South Mountain corridor team

Noise Report

In support of the
Environmental Impact Statement

South Mountain Transportation Corridor in Maricopa County, Arizona

Arizona Department of Transportation
Federal Highway Administration
in cooperation with
U.S. Army Corps of Engineers
U.S. Bureau of Indian Affairs
Western Area Power Administration

ADOT

June 2014

Federal-aid Project Number: NH-202-D(ADY)
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Abstract: This document evaluates the projected noise impacts from the various alternatives and options for the South Mountain Transportation Corridor. Based on computer modeling of the proposed transportation corridor, impacts are identified and noise mitigation is evaluated to reduce impacts at selected noise-sensitive receivers throughout the project corridor.

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List of Acronyms and Abbreviations

ADOT	Arizona Department of Transportation
C	Central
C.F.R.	Code of Federal Regulations
Community	Gila River Indian Community
dB	decibel
dBA	A-weighted decibel average
E	Eastern
E1	E1 Alternative
EIS	environmental impact statement
FHWA	Federal Highway Administration
FR	Full Reconstruction
I-10	Interstate 10
L_{eq}	logarithmic equivalent
LOS	level of service
MAG	Maricopa Association of Governments
mph	miles per hour
NAC	Noise Abatement Criteria
NAP	Noise Abatement Policy
PR	Partial Reconstruction
R/W	right-of-way
SMTC	South Mountain Transportation Corridor
SR	State Route
TI	traffic interchange
TNM 2.5	Traffic Noise Model, version 2.5
W	Western
W101CFR	W101 Alternative, Central Option, Full Reconstruction
W101CPR	W101 Alternative, Central Option, Partial Reconstruction
W101EFR	W101 Alternative, Eastern Option, Full Reconstruction
W101EPR	W101 Alternative, Eastern Option, Partial Reconstruction
W101WFR	W101 Alternative, Western Option, Full Reconstruction
W101WPR	W101 Alternative, Western Option, Partial Reconstruction
W59	W59 Alternative
W71	W71 Alternative

Glossary

affected environment	Those elements of the Study Area that may be changed by the proposed alternatives. These changes might be positive or negative in nature.
ambient noise level	The noise level existing in an area before the introduction of the proposed roadway improvement project. This noise is measured in decibels (dBA) and expressed as L_{eq} ambient noise levels.
at grade	Approximately level with the immediate surrounding terrain.
automobiles	All vehicles with two axles and four wheels designed primarily for passenger transportation. Generally, the gross vehicle weight is less than 10,000 pounds. Examples include passenger cars such as a Ford Mustang and Honda Accord.
barrier	A solid wall or earth berm located between the road and receiver location that breaks the line-of-sight between the receiver and the road sources and reduces the noise level at the receiver.
capacity	The maximum number of vehicles that a given section of roadway or traffic lane can accommodate in one direction in 1 hour.
decibel (dB)	A logarithmic unit that indicates the amount of sound energy. The approximate threshold of hearing is 0 dBA, while the approximate threshold of pain is 140 dBA. Most suburban areas have daytime noise levels ranging from 50 to 70 dBA.
depressed roadway	A roadway that is constructed below the immediate surrounding terrain.
design year	The future year used to determine the probable traffic volume for which a highway and noise abatement are designed.
Eastern Section	The portion of the Study Area located east of 59th Avenue.
elevated roadway	A roadway that is constructed above the immediate surrounding terrain, either on an embankment or a structure.
environmental impact statement (EIS)	A project document prepared in accordance with the National Environmental Policy Act when the project is anticipated to have a significant impact on the environment.
existing noise levels	The noise resulting from the natural and mechanical sources and human activity usually present in a particular area.
Federal Highway Administration (FHWA)	A branch of the U.S. Department of Transportation responsible for administering the Federal-aid Program. The program provides financial resources and technical assistance for constructing, preserving, and improving the National Highway System along with other urban and rural roads.
heavy trucks	All vehicles having three or more axles and designed for the transportation of cargo. Generally, the gross weight is greater than 26,400 pounds. Examples include semi-tractor-trailer trucks and concrete trucks.
impact	A direct or indirect consequence of the construction or operation of the proposed alternative on the environment in the Study Area.

L_{Aeq1h}	The L_{eq} for 1 hour.
L_{eq}	The equivalent steady-state, A-weighted sound level that, in a stated period of time, would contain the same acoustical energy as the time-varying sound levels during the same period. The average noise level over a period of time.
level of service (LOS)	The operating level of an intersection or road segment. Level of service is a qualitative description of operation based on delay and maneuverability.
light trucks	All vehicles with two axles and four wheels designed primarily for transportation of passengers and cargo. Generally, the gross vehicle weight is less than 10,000 pounds. Examples include pickup trucks, such as a Ford F-150 and Chevrolet Silverado, as well as sport utility vehicles, such as a Ford Explorer and Chevrolet Tahoe.
main line	The main travel lanes of a transportation facility, such as a freeway.
medium-sized trucks	All vehicles having two axles and six wheels designed for the transportation of cargo. Generally, the gross vehicle weight is greater that 10,000 pounds but less than 26,400 pounds. Examples include local delivery trucks, such as a UPS truck.
mitigation	An action taken to reduce or eliminate an adverse impact stemming from construction, operation, or maintenance of a proposed action alternative. Mitigation could reduce the magnitude and extent of an impact from a level of significance to a level of insignificance. Mitigation includes *avoiding* the impact altogether by not taking a certain action or parts of an action; *minimizing* impacts by limiting the degree of magnitude of the action and its implementation; *rectifying* the impact by repairing, rehabilitating, or restoring the affected environment; *reducing or eliminating* the impact over time by preservation and maintenance operations during the life of the action; and *compensating* for the impact by replacing or providing substitute resources or environments. (40 Code of Federal Regulations § 1508.20)
noise level reduction	The change in noise level at a receiver location due to the presence of a barrier or shielding element between the road and the receiver.
peak hour	The single morning or evening hour during which the maximum traffic volume occurs.
receiver	The location at which noise levels are computed and analyzed. Receivers are usually residences, schools, parks, or other noise-sensitive land uses.
right-of-way (R/W)	Publicly owned land used or intended to be used for transportation and other purposes.
single-family residence	Single-family, detached house.
sound level (or noise level)	Weighted sound level measured with a sound-level meter having metering characteristics and a frequency weighting of A, B, or C, as specified in the sound-level meter standard.
speed	The rate of movement of vehicular traffic, in miles per hour.
Study Area	The geographic area within which build alternative solutions to the problem are developed.

