

APPENDIX B

**Tremley Point Connector Road Mobile Source Noise Impact
Assessment**

NEW JERSEY TURNPIKE AUTHORITY

TREMLEY POINT CONNECTOR ROAD

**MOBILE SOURCE
NOISE IMPACT ASSESSMENT**

MAY 2003

Prepared by:

Paulus, Sokolowski & Sartor, LLC
consulting engineers and environmental planners

A **KEYSPAN** BUSINESS SOLUTION

67A Mountain Boulevard Extension
Warren, New Jersey 07059

**NEW JERSEY TURNPIKE AUTHORITY
TREMLEY POINT CONNECTOR ROAD**

**MOBILE SOURCE
NOISE IMPACT ASSESSMENT**

CONTENTS

<u>Section</u>	<u>Page No.</u>
1.0 INTRODUCTION	1-1
1.1 Purpose.....	1-1
1.2 Scope.....	1-2
1.3 Noise Descriptors.....	1-2
1.3.1 Environmental Noise	1-2
1.3.2 EPA Criteria Leq.....	1-3
1.3.3 Statistical Descriptors	1-4
1.4 Noise Standards and Criteria	1-4
1.4.1 NJTA Noise Policy	1-5
1.4.2 FHWA Noise Abatement Criteria.....	1-5
1.4.3 Middlesex County and Union County	1-6
1.4.4 New Jersey Noise Standards	1-6
1.4.5 HUD Criteria.....	1-7
2.0 PROJECT DESCRIPTION.....	2-1
3.0 NOISE MONITORING	3-1
3.1 Noise Monitoring Equipment	3-1
3.2 Noise Monitoring Methodology	3-2
3.3 Noise Monitoring Locations	3-3
3.4 Noise Monitoring Results	3-4
4.0 TRAFFIC VOLUMES.....	4-1
4.1 Field Traffic Count	4-1
4.2 Hourly Traffic Volumes.....	4-1
5.0 NOISE MODELING	5-1
5.1 FHWA Traffic Noise Model	5-1
5.2 Model Verification.....	5-1
5.3 Noise Modeling Scenarios	5-2

5.4	Noise Modeling Input	5-2
5.4.1	Roadway Segments and Terrain	5-2
5.4.2	Noise Modeling Receptors.....	5-3
5.5	Noise Modeling Results.....	5-3
6.0	SUMMARY AND CONCLUSIONS	6-1
7.0	REFERENCES	7-1

APPENDICES

Appendix A	Noise Monitoring Data Sheets
Appendix B	Traffic Data
Appendix C	Model Verification Results
Appendix D	Noise Modeling Input Files
Appendix E	Noise Modeling Output Files

FIGURES

Figure 2-1	Site Location Map
Figure 3-1	Noise Monitoring Locations (NM3, NM4)
Figure 3-2	Noise Monitoring Location (NM6)
Figure 5-1	Noise Modeling Receptor Locations (Existing)
Figure 5-2	Noise Modeling Receptor Locations (Project Build)

TABLES

Table 1-1	FHWA Noise Abatement Criteria
Table 1-2	Noise Sensitivity Criteria, Decibel Changes and Loudness
Table 3-1	Noise Monitoring Locations
Table 3-2	Noise Monitoring Results
Table 4-1	Existing Traffic Volumes
Table 4-2	Project Build Traffic Volumes
Table 5-1	Noise Modeling Results - Sensitive Receptors

SECTION 1.0

INTRODUCTION

**NEW JERSEY TURNPIKE AUTHORITY
TREMLEY POINT CONNECTOR ROAD**

**MOBILE SOURCE
NOISE IMPACT ASSESSMENT**

1.0 INTRODUCTION

The planned Tremley Point Connector Road would provide a direct access from Tremley Point in Linden to Interchange 12 of the New Jersey Turnpike in Carteret, New Jersey. Currently, the only means of vehicular access to Carteret from Linden is via Roosevelt Avenue to Rahway, travel along Routes 1 & 9 to Linden and then travel through a residential area of Linden to the industrial section of Tremley Point. The planned Tremley Point Connector Road, which links Tremley Point Road and Industrial Road connecting to Interchange 12, will address the significant truck traffic that currently travels through the residential section of Linden. The proposed improvements to Interchange 12 are an independent action that has independent utility and would need to be constructed prior the proposed Tremley Point Connector Road.

1.1 Purpose

This Mobile Source Noise Impact Assessment presents an assessment of noise concerns due to traffic associated with the preferred alternative considered for the planned Tremley Point Connector Road Project (Project). This assessment includes measurement of existing noise in the vicinity of the planned Project, identification of traffic scenarios (noise sources), and modeling noise due to existing traffic as well as future traffic.

