.

When and for how long should there be requirements for a minimum number of occupants for a vehicles to use the HOV lanes?

An operational analysis of current and estimated future travel should be the basis for determining the specific part of the day when there are requirements for a minimum number of occupants for a vehicle to use the HOV lane. HOV lanes can be operated on a 24-hour basis, for extended periods of the day, during peak periods only, or during special events or other activities. The requirement for a minimum number of occupants for a vehicle to use an HOV lane must be in effect for most or all of at least one of the usual times during the day when the demand to travel is greatest (e.g., the morning or afternoon rush hours). At a minimum, the vehicle occupancy requirements for an HOV lane should be in effect during the times of the day when the problems from traffic congestion on the roadways and within the transportation corridor are at their worst. These critical times may be identified when an area’s Transportation Plan is developed and updated.

What would be a “significant” change to HOV operations?

Proposals to adjust only the HOV lane hours of operation during the day (e.g., minor changes in hours during peak travel periods), or the occupancy requirements (e.g., HOV-3 to HOV-2), are not considered significant operational changes requiring an explicit Federal review or approval. However, a proposal to significantly adjust the hours of operation or to convert an HOV lane to a general purpose lane is considered a significant change in the original project design concept or scope and would require Federal review.

Similarly, if the HOV lane is operational only during one peak travel period, any significant reduction in the hours of operation will be considered a significant change to the original project design concept or scope. A review as described in this guidance would be required.

Also, if an HOV lane is being managed and operated in a manner that renders it functionally inoperable or obsolete (for example, no enforcement procedures provided), FHWA will consider that significant changes to the original project design concept or scope have occurred. As such, a review as described in this guidance would be required.

What should be reviewed related to an area's Congestion Management System?

According to the transportation planning requirements noted in 23 CFR 450.320(c) [and cross referenced in 23 CFR 500.109(b) and in 49 CFR 613.100], Transportation Management Areas are required to develop a Congestion Management System to provide for effective management of new and existing facilities. Any proposed action to convert or significantly change the operation of an HOV facility in a Transportation Management Area, requires a review by Federal officials to gauge the change's impact to the original Congestion Management System, and to determine whether the Congestion Management System needs to be revised or updated.

What should be reviewed related to an area's air quality conformity finding?

In air quality non-attainment and maintenance areas, transportation plans, programs and projects cannot cause or contribute to new air quality violations, increase the frequency or severity of existing violations, or delay timely attainment of the identified standards [23 CFR 450.216(a)(4) and 23 CFR 450.330(b)]. Any significant changes in the design concept or scope (i.e., conversion of HOV lanes) of a project that has been already addressed and accommodated in a conforming Transportation Plan or Transportation Improvement Program (TIP) require that the viability of the existing conformity determination be re-evaluated. This re-evaluation would be done through a new conformity analysis and determination of the transportation plan and the TIP and would be conducted by the Metropolitan Planning Organization (MPO) with input from the Environmental Protection Agency, FTA, FHWA, and state and local agencies. The MPO must submit its conformity finding to FHWA and FTA for a final conformity determination [23 CFR 450.322(d)].

What should be reviewed related to the State Implementation Plan?

The Clean Air Act Amendments of 1990 contained a list of transportation control measures (TCMs), including HOV lanes, which can be considered and included in a State Implementation Plan (SIP) to assist an area in attaining or maintaining National Ambient Air Quality Standards. Non-attainment and maintenance areas must provide for timely implementation of TCMs that are included in an approved SIP. If the HOV lane is included in the approved SIP as a TCM, a SIP modification will be required before it can be converted to a general purpose lane.

What should be reviewed related to the results of the project's National Environmental Policy Act process?

During the NEPA process that preceded the construction of an HOV project, FHWA, FTA, and their partners may have made certain commitments to various public and resource agencies concerning various aspects of the project, pursuant to 23 CFR 771. An agency proposing to convert an HOV lane must initiate a review to determine whether such an action would comply with the commitments and conditions contained in the Record of Decision or Finding of No Significant Impact, or in other agreements prepared for the original HOV project. The FHWA Division Office and FTA will review any proposed HOV lane conversion based upon the established procedures under NEPA. The environmental documentation for a proposed conversion will be appropriate to its class of action under NEPA and also will include documentation regarding the involvement of the public and stakeholders in the decisions concerning the action in question.

What should be reviewed related to design or safety features?

When a proposal is made to convert an HOV lane, an assessment is required on the existing and future impacts to the safety and operation of the facility. Agencies must ensure that appropriate geometric and other design features (such as cross-section, alignment, lane and shoulder widths, etc.) exist in support of the proposed new use. Agencies must rectify any unsafe conditions that may be identified.

What should be reviewed related to limitations on the use of Federal funding?

Several categories of Federal-aid funding have been and can be used to acquire right-of-way, or to design or construct HOV lanes. These categories have specific eligibility requirements and regulations that remain in effect even after the project is completed. Some funding categories cannot be used for constructing additional roadway capacity in the form of unrestricted general purpose travel lanes. These categories include funds for the Congestion Mitigation & Air Quality Improvement (CMAQ) program [23 USC 149(b)], Interstate Maintenance program [23 USC 119(d)], Mass Transit Capital Investment Grants [49 USC 5309(a)(1)(B)], and, in some cases, the Interstate Construction program (23 CFR 635).

If funds from these programs were used to acquire the right-of-way, design, or construct HOV lanes, the FHWA Division Office or FTA will require the repayment of these funds before any significant change to the operation of an HOV lane, or any conversion of an HOV lane to a general purpose lane. As part of the documentation for the proposed action to convert HOV lanes, the sources and amounts of Federal-aid funding used for the design and construction must be identified. Based on review of this documentation, FHWA or FTA will determine the need for, and the amount of, funding to be reimbursed.

Section 3 – Definitions

The following definitions apply to terms used in this guidance:

1. The term “agency” means any state or local agency which is considered to be the owner and operator of the HOV lanes or the adjoining transportation facility.
2. The term “High-Occupancy Vehicle” means a motor vehicle, carrying at least two or more persons, including carpools, vanpools and buses.
3. The term “HOV lane” means any kind of lane designated for exclusive use by high-occupancy vehicles (HOVs) for all or part of a day, including a designated lane on a freeway, other highway or a street, or independent roadway on a separate right-of-way.
4. The term “HOV facility” means any kind of treatment that gives priority to buses, van pools, car pools and high-occupancy vehicles, including HOV lanes, park-and-ride lots, and other support facilities or elements.
5. The term “HOV system” means any coordinated region wide network of integrated HOV facilities.
6. The term “occupancy requirement” means any restriction that regulates the use of a facility for any period of the day based on a specified number of persons in a vehicle.