traffic noise impacts	Impacts that occur when the predicted traffic noise approaches or exceeds the noise abatement criteria or substantially exceeds the existing noise level.
Traffic Noise Model, version 2.5 (TNM 2.5)	Noise prediction model developed by the Federal Highway Administration. This model is considered the standard for road noise analysis.
Western Section	The portion of the Study Area located west of 59th Avenue.

1. Project Description and Purpose and Need

Project Description

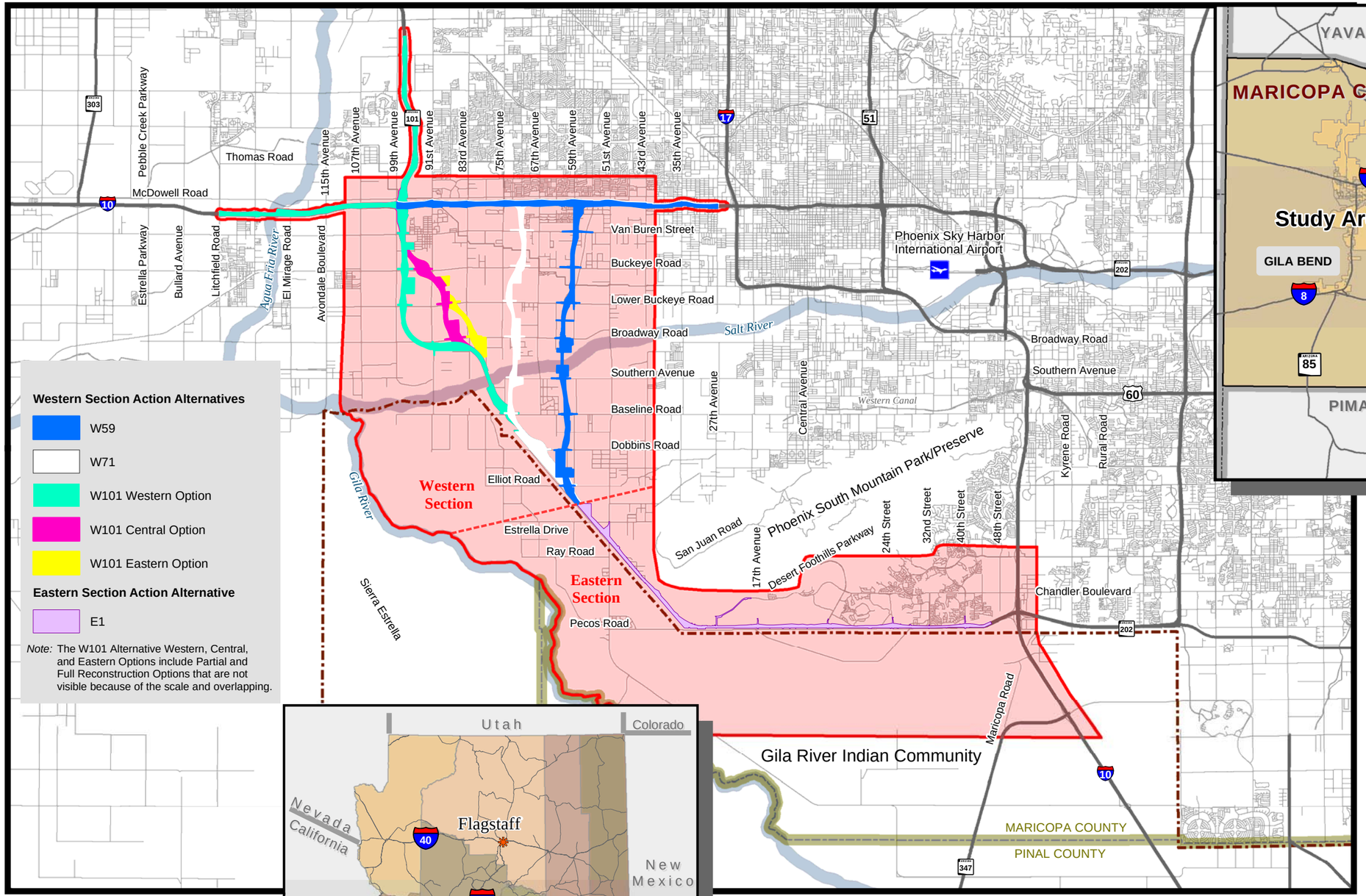
The Arizona Department of Transportation (ADOT) is studying the South Mountain Transportation Corridor (SMTC) in southern Phoenix, Maricopa County, Arizona. The South Mountain Freeway corridor was adopted into the Maricopa Association of Governments (MAG) regional freeway system in 1985 as part of the *MAG Freeway/Expressway Plan* (MAG 1985), at which time it was placed on the state highway system by the State Transportation Board. In 1988, ADOT prepared a design concept report and a state-level environmental assessment for the project, identified at that time as the South Mountain Parkway (ADOT 1988a, 1988b). As presented then, the project would connect Interstate 10 (I-10) (Maricopa Freeway) south of Phoenix with I-10 (Papago Freeway) west of the city, following an east-to-west alignment along Pecos Road through the western tip of the Phoenix South Mountain Park/Preserve, then north to I-10 between 59th and 99th avenues. Because of the time elapsed since those documents were approved and to secure eligibility for federal funding for a proposed project within this corridor, ADOT and the Federal Highway Administration (FHWA) are now preparing an environmental impact statement (EIS) in accordance with the National Environmental Policy Act. In November 2004, the MAG *Regional Transportation Plan* (2003) was placed before Maricopa County voters, who approved the sales tax funding the plan. The South Mountain Freeway was included in this plan.

