Performance ASSESSMENT

Reliability

The project was evaluated for changes in **Reliability** using the VPP Suite **Performance Summaries** module:

- **Travel Time** – the time it takes to drive along a stretch of road
- **Buffer Time** – the **extra** time you must add to your average trip to ensure on time arrival
- **Planning Time** – the **total** time you should allow to ensure on time arrival

User Delay Cost

The project was further evaluated for changes in **Delay Cost** (total, per vehicle and per person) and **Hours of Delay** (person-hours, vehicle-hours and per vehicle) using the VPP Suite **User Delay Cost Analysis** module.

Reliability Comparison

Before Condition

	Buffer time (minutes) 5:00 PM - 6:00 PM	Planning time (minutes) 5:00 PM - 6:00 PM	Travel time (minutes) 5:00 PM - 6:00 PM
Monday	1.12	4.88	3.81
Tuesday	1.76	5.56	3.91
Wednesday	1.17	4.91	3.87
Thursday	1.12	4.88	3.82
Friday	1.47	5.23	3.9
Saturday	1.07	4.62	3.64
Sunday	0.58	4.09	3.55
Weekends	1.78	5.23	3.72
Weekdays	2.69	6.14	4.23
All Days	2.35	5.8	4.06

After Condition

	Buffer time (minutes) 5:00 PM - 6:00 PM	Planning time (minutes) 5:00 PM - 6:00 PM	Travel time (minutes) 5:00 PM - 6:00 PM
Monday	1.1	4.85	3.72
Tuesday	0.62	4.42	3.7
Wednesday	0.61	4.35	3.66
Thursday	1	4.76	3.71
Friday	0.52	4.28	3.64
Saturday	0.41	3.96	3.43
Sunday	0.57	4.08	3.48
Weekends	1.07	4.53	3.61
Weekdays	2.03	5.48	3.85
All Days	1.57	5.03	3.76

25% ↓ (Weekdays) 11% ↓ (Weekdays) 9% ↓ (Weekdays)

Comparisons of changes in **Travel**, **Buffer** and **Planning Times** show favorable reductions in the After condition that can be attributed to the improved flow in the WB lanes of I-80 prior to the Squirrelwood Road off-ramp.

User Delay Cost Comparison

Before Condition

5 PM

Delay cost:
Total: $4,903,322.13
Per vehicle: $1,151.86
Per person: $969.98
Hours of delay:
Person-hours: 155,492.15 hours
Vehicle-hours: 130,940.76 hours
Per vehicle: 30.76 hours
Data validity: 88.08%

After Condition

5 PM

Delay cost:
Total: $902,379.14
Per vehicle: $192.3
Per person: $161.94
Hours of delay:
Person-hours: 28,719.9 hours
Vehicle-hours: 24,185.18 hours
Per vehicle: 5.15 hours
Data validity: 95.89%

Comparisons of changes in **User Delay Cost** show substantial reductions in cost and hours of delay in the After condition, across all categories.

Project Assessment Summary

July 16, 2012

Technical Toolbox

Vehicle Probe Project Suite

The VPP Suite is a Flash-based web site that supports operations, planning, analysis, research & performance measure generation using probe data.

NJ OpenReach

NJ OpenReach is a web-based, multi-modal regional (NY/NJ/CT) tool that integrates incidents, construction, travel times and video.

Google™ Earth

Google™ Earth is a virtual globe and geographical information program that maps the Earth using superimposition of satellite imagery, aerial photography and GIS 3D.

NJ Department of Transportation

This Summary incorporates data, analyses and reports by various NJDOT Units, such as: Data Development, Safety, Mobility and Systems Engineering, Project Management and Systems Planning.

