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

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Operations Office of Travel Management

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16. Abstract

This report summarizes the New Jersey I-80 and I-287 high-occupancy vehicle (HOV) lane case study. Information on planning, implementing, operating, and redesignating the HOV lanes on the two freeways is presented. The factors that appear to have influenced the redesignation process are discussed. 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 described.

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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HOV Lane Case Study

Introduction

The high-occupancy vehicle (HOV) lane designation on two freeways in northern New Jersey was rescinded in 1998, and the lanes were opened to general purpose traffic. A variety of factors influenced the termination of the morning and afternoon peak-period HOV-only designation on I-80 and I-287, which had been in operation for approximately four years and 10 months, respectively. This report summarizes the results of a study sponsored by the Federal Highway Administration (FHWA) examining the factors influencing both the development and the termination of the I-80 and I-287 HOV lanes. The study was completed by the Texas Transportation Institute and Parsons Brinckerhoff Quade & Douglas. This Executive Summary is provided for policy level staff and public officials interested in operating successful HOV facilities. A companion technical report is available for individuals interested in more detailed information on the case study.

Background

Traffic congestion continues to be a major problem in metropolitan areas throughout the country. Providing for the safe and efficient 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 mix of approaches are being pursued in metropolitan areas to respond to these problems. Many areas are pursuing both proven and innovative strategies to proactively manage and operate the various components of the surface transportation system. High-occupancy vehicle (HOV) facilities represent one of the strategies available 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 trips 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.

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.

Not all HOV lanes have been successful, however, and a few projects have been terminated. Some HOV lanes operated as short-term projects, and were removed with completion of a major transportation improvement. Other HOV facilities not meeting specific project objectives have been discontinued. Still other projects were terminated due to public and political pressure. The HOV lanes on I-80 and I-287 in New Jersey represent examples of projects receiving extensive public and political scrutiny, which were discontinued for not meeting desired transportation objectives.

Elements of Successful HOV Facilities

Approximately 1,200 route-miles or 2,300 lane-miles of HOV lanes are in operation primarily on freeways in 28 metropolitan regions in North America. HOV lanes and supporting facilities 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. These facilities provide travel time savings and improved trip reliability to users, and increase the person movement capacity of freeways in the regions.

Based on experience over the past 20 years, a number of factors have been identified that may contribute to the successful implementation and operation of freeway HOV facilities. Area and corridor characteristics deemed important included a regional population of at least 1.5 million persons and a congested freeway corridor serving trips oriented toward a downtown area or a major activity center. Legislative direction, policy support, a lead agency with a strong project champion, cooperation with other involved agencies, and support from federal agencies are important factors during the planning and operating phases of a project. Other factors contributing to well used and publicly accepted HOV lanes include high levels of bus service, travel time savings of at least 1 to 1.5 minutes a mile, improved trip reliability, adequate enforcement, public information programs, and supporting transit and ridesharing facilities, services, and policies.

Planning and Operating the I-80 and I-287 HOV Lanes

As illustrated in Figure 1, the I-80 and I-287 corridors are located in northern New Jersey. Both are heavily used freeways serving commuters, intra- and interstate travelers, and commercial