Alternatives considered for the SMTC included past freeway proposals as well as transportation system management, transportation demand management, transit improvements, arterial street network improvements, and land use controls. A freeway facility was determined to best address the project purpose and need. Therefore, this report discusses the potential impacts of a proposed freeway in the SMTC.

The Study Area for the EIS encompasses more than 156 square miles and is divided into a Western Section and an Eastern Section at a location common to all action alternatives (Figure 1). The division between sections occurs just east of 59th Avenue and south of Elliot Road.

Within the Western Section, three action alternatives are being considered for detailed study. These are the W59, W71, and W101 Alternatives. The W59 Alternative would connect to I-10 at 59th Avenue, while the W71 Alternative would connect at 71st Avenue. The W101 Alternative would connect to I-10 at the existing State Route (SR) 101L (Agua Fria Freeway)/I-10 system traffic interchange (TI) and has six associated options. The W101 Alternative options vary geographically among the Western (W), Central (C), and Eastern (E) Options and would vary geometrically based on a Partial Reconstruction (PR) or a Full Reconstruction (FR) of the system TI.

Improvements to I-10 (Papago Freeway) would occur for each Western Section action alternative (W59, W71, and W101). Improvements to SR 101L would occur for each option associated with the W101 Alternative.



Location in county

Location in state

Study Area and action alternatives

South Mountain Transportation Corridor
Federal-aid Project Number: NH-202-D(ADY)
ADOT Project Number: 202L MA 054 H5764 01L

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Figure 1

Study Area and Action Alternatives

Noise Report

Within the Eastern Section of the Study Area, one action alternative is being considered. The E1 Alternative would begin near Elliot Road and 59th Avenue and proceed to the southeast to Pecos Road, which it would follow to the east until connecting to I-10 (Maricopa Freeway) at the Pecos Road/I-10/SR 202L (Santan Freeway) system TI.

The action alternatives and options are summarized in Table 1.

Table 1. Action Alternatives and Options

Section	Interstate 10 Connection	Action Alternative	Option – Broadway Road to Buckeye Road	Option – State Route 101L/ Interstate 10 Connection Reconstruction	Option Name
Western	59th Avenue	W59	—[a]	—	—
	71st Avenue	W71	—	—	—
	State Route 101L	W101	Western	Partial Reconstruction	W101WPR
				Full Reconstruction	W101WFR
			Central	Partial Reconstruction	W101CPR
				Full Reconstruction	W101CFR
			Eastern	Partial Reconstruction	W101EPR
				Full Reconstruction	W101EFR
Eastern	Pecos Road	E1	—	—	—

[a] not applicable

The No-Action Alternative is being considered for the entire Study Area.

Purpose and Need

An analysis of population trends, land use plans, and travel demand shows that a considerable traffic problem in the Phoenix metropolitan area is projected for the future, resulting in the need for a new freeway in the SMTC. This traffic problem is likely to worsen if plans are not made to accommodate the regional travel anticipated. The purpose of a freeway within the SMTC is to support a solution to traffic congestion. Between the early 1950s and the mid-1990s, the metropolitan area grew by over 500 percent, compared with approximately 70 percent for the United States as a whole (MAG 2001). From 1980 to 2010, the population of Maricopa County more than doubled, from 1.5 million to 3.8 million. The MAG region has been one of the fastest-growing metropolitan areas in the United States; by population, Phoenix is the sixth-largest city in the country and the region ranks as the 13th-largest metropolitan area in the country (U.S. Census Bureau 2012).

Travel demand and vehicle miles driven in the metropolitan area are expected to increase at a faster rate than the population. MAG projections (conducted in collaboration with the Arizona Department of Economic Security) indicate Maricopa County's population will increase from 3.8 million in 2010 to

5.8 million in 2035 (MAG 2013). It is projected that in the next 20 years, daily VMT will increase from 91 million to 147 million.

Even with anticipated improvements in light rail service, bus service, trip reduction programs, and existing roads and freeways, vehicle traffic volumes are expected to exceed the capacity of Phoenix metropolitan area streets and highways by as much as 18 percent in 2035. A freeway within the SMTC would accommodate approximately 11 percentage points of the 18 percent of the unmet travel demand and would be part of an overall traffic solution.

2. Affected Environment

Noise Criteria

The basic unit of measurement for noise is the decibel (dB), which is a logarithmic unit that expresses the ratio of the sound pressure level being measured to a standard reference level. Environmental noise is typically frequency-weighted using the A-scale (dBA) to approximate the frequency response of the human ear. Noise analyses for transportation projects use the hourly equivalent sound level (L_{Aeq1h}, or simply L_{eq}), which is a logarithmic energy average over a 1-hour period.

The FHWA Federal Aid Program Guide H-772 and Title 23, Code of Federal Regulations (C.F.R.), Part 772 (23 C.F.R. § 772) require transportation agencies to identify noise-sensitive land uses near their projects, to evaluate the noise impacts to those land uses, and to consider noise abatement options. To further clarify the process of noise analysis and the evaluation of noise abatement, ADOT has adopted a Noise Abatement Policy (NAP) (ADOT 2011).

The federal regulations specify Noise Abatement Criteria (NAC) for various types of land use activity categories, summarized in Table 2, and state that noise abatement must be considered when the predicted future peak hour traffic noise from a project approaches or exceeds the NAC. The NAP defines an approach as within 3 dBA of the federal NAC for activity categories A, B, C, D, and E. Additionally, mitigation must be considered for properties if predicted traffic noise levels substantially exceed existing levels. “Substantially exceed” is defined in the NAP as 15 dBA.