I-80/Squirrelwood Road

Highway Operational Improvement

Interchange #56; MP 56.76 – 57.47

West Paterson, Passaic County

Start Date: June 8, 2007

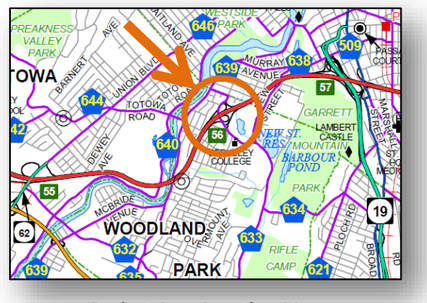
Completion Date: March 3, 2008

Construction Cost: $1,282,304

Geographic Context

Route I-80 is a vital east-west interstate facility in northern New Jersey. It provides a continuous route between the Delaware Water Gap (at the PA border) and the George Washington Bridge (at the NY border) and is *essential* in serving the bedroom communities of northeast NJ and New York City, goods movement (local, regional and national) and recreational areas, such as the Pocono Mountains and Delaware Water Gap National Recreation Area.

Squirrelwood Road is classified as a urban minor arterial (County Route 636) and is accessed from I-80 at Interchange 56. This road serves the densely populated municipalities of Paterson and West Paterson in Passaic County.



Project Area Location Map

Project Background

In March, 1990, the I-80/Squirrelwood Road interchange was entered into the NJDOT's Pipeline Process via a Problem Statement generated by Township officials.

According to the Problem Statement, inadequate capacity at the unsignalized intersection of the WB exit ramp of I-80 with Squirrelwood Road causes traffic to backup on the ramp and into the I-80 mainline, creating safety and operational problems. There is also a secondary capacity constraint at the intersection of Squirrelwood Road and Glover Avenue that may contribute to this problem.

In June, 1992, a Needs Assessment report was prepared by the Bureau of Transportation and Corridor Analysis. This report described the existing conditions, general characteristics of the surrounding region, traffic analyses and proposed improvement concepts.

Subsequently, a Tier II Screening Report was completed in February, 2005, that presented accident history, revised traffic analyses and proposed traffic control and geometric improvements.

Mobility ASSESSMENT

Project Detail

The project will eliminate the bottleneck occurring at the intersection of Squirrelwood Road and the WB I-80 off ramp, that causes traffic to queue back down the ramp and deceleration lane and into the I-80 through lanes, by:

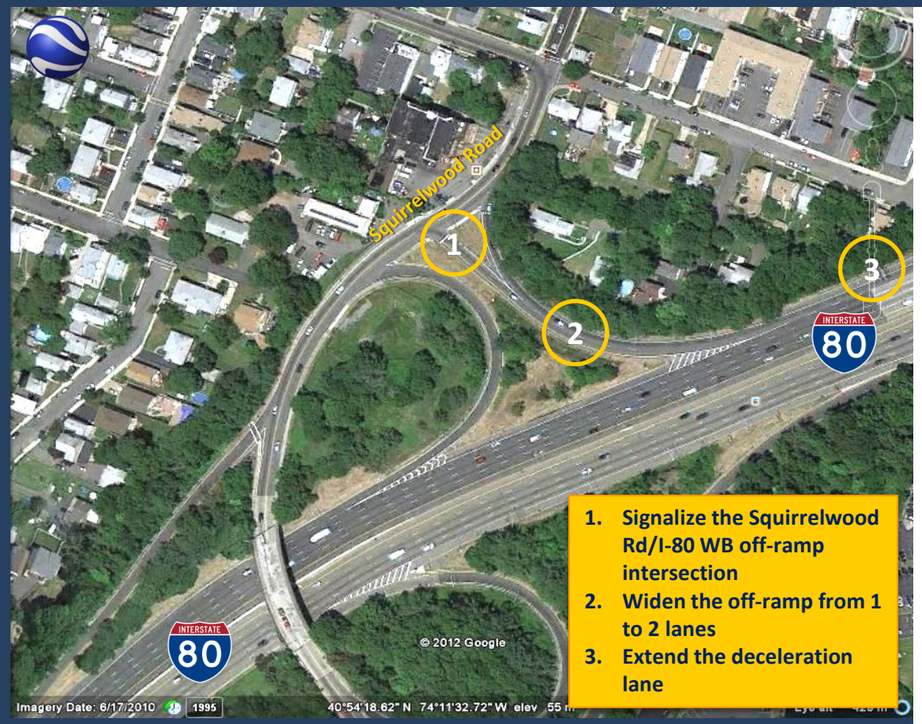
▶ Signalizing the intersection of the WB off-ramp and Squirrelwood Road (to reduce left turn delays and queues)