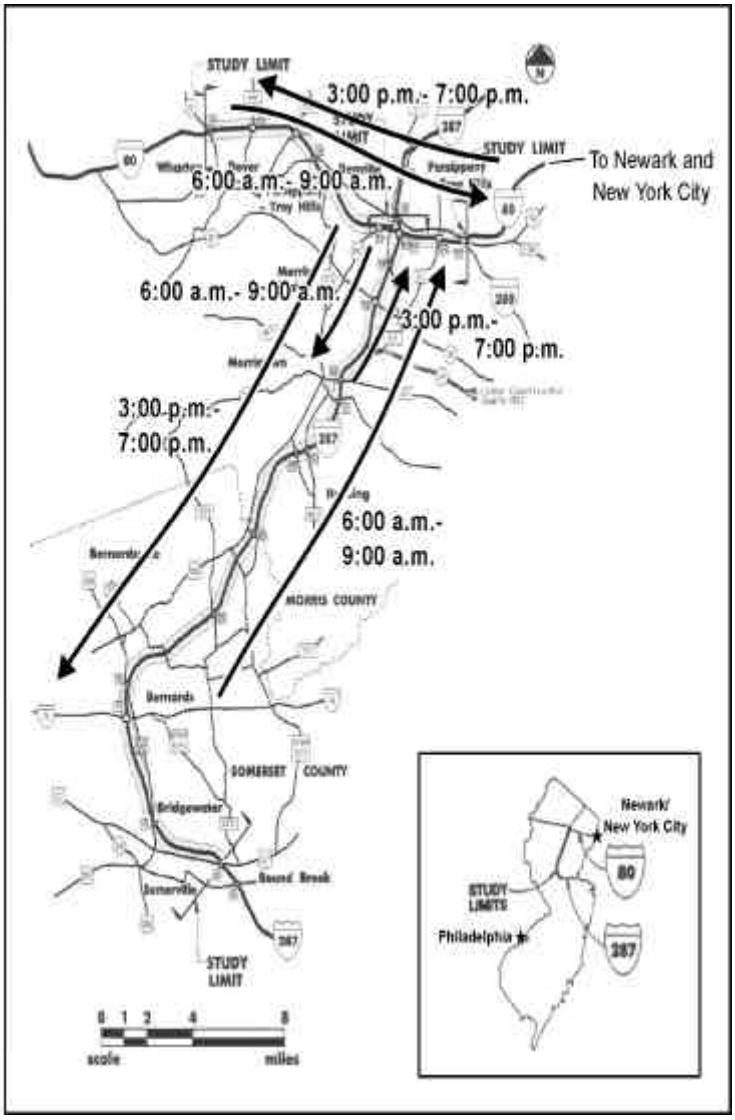

Figure 1. Location and Operation of the HOV Lanes on I-80 and I-287.

vehicles. The corridors are characterized by low density residential, employment, and commercial development, with significant growth occurring during the 1990s. I-80 is a major radial route for commuters and commercial vehicles entering and leaving the greater New York City metropolitan area, and serves destinations in the corridor. Commute trips originate from communities in Morris County and from areas as far west as Pennsylvania. I-287 provides a bypass around the greater New York City metropolitan area and serves a growing number of employment centers in the corridor.

A number of activities were underway in the 1990s in response to increasing travel demands and traffic congestion levels in the region. These efforts included the HOV lanes on I-80 and I-287, a regional Intelligent Transportation System (ITS), the MAGIC incident management system, enhancements to the commuter rail network, the Hudson-Bergen light rail (LRT) line, and other roadway, transit, and ridesharing programs. Agencies and groups involved in planning and developing these projects included NJDOT, New Jersey Transit (NJT), North Jersey Transportation Coordinating Council, New Jersey Turnpike Authority, Federal Highway Administration New Jersey Division, counties, cities, transportation management associations, local groups, and businesses. These efforts were coordinated through ongoing state and metropolitan planning processes, and project steering committees.

Federal and state policies influenced consideration of the HOV lanes on I-80 and I-287. At the federal level, the 1990 Clean Air Act Amendments and the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 mandated or strongly encouraged trip reduction programs and other efforts to reduce vehicle miles of travel and promote ridesharing and transit use. Similar requirements were contained in the New Jersey Traffic Congestion and Air Pollution Control Act of 1993. Many of these requirements were later relaxed or eliminated, including both the Federal and State Employee Trip Reduction Program, which became voluntary in 1996.

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 and reflected national practice. Both studies used a multiagency Steering Committee to provide oversight and direction. The results of a four step planning process — preliminary concept viability, alternative identification, development of recommended alternatives, and project documentation — found concurrent flow HOV lanes to be viable concepts for more detailed consideration on I-80 and for some segments of I-287. HOV lanes were implemented on both facilities based on the recommendations from the studies.

The operation of the concurrent flow HOV lanes is illustrated in Figure 1. The HOV lanes on I-80 were opened with a peak-period two person vehicle (2+) HOV designation in March 1994. The HOV lanes on I-287 were open in their entirety in January 1998, with the same 2+ and peak-period operating requirements.