When the predicted noise level at a noise-sensitive land use approaches or exceeds the NAC, or substantially exceeds the existing noise level, noise abatement must be considered. Part of the noise abatement consideration process specifies that the abatement must be reasonable and feasible. Feasibility evaluations consist of various constructibility issues and whether the proposed noise abatement can provide substantial noise reduction. Reasonability criteria consist of cost-benefit considerations, maximum barrier heights, and other barrier design issues.

Table 2. Federal Highway Administration and Arizona Department of Transportation Noise Abatement Criteria

Land Use – Primary Activity Category	Activity Category L_{Aeq1h}[a]		Evaluation Location	Land Use Activity Description
	FHWA[b] Noise Abatement Criteria	ADOT[c] Noise Abatement Criteria		
A	57	54	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where preserving those qualities is essential if the area is to continue to serve its intended purpose
B[d]	67	64	Exterior	Residential
C[d]	67	64	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52	49	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E[d]	72	69	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in category A–D or F
F	—[e]	—	—	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities, water resources, water treatment, electrical, and warehousing
G	—	—	—	Undeveloped lands that are not permitted

[a] The L_{Aeq1h} activity category values are for impact determination only and are not design standards for noise abatement measures.
[b] Federal Highway Administration
[c] Arizona Department of Transportation
[d] includes undeveloped lands permitted for this activity category
[e] not applicable

Existing Noise Levels

Ambient or existing noise level readings were taken at 44 locations within the project limits. A discussion of the analysis methodology and assumptions is located in Appendix A. The monitoring sites were located at approximately 1-mile spacing along the corridor. The monitoring sites are described below. Monitoring locations are shown, along with receiver locations, on Figures 2–5 in the next section.

The existing noise levels were recorded at the monitoring sites with Larson Davis Model 812 and Model 820 Type I integrating sound level meters. The readings were taken on numerous occasions from September 2003 to July 2004 during midday nonpeak traffic conditions.

The weather conditions during the readings ranged from clear skies to mostly cloudy skies, 58 to 103 degrees Fahrenheit, and 8 to 35 percent relative humidity, with breezes averaging 0 miles per hour (mph) to 5.9 mph from variable directions. These weather conditions are within the parameters established by FHWA in *Measurement of Highway-Related Noise* (FHWA 1996) and have little effect on the transmission of sound energy for the receivers in the Study Area.

Each monitoring period consisted of a single 15- to 30-minute sound level recording using an integrating sound level meter. Most readings were conducted for a period of 15 minutes. Based on FHWA guidance, the longer monitoring periods were used at locations with little traffic noise and a greater short-term variability in the ambient noise. The duration of each reading was sufficient to record the existing noise characteristics at the monitoring location. At all locations, the meter was placed approximately 5 feet above the ground. Results of the ambient noise monitoring are shown in Table 3.

Table 3. Results of Ambient Noise Monitoring

Site ID	Action Alternative and Option	Location Description	Duration (minutes)	Ambient Noise Level (L_{eq})
M1	E1	Near 44th Street and Cedarwood Lane	15	55
M2	E1	Near 36th Place and Windsong Drive	15	52
M3	E1	End of 26th Street, south of Redwood Lane	15	56
M4	E1	Apartments at 21st Street and Liberty Lane, southwestern side	15	53
M5	E1	Church near 15th Street and Liberty Lane	15	54
M6	E1	Near Ashurst Drive and 2nd Place	15	45
M7	E1	Near 15th Avenue and Liberty Lane	30	44
M8	E1	North of Pecos Road, between 17th and 27th avenues	30	46
M9	E1	Corner of 30th Lane and Redwood Lane	30	51
M10	E1	Pecos Road at Community[a] boundary	15	45
M11	E1	Corner of 45th Avenue and Galveston Street	15	48
M12	E1	Corner of Dusty Lane and Ray Road	15	54
M13	E1	Estrella Drive at Community boundary	15	55
M14	E1	Corner of 59th Avenue and Elliot Road	15	49
M15	W59	59th Avenue, ⅜ mile north of Elliot Road	15	45
M16	W59	South Mountain Avenue, west of 59th Avenue	15	47
M17	W59	Corner of 59th Avenue and Vineyard Road	15	50
M18	W59	Southern Avenue, ½ mile west of 59th Avenue	15	58
M19	W59	Corner of 61st Avenue and Warner Street	15	51

Table 3. Results of Ambient Noise Monitoring

Site ID	Action Alternative and Option	Location Description	Duration (minutes)	Ambient Noise Level (L_{eq})
M20	W59	59th Avenue and Roosevelt Irrigation District canal	15	64
M21	W59	57th Drive south of Jefferson Street	15	58
M22	W59	Southwest Village Apartments, 777 North 59th Avenue, southeastern corner	15	49
M23	W101W W101C W101E W71	Elliot Road at Community boundary	15	49
M24	W101W W101C W101E W71	Dobbins Road at Community boundary	15	54
M25	W101W W101C W101E	Baseline Road at Community boundary	15	61
M26	W101W W101C	Alta Vista Road, west of 75th Avenue	15	50
M27	W101W W101C	87th Avenue, ¼ mile south of Broadway Road	15	52
M28	W101W	Broadway Road, ½ mile west of 91st Avenue	15	62
M29	W101W	Kingman Street, east of 97th Avenue	15	48
M30	W101W	99th Avenue, ½ mile north of Lower Buckeye Road	15	57
M31	W101W W101C W101E	Apartments on 96th Avenue, north of Van Buren Street	15	50
M32	W101C	91st Avenue, 500 feet north of Broadway Road	15	62
M33	W101C	87th Avenue, north of Lower Buckeye Road	15	53
M34	W101C W101E	Buckeye Road, ½ mile east of 99th Avenue	15	59
M35	W101E	75th Avenue, ½ mile south of Southern Avenue	15	49
M36	W101E	83rd Avenue, ¾ mile south of Broadway Road	15	53
M37	W101E	Elwood Street, west of 83rd Avenue	15	53
M38	W101E	Watkins Street, east of 86th Drive	15	54
M39	W71	Baseline Road, east of 75th Avenue	15	63
M40	W71	Southern Avenue, east of 75th Avenue	15	62
M41	W71	71st Avenue, south of Wier Avenue	15	44
M42	W71	Crown King Road, east of 73rd Drive	15	54
M43	W71	Durango Street, west of 71st Avenue	15	48
M44	W71	Corner of 71st Avenue and Polk Street	15	55