▶ Widening the ramp to 2 lanes (for extra storage capacity and to remove the conflict of left turning vehicles blocking right turning vehicles)

▶ Extending the deceleration lane leading to the WB I-80 off ramp (for extra storage capacity)

There are no right-of-way issues with widening the ramp or extending the deceleration lane on I-80.

Project Element Location Map



Highway Capacity Software Intersection Analysis

Location		Volume	Level of Service		Avg. Queue (ft.)	
Approach	Movement	AM	No Signal	Signal	No Signal	Signal
Squirrelwood Road						
Eastbound	Through	250	A	A	0	38
Westbound	Through	1020	A	B	0	145
Route I-80 Exit 56 Ramp						
Northbound	Left	250	F	C	209	72
	Right	570	D	See note	65	0

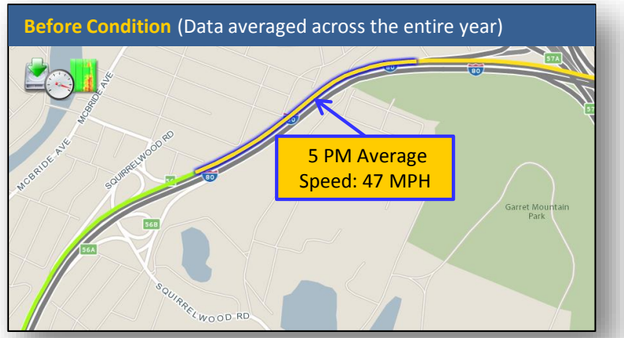
Location		Volume	Level of Service		Avg. Queue (ft.)	
Approach	Movement	PM	No Signal	Signal	No Signal	Signal
Squirrelwood Road						
Eastbound	Through	490	A	B	57	98
Westbound	Through	800	A	B	0	162
Route I-80 Exit 56 Ramp						
Northbound	Left	340	F	C	386	116
	Right	600	F	See note	424*	424*

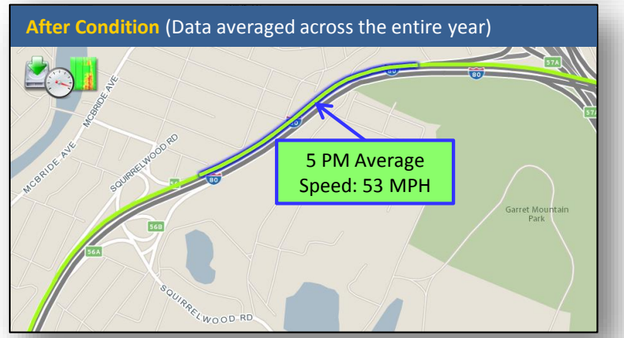
HCS analysis indicates a substantial LOS and Avg. Queue improvement on the ramp approach of the intersection with only a slight LOS degradation on the Squirrelwood Rd. approaches.

* This queue represents the available storage on the ramp. Observed queue extends as far back as 1,500' on the I-80 WB mainline.

Note: LOS under signalized conditions is not provided for channelized right turn. Results would be similar to un-signalized analysis.