Use of the I-80 HOV lanes exceeded projections. Peak hour volumes on I-80 averaged 960 vehicles per hour in the peak direction of travel during the first few weeks and between 900 and 1,400 vehicles per hour over most of the project life. Utilization levels on I-287 were below projections, averaged between 330 and 650 vehicles per hour. The average vehicle occupancy (AVO) on both freeways – HOV and general purpose lanes – increased after the opening of HOV lanes. The AVO during the morning peak hour increased on I-80 from approximately 1.23 to an average of 1.30 and from 1.1 to 1.2 on I-287. Violation rates on the I-80 HOV lanes ranged from a low of 4.7 percent to a high of 21.5 percent depending on the level of enforcement. In general, violation levels were higher on I-287 than on I-80, with rates ranging from five percent to 75 percent. The number of violators varied by location, by time of day, and level of enforcement.

Few supporting facilities and services were implemented with either project, but especially with the I-287 HOV lanes. This situation occurred due to the change in national and state policies described previously, the relatively short duration of the projects, and the difficulty of serving diverse origins and destinations. For example, no park-and-ride lots were developed along I-287 and the proposed transit shuttle service was not started. The HOV connections at the I-80/I-287 interchange were moving forward in preliminary design 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.

Redesignation of the I-80 and I-287 HOV Lanes

A number of events culminated in the redesignation of the HOV lanes on I-80 and I-287. 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 opening and ongoing operation of the I-80 HOV lanes in 1994 received generally favorable coverage in the news media. Press coverage became less supportive during the operation of the initial HOV lane segments on I-287 and became strongly critical shortly after the opening of the completed HOV lanes on I-287 in January 1998. It is difficult to tell if public sentiment influenced the press reaction or if the press fueled 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. Although the 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 process to terminate the HOV lane occupancy requirement and open the lanes to general purpose traffic during the peak-periods started shortly after the first newspaper articles in 1998. In response to the concerns raised by the media and policy makers, 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 corridors. Initially anticipated to take a year, the study was accelerated based on state and federal legislative efforts.

The analysis performed by 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. 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 HOV lanes to demonstrate continued conformity.

A Congressional fact finding forum was held in July 1998. 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 other groups were among those who testified. Information on the current use of the HOV 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.

The I-80 HOV lanes were constructed using funding from Federal-aid programs that did not contain any limitations on roadway capacity or mandates associated with 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 federal funds used to design and construct these lanes.

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. The amendment was passed as part of the final bill, and in October Governor Christine Todd 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. The HOV lane occupancy requirement was officially removed on November 30, 1998.

Conditions Since the Redesignation

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, motorists experience good days with little congestion and bad days with rolling queues. The HOV lane on I-80 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.

Assessment

The low utilization of the I-287 HOV lanes, combined with the lack of a mode shift on either facility, resulted in pressures from the public and the press to terminate the HOV requirement. A number of factors contributed to the lower than projected HOV volumes, and the spatial rather than mode shift. As highlighted in Table 1, 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 the general-purpose lanes and the HOV lane was not significant enough to encourage use of the HOV lane.

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.

Table 1. 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.

Changes in Regulatory Environment. Major changes occurred in the regulatory or authorizing environment over the course of the projects. Federal and state legislation in place during the planning process mandated or supported strategies to reduce vehicle miles of travel (VMT) and to address air quality concerns. The regulatory environment was dramatically different when the I-80 and I-287 HOV lanes were in operation. Congress had changed the mandatory 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. Also, a project champion was not present throughout the duration of the projects due to changes in state government.

Area and Corridor Characteristic. Both I-80 and I-287 are congested travel corridors located in a major metropolitan region. The orientation of trips using the two freeways 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 both corridors makes 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. The actual implementation of these elements was mixed, however. Marketing and public information efforts were conducted 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 I-287. Only one of the recommended improvements to the I-80/I-287 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 the these factors contributed to the lower than projected use levels on I-287 and the lack of a 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 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.

As described in this case study, 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.