[a] Gila River Indian Community

3. Environmental Consequences

More than 220 sensitive receivers were evaluated from a traffic noise perspective for the three Western Section action alternatives and options and the Eastern Section action alternative. Receiver locations for the Western Section of the Study Area are indicated on Figures 2 and 3. Receiver locations for the Eastern Section of the Study Area are indicated on Figures 4 and 5. The impacts from each of the action alternatives and options and the No-Action Alternative are discussed in more detail later in this chapter.

In areas where the Western Section action alternatives are located close together, nearby receivers were evaluated for both alternatives and are listed in Table 4 under both alternatives. Also, several new residential subdivisions have been developed since the initial noise evaluations began in 2003. To include these new receiver locations without altering the sequential numbering system, additional receivers were assigned an identification number beginning with the nearest receiver number, followed by a letter to distinguish the new receiver. For instance, if the nearest existing receiver was numbered 26, the additional nearby receiver would be numbered 26a.

The receivers were evaluated using the future year (2035) peak-hour traffic volumes. Noise levels with and without mitigation were modeled, and the results of the noise analysis for each receiver are summarized in Table 4. For some of the receivers, noise from nearby cross-street traffic limited the amount of noise reduction that could be achieved for the SMTC. Mitigation is discussed in further detail in the next section.

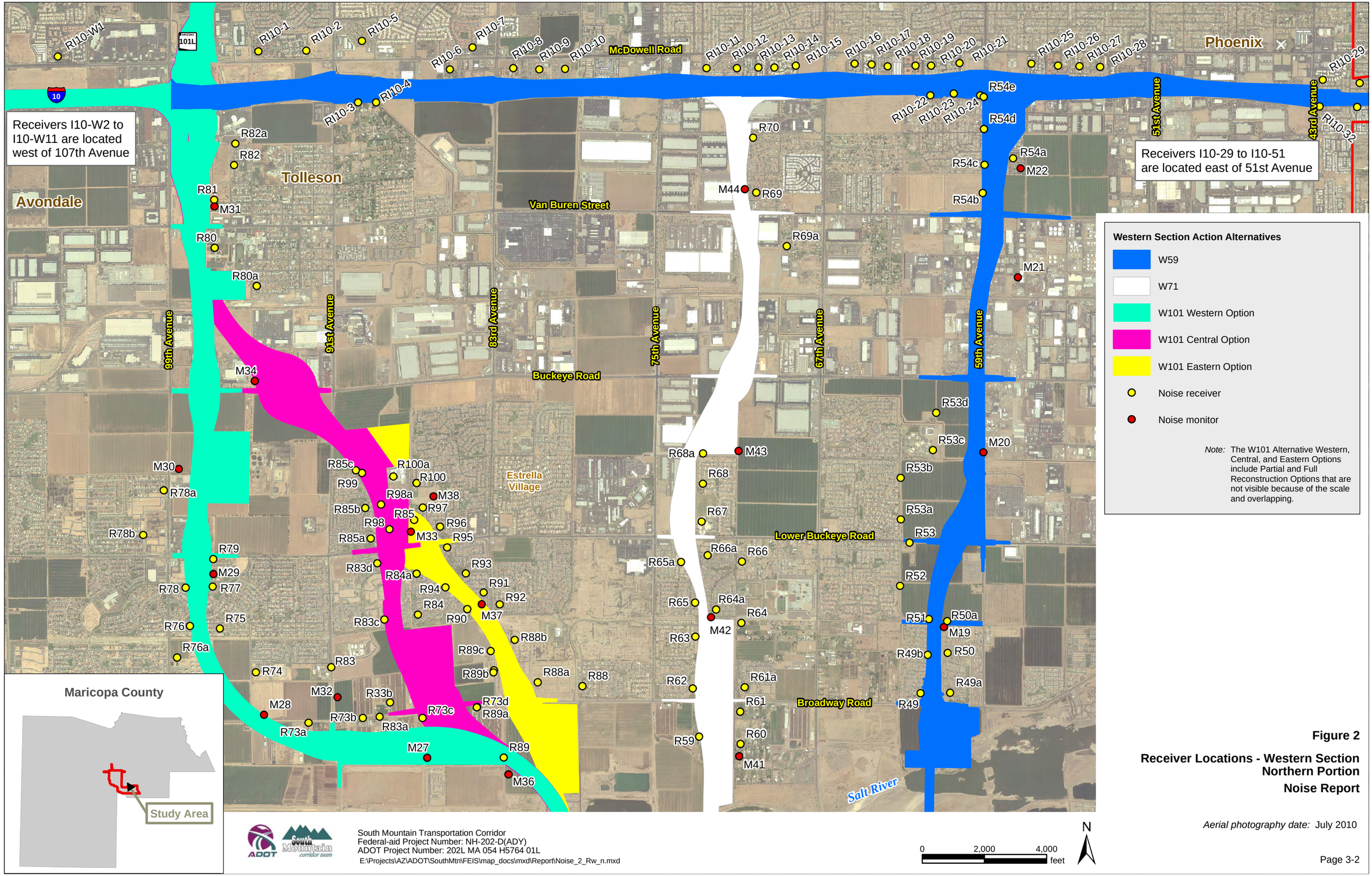

Figure 2

Receiver Locations - Western Section Northern Portion

Noise Report

Aerial photography date: July 2010

Gila River Indian Community boundary
Western and Eastern Sections boundary
Noise receiver
Noise monitor

Western Section Action Alternatives

W59
W71
W101 Western Option
W101 Central Option
W101 Eastern Option

Eastern Section Action Alternative

E1

Note: The W101 Alternative Western, Central, and Eastern Options include Partial and Full Reconstruction Options that are not visible because of the scale and overlapping.