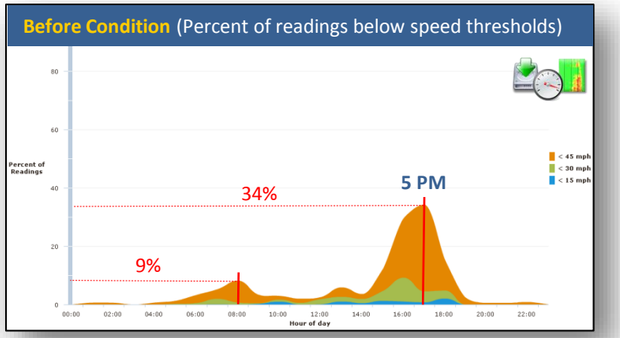
Average Speed Change

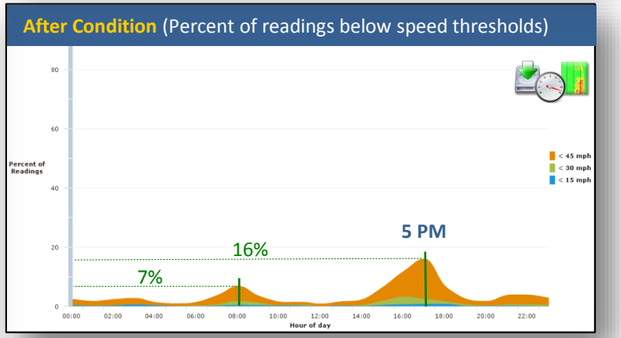




During the PM Peak Hour (5:00 PM), there has been a **13% increase in speed** along the section of WB I-80 approaching the Squirrelwood Road interchange (blue highlight) since the implementation (and "shake-out" period) of the project. (the AM Peak Hour showed a **4% increase in speed**).

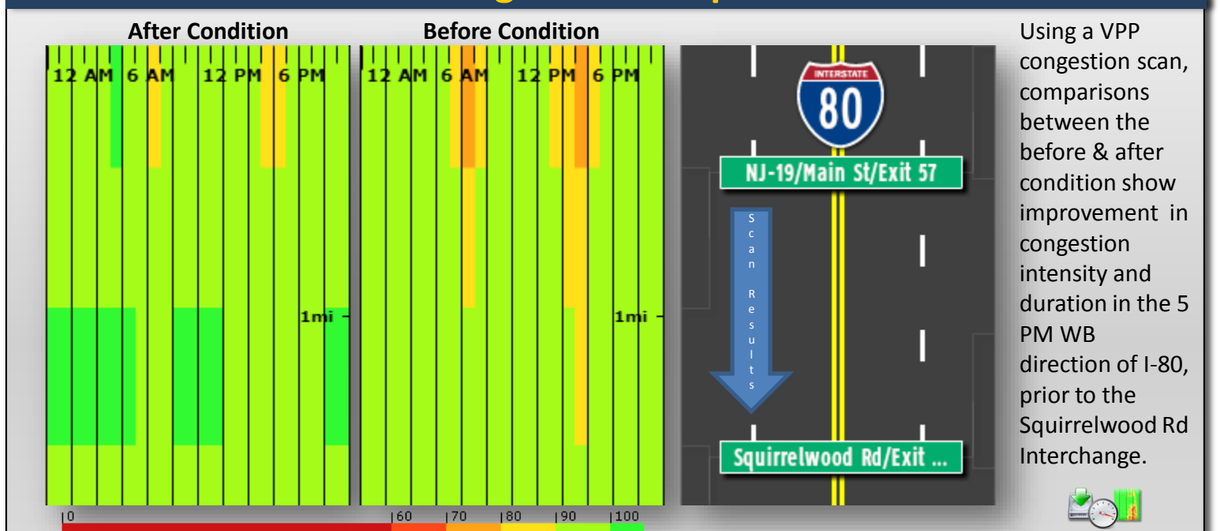
Speed Threshold Change





There has been a substantial improvement in speeds that fall below 45 MPH (a threshold indicating the beginning of congested conditions). In the "Before" condition, PM Peak Hour (5:00 PM) , 34% of readings were < 45 MPH. In the "After", the percentage of readings dropped to 16%, **an overall decrease of 53%**.

Congestion Comparison



Using a VPP congestion scan, comparisons between the before & after condition show improvement in congestion intensity and duration in the 5 PM WB direction of I-80, prior to the Squirrelwood Rd Interchange.