Paulus, Sokolowski and Sartor, LLC (PS&S) prepared this noise impact assessment and performed noise monitoring of existing conditions and modeling of noise from traffic associated with Existing and Project Build scenarios of the Project. This noise impact assessment was prepared in accordance with generally accepted noise assessment procedures and other guidance as presented in Section 1.3.

1.2 Scope

Preparation of this noise impact assessment involved reviewing existing noise conditions in the vicinity of the planned Project, identifying noise from traffic associated with the Project, and assessing the significance of any potential noise impacts from the projected noise from traffic related to the Project.

The activities performed as part of this assessment included:

- Identifying potential noise sensitive receptors in the vicinity of the Tremley Point Connector Road Project site;
- Measuring existing (background) noise levels;
- Identifying existing noise sources in the vicinity of the Project site;
- Predicting noise levels with the most current Federal Highway Administration (FHWA) Traffic Noise Model (TNM2.0) due to existing traffic as well as noise levels expected from project-related traffic; and,
- Compiling, reviewing and comparing results to applicable noise impact assessment criteria and standards.

This mobile source noise impact assessment of the Tremley Point Connector Road Project is based on available information on existing traffic (2002) and future alternative traffic scenarios obtained from the Alternative Analysis Summary Final Report prepared by Edwards & Kelcey, Inc. (December 17, 2002) for the preferred alternative.

1.3 Noise Descriptors

1.3.1 Environmental Noise

Noise is commonly defined as unwanted sound, where sound is comprised of pressure waves that move or propagate through the air or other media. Factors that affect how noise is perceived by the human ear include the amplitude or loudness, the

frequency, and the duration of the sound, as well as the location of the receiver relative to the source of sound. Sound energy (noise) dissipates with distance from the source. Sound levels can also be dissipated by ground and atmospheric absorption and can often be significantly reduced by barriers that block the line of sight between the source and the receiver.

The standard sound measurement unit is the decibel (dB). Sound weighted to correspond to the range of human hearing is referred to as the A-scale (dBA). One of the most commonly used noise descriptions for outdoor time varying noise is the L-equivalent (Leq) which is the equivalent steady state sound that contains the same acoustic energy as the time-varying noise level over the same time period.

Noise associated with motor vehicles stems from a variety of sources. For cars the rolling of tires on pavement is the predominant noise source, while most noise from trucks is from exhaust and engine noise. Additionally, vehicle noise is generated by brakes, loose body components, and faulty exhaust systems.

Although the human ear can detect changes in sound as small as 1 dBA, a 3 dBA change in noise level is considered to be the smallest detectable change over an extended period of time. A change of 10 dBA is perceived by most people to be a doubling or halving of the sound level.

1.3.2 EPA Criteria Leq

The equivalent sound level (Leq) is defined as the value of a steady-state sound which has the same A-weighted sound energy as that contained in the time-varying sound. The Leq is a single value of sound level for a desired duration, which includes all of the time-varying sound energy in the measurement period in units of A-weighted decibels (dBA). The United States Environmental Protection Agency (USEPA) has chosen Leq as the best environmental noise descriptor for several

reasons, but primarily because it correlates reasonably well with the effects of noise on people, even for wide variations on environmental sound levels and time patterns. Also, it is easily measurable with available equipment.

The USEPA has identified an Leq of 70 dBA as protecting against damage to hearing, and an Leq (for steady noise) of 60 dBA that allows 95 percent sentence intelligibility at a distance of 6.6 feet (2 meters) (USEPA 1974).

1.3.3 Statistical Descriptors

The L10, L70, and L90 are statistical descriptors of the Leq, and represent the sound (decibel) level above which the noise is 10, 70, and 90 percent of the time, respectively. The L10 level (exceeded only 10 percent of the time) is defined as the intrusive level. The L90 level (exceeded 90 percent of the time) is defined as the ambient level. These statistical descriptors are also referred to as the Ln where the value of "n" is defined by the user.

Measurements of the residual or background sound level are useful in characterizing the type of community noise. Comparisons of data have shown that the L90 closely approximates the residual or ambient sound level. The residual sound level is the minimum sound level reading in the absence of identifiable or intermittent local sources. It is not the absolute minimum level during a specific observation period, but is the minimum reading that is reached and repeated during measurement (Bolt, Beranek, and Newman, Inc. 1978).

1.4 Noise Standards and Criteria

A review of various noise requirements, standards, criteria, and guidance applicable to noise associated Projects was performed. Generally, the FHWA criteria are applicable to traffic noise while other state and local standards apply to commercial/industrial operations that

generate noise. Relevant noise requirements, standards, criteria, and guidance are summarized below.