Maricopa County

Study Area

South Mountain Transportation Corridor
Federal-aid Project Number: NH-202-D(ADY)
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0 2,000 4,000 feet

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Figure 3

Receiver Locations - Western Section Southern Portion

Noise Report

Aerial photography date: July 2010

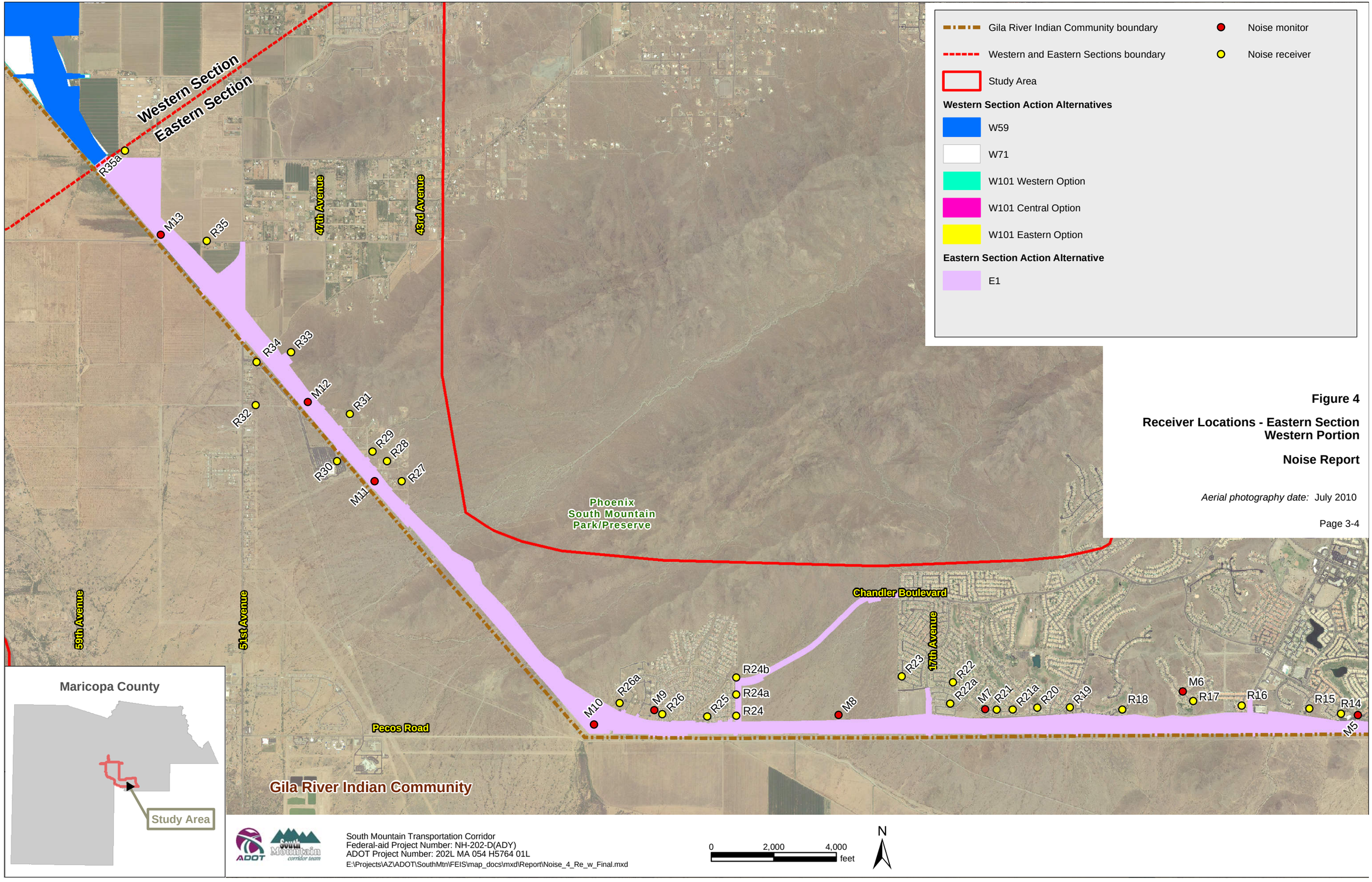

Figure 4

Receiver Locations - Eastern Section Western Portion

Noise Report

Aerial photography date: July 2010

Gila River Indian Community boundary
Study Area
Noise monitor
Noise receiver

Eastern Section Action Alternative

E1

Ahwatukee Foothills Village

Chandler Boulevard

Gila River Indian Community

Desert Foothills Parkway

24th Street

32nd Street

40th Street

48th Street

56th Street

10

M6 R17 R16 R15 R14 M5 R13 R12 R11 M4 R10 R9 M3 R8 R7 R6 R5 M2 R4 R3 M1 R2 R1 R1a R1b R1c R18

Maricopa County

Study Area

South Mountain Transportation Corridor
Federal-aid Project Number: NH-202-D(ADY)
ADOT Project Number: 202L MA 054 H5764 01L
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0 2,000 4,000 feet

N

Figure 5

Receiver Locations - Eastern Section Eastern Portion

Noise Report

Aerial photography date: July 2010

Table 4. Noise Analysis Results

Receiver ID	Activity Category	ADOT Noise Abatement Criteria (L_{Aeq1h})	Distance (in feet) and Direction from Centerline	Neighborhood or Area	Unmitigated Future Build Noise Level (dBA L_{eq})	Mitigated Future Build Noise Level (dBA L_{eq})
E1 Alternative						
1	**B**	**64**	**250 feet north**	**Foothills Paseo 2**	**75**	**63**
1a	**C**	**64**	**460 feet south**	**Pecos Park**	**73**	**61**
1b	**C**	**64**	**320 feet south**	**Pecos Park**	**75**	**62**
1c	**C**	**64**	**440 feet south**	**Pecos Park**	**73**	**60**
2	**B**	**64**	**260 feet north**	**Foothills Paseo 2**	**76**	**62**
3	**B**	**64**	**335 feet north**	**Foothills Paseo 2**	**72**	**61**
4	**B**	**64**	**785 feet north**	**Wilton Commons**	**68**	**62**
5	**C**	**64**	**235 feet north**	**Kyrene de los Lagos Elementary School**	**76**	**63**
6	**B**	**64**	**220 feet north**	**Lakewood Parcel 20**	**74**	**63**
7	**B**	**64**	**215 feet north**	**Lakepoint 21 at Lakewood**	**75**	**63**
8	**C**	**64**	**380 feet north**	**Kyrene Akimel Middle School**	**74**	**61**
9	B	64	390 feet north	Foothills Mountain Ranch 2	70	63
10	**B**	**64**	**280 feet north**	**Foothills Apartments**	**72**	**62**
11	**B**	**64**	**320 feet north**	**Foothills Parcel 5B**	**74**	**62**
12	**B**	**64**	**325 feet north**	**Foothills Parcel 5A**	**74**	**62**
13	**B**	**64**	**305 feet north**	**Foothills Parcel 5C**	**75**	**62**
14	**B**	**64**	**290 feet north**	**Parcel 6A at the Foothills**	**75**	**62**
15	**B**	**64**	**370 feet north**	**Parcel 6A at the Foothills**	**73**	**67[a]**
16	**B**	**64**	**400 feet north**	**Foothills Parcels 12A, B, C**	**73**	**69[b]**
17	**B**	**64**	**690 feet north**	**Foothills Parcels 12A, B, C**	**70**	**62**
18	**B**	**64**	**405 feet north**	**Fairway Hills at Club West**	**73**	**62**
19	**B**	**64**	**455 feet north**	**Fairway Hills at Club West**	**72**	**61**
20	**B**	**64**	**460 feet north**	**Parcel 9G at Foothills Club West**	**72**	**61**

Table 4. Noise Analysis Results

Receiver ID	Activity Category	ADOT Noise Abatement Criteria (L_{Aeq1h})	Distance (in feet) and Direction from Centerline	Neighborhood or Area	Unmitigated Future Build Noise Level (dBA L_{eq})	Mitigated Future Build Noise Level (dBA L_{eq})
21	**B**	**64**	**350 feet north**	**Parcels 18A, 19D, 19E, 26B at Foothills Club West**	**74**	**62**
21a	**B**	**64**	**395 feet north**	**Parcels 18A, 19D, 19E, 26B at Foothills Club West**	**73**	**61**
22	**B**	**64**	**1,175 feet north**	**Parcel 26 at Foothills Club West**	**65**	**61**
22a	**B**	**64**	**470 feet north**	**Foothills Club West Parcels 20 and 25 Amended**	**71**	**64[a]**
23	**B**	**64**	**1,370 feet north**	**Parcel 23 at Foothills Club West**	**64**	**60**
24	**B**	**64**	**210 feet north**	**Foothills Reserve Parcel D**	**77**	**63**
24a	**B**	**64**	**865 feet north**	**Foothills Reserve**	**67**	**60**
24b	**B**	**64**	**1,400 feet north**	**Foothills Reserve**	**69**	**61**
25	**B**	**64**	**195 feet north**	**Foothills Reserve Parcel D**	**76**	**62**
26	**B**	**64**	**240 feet north**	**Foothills Reserve Parcel C**	**76**	**62**
26a	**B**	**64**	**350 feet north**	**Foothills 80**	**75**	**63**
27	**B**	**64**	**470 feet east**	**Dusty Lane area**	**72**	**61**
28	**B**	**64**	**490 feet east**	**Dusty Lane area**	**72**	**61**
29	**B**	**64**	**335 feet east**	**Dusty Lane area**	**74**	**62**
30	**E**	**69**	**760 feet west**	**Community[c] Casino**	**67**	**67[d]**
31	**B**	**64**	**580 feet east**	**Dusty Lane area**	**69**	**60**
32	B	64	1,540 feet west	Community, 51st Avenue area	63	59
33	**B**	**64**	**420 feet east**	**Dusty Lane area**	**74**	**68[a]**
34	B	64	760 feet west	Community, 51st Avenue area	67	62
35	**B**	**64**	**670 feet east**	**53rd Avenue and Estrella Drive**	**68**	**62**
35a	**B**	**64**	**770 feet east**	**Tierra Montana Phase 1**	**69**	**62**
W59 Alternative						
36	**B**	**64**	**580 feet east**	**59th Avenue and Elliot Road**	**69**	**64**