1.4.1 NJTA Noise Policy

The NJTA has established a written policy for the construction of sound barriers that outlines the conditions for which a sound barrier will be constructed at the NJTA's expense. This policy outlines two (2) scenarios under which NJTA will construct sound barriers at its own expense: As a part of a new roadway construction or widening and on a priority basis as part of a retrofit program. However, in all cases, the noise level criterion for NJTA action is the exceedance of 67 dBA at the exterior of homes immediately adjacent to the NJTA right-of-way, as projected for the peak noise design hour from turnpike traffic. Additional criteria involves expected barrier effectiveness, cost per dwelling, maximum height, and construction feasibility.

1.4.2 FHWA Noise Abatement Criteria

The FHWA has established noise abatement criteria for motor vehicle noise on roadways (23 CFR 772). These requirements are intended to apply to highway projects. However, these criteria can also be used as guidance for assessing traffic noise on local roads too. These criteria are presented in Table 1-1 and represent maximum desirable noise levels for various land uses and associated human activities for use in assessing noise levels from roadway traffic. An exterior Leq of 67 dBA is the Noise Abatement Criterion typically used to evaluate noise levels along highways (Table 1-1, Activity Category B) applicable to residential areas. The FHWA Noise Abatement Criterion for areas not considered sensitive receptors, such as manufacturing zones, is an Leq of 72 dBA (Table 1-1, Activity Category C).

FHWA also provides noise sensitivity criteria to evaluate the significance of any

noise impacts which are presented in Table 1-2. Generally, a three dBA or smaller change in noise level would be barely perceptible to most listeners, whereas a ten dBA change is normally perceived as a doubling (or halving) of noise levels. These guidelines permit direct estimation of an individual's probable perception of changes in noise levels; thus, a three-dBA increase is commonly used as the threshold for determining noise impact significance.

1.4.3 Middlesex County and Union County

The Counties of Middlesex and Union both enforce the New Jersey Noise Regulations, which require that sound from any industrial or commercial operation measured at any residential property line must not exceed a continuous sound level of 65 dBA during the daytime (7:00 am to 10:00 pm) or a level of 50 dBA during the nighttime (10:00 pm to 7:00 am). The noise regulations also limit continuous sound from any industrial or commercial operation measured at any other commercial property line to 65 dBA (Ord. 89-38). Carteret, New Jersey does have a noise ordinance (Ord. 92-21) in effect which sets the same noise level limits as stated above.

1.4.4 New Jersey Noise Standards

The State of New Jersey noise standards require that sound from any industrial or commercial operation measured at any residential property line must not exceed a continuous sound level of 65 dBA during the daytime (7:00 am to 10:00 pm) or a level of 50 dBA during the nighttime (10:00 pm to 7:00 am). New Jersey noise standards also limit continuous sound from any industrial or commercial operation measured at any other commercial property line to 65 dBA (N.J.A.C. 7:29, 2000). Noise associated with the use of public roadways is exempt from the requirements and standards of the current noise regulations pursuant to N.J.A.C. 7:29-1.4.

Octave band sound levels have been specified by the State of New Jersey, which limit the sound intensity at residential and commercial property boundary lines. The State standard also includes both daytime and nighttime octave band sound level limits (N.J.A.C. 7:29-1.2, May 2000). An octave band sound level limit requires a noise analysis of sound levels at various frequencies. Sound signals can be electronically separated into frequency bands, such as octave bands, each of which covers a 2 to 1 range of frequencies. For example, the effective band for the 1,000 Hz octave band center frequency extends from 707 to 1,414 Hz.

1.4.5 HUD Criteria

The Department of Housing and Urban Development (HUD) has issued environmental noise standards ranking the suitability of sites for new housing construction in terms of environmental noise. HUD has determined that sites with a total outdoor day/night equivalent sound level (Ldn) of 65 dBA and below are acceptable (HUD 1979).

**Table 1-1
FHWA Noise Abatement Criteria (dBA)**

Activity Category	Threshold of Noise Interference		Noise Abatement Criteria		Description of Activity Category
	L10	Leq	L10	Leq	
A (Exterior)	48	45	60	57	Tracts of land for which serenity and quiet are of extraordinary significance and which serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, open spaces, or historic districts which are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B (Exterior)	58	55	70	67	Picnic areas, recreation areas, playgrounds, active sports areas, and parks which are not included in Category A and residences, motels, hotels, public meeting rooms, schools, churches, libraries, and hospitals.
C (Exterior)	63	60	75	72	Developed lands, properties or activities not included in Categories A or B above.
D	--	--	--	--	For requirements on undeveloped lands see paragraphs 11a and c of Federal Aid Highway Program Manual Volume 7, Chapter 7, Section 3.
E (Interior)	43	40	55	52	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: FHWA Report "A Field Review of the Highway Traffic Noise Impact Identification and Mitigation Decision Making Processes",
Federal Aid Highway Program Manual, Volume 7, Chapter 7, Section 3 - August 4, 1982.