Table 4. Noise Analysis Results

Receiver ID	Activity Category	ADOT Noise Abatement Criteria (L_{Aeq1h})	Distance (in feet) and Direction from Centerline	Neighborhood or Area	Unmitigated Future Build Noise Level (dBA L_{eq})	Mitigated Future Build Noise Level (dBA L_{eq})
37	**B**	**64**	**1,170 feet east**	**59th Avenue north of Elliot Road**	**66**	**60**
38	**B**	**64**	**1,500 feet east**	**59th Avenue and Olney Avenue**	**64**	**58**
39	**B**	**64**	**1,225 feet east**	**59th Avenue and Dobbins Road**	**66**	**58**
40a	**B**	**64**	**925 feet west**	**63rd Avenue and Dobbins Road**	**67**	**60**
40b	**B**	**64**	**1,220 feet west**	**63rd Avenue and Dobbins Road**	**65**	**59**
40c	**B**	**64**	**250 feet east**	**61st Avenue and Dobbins Road**	**73**	**63**
41	**B**	**64**	**385 feet west**	**61st Avenue and South Mountain Avenue**	**74**	**64**
42	**B**	**64**	**790 feet east**	**59th Avenue and South Mountain Avenue**	**69**	**62**
43	**B**	**64**	**920 feet west**	**Rancho Grande**	**63**	**58**
43a	**B**	**64**	**1,750 feet west**	**Avalon Village**	**67**	**61**
44	**B**	**64**	**835 feet west**	**Rancho Grande**	**68**	**61**
44a	C	64	1,590 feet east	Cottonwood Golf Course	63	62
45	B	64	530 feet west	Rancho Grande	71	63
46	**B**	**64**	**145 feet west**	**Rancho Grande**	**78**	**63**
47	B	64	895 feet west	Rancho Grande	69	61
48	B	64	840 feet west	Rancho Grande	68	62
49	**B**	**64**	**485 feet west**	**Rio Del Rey Unit 1**	**71**	**64[a]**
49a	**B**	**64**	**470 feet east**	**Rio Del Rey Unit 2**	**71**	**64[a]**
49b	**B**	**64**	**270 feet west**	**Rio Del Rey Unit 1**	**74**	**61**
50	**B**	**64**	**375 feet east**	**Rio Del Rey Unit 2**	**73**	**62**
50a	**B**	**64**	**345 feet east**	**Rio Del Rey Unit 2**	**75**	**64**
51	**B**	**64**	**250 feet west**	**Rio Del Rey Unit 1**	**76**	**63**
52	**B**	**64**	**1,245 feet west**	**Estrella Manor**	**66**	**58**
53	B	64	1,285 feet west	Meadows	65	60
53a	B	64	1,825 feet west	Park at Terralea	62	59
53b	B	64	2,350 feet west	Park at Terralea	61	58

Table 4. Noise Analysis Results

Receiver ID	Activity Category	ADOT Noise Abatement Criteria (L_{Aeq1h})	Distance (in feet) and Direction from Centerline	Neighborhood or Area	Unmitigated Future Build Noise Level (dBA L_{eq})	Mitigated Future Build Noise Level (dBA L_{eq})
53c	C	64	1,520 feet west	Western Valley Elementary School	65	60
53d	B	64	1,405 feet west	61st Avenue and Buckeye Road	65	60
54b	B	64	355 feet west	59th Avenue north of Van Buren Street	72	67
54c	B	64	430 feet west	Centura West	72	69
54d	B	64	700 feet west	Centura West	71	69
54e	B	64	900 feet west	Patio Homes West	71	70
Interstate 10 with W59 Alternative						
I10-1	B	64	1,350 feet north	Sheely Farms Parcel 3	63	63
I10-2	B	64	1,180 feet north	Apartments – McDowell Road and 93rd Avenue	62	62
I10-3	B	64	510 feet south	Tolsun Farms	68	62
I10-4	**B**	**64**	**520 feet south**	**Tolsun Farms**	**70**	**63**
I10-5	B	64	1,440 feet north	Westpoint	62	62
I10-6	**E**	**69**	**470 feet north**	**EconoLodge**	**72**	**72**[d]
I10-7	B	64	1,440 feet north	Amberlea Cottages	62	62
I10-8	B	64	460 feet north	Legacy Suites Apartments	65	60
I10-9	B	64	410 feet north	Daravante	65	58
I10-10	B	64	380 feet north	Daravante	68	58
I10-11	B	64	440 feet north	Hampton Square Apartments	64	63
I10-12	B	64	420 feet north	Hampton Square Apartments	64	60
I10-13	B	64	390 feet north	Sunpointe Apartments	65	60
I10-14	B	64	420 feet north	Las Gardenias Apartments	66	61
I10-15	B	64	460 feet north	Las Gardenias Apartments	65	63
I10-16	B	64	490 feet north	Westover Parc Condominiums	63	60
I10-17	B	64	440 feet north	Apartments – McDowell Road and 85th Avenue	63	60

Table 4. Noise Analysis Results

Receiver ID	Activity Category	ADOT Noise Abatement Criteria (L_{Aeq1h})	Distance (in feet) and Direction from Centerline	Neighborhood or Area	Unmitigated Future Build Noise Level (dBA L_{eq})	Mitigated Future Build Noise Level (dBA L_{eq})
I10-18	B	64	420 feet north	Apartments – McDowell Road and 84th Avenue	63	61
I10-19	B	64	410 feet north	Apartments – McDowell Road and 83rd Avenue	63	59
I10-20	B	64	400 feet north	Avanti Apartments	65	59
I10-21	B	64	500 feet north	Avanti Apartments	65	60
I10-22	B	64	340 feet south	La Terraza	66	62
I10-23	**B**	**64**	**280 feet south**	**Patio Homes West**	**72**	**63**
I10-24	B	64	350 feet south	Patio Homes West	66	63
I10-25	B	64	430 feet north	Apartments – McDowell Road and 57th Avenue	67	62
I10-26	B	64	390 feet north	Apartments – McDowell Road and 56th Avenue	69	61
I10-27	**B**	**64**	**360 feet north**	**Hallcraft Villas West Condominiums**	**71**	**59**
I10-28	**B**	**64**	**380 feet north**	**Hallcraft Villas West Condominiums**	**73**	**62**
I10-29	B	64	320 feet north	Winona Park 1	69	60
I10-30	B	64	250 feet north	Winona Park 6A	67	61
I10-31	B	64	250 feet north	Winona Park 6A	67	61
I10-32	B	64	310 feet south	Winona Park 2	68	61
I10-33	B	64	270 feet south	Deluxe Mobile Home Park	67	61
I10-34	B	64	280 feet south	Deluxe Mobile Home Park	66	61
I10-35	B	64	300 feet north	Franmar Manor	68	61
I10-36	**B**	**64**	**300 feet north**	**West View Manor**	**72**	**61**
I10-37	**B**	**64**	**310 feet north**	**West View Manor**	**71**	**61**
I10-38	B	64	270 feet south	West Phoenix No. 4	67	61
I10-39	**B**	**64**	**220 feet south**	**West Phoenix No. 4**	**73**	**63**
I10-40	**B**	**64**	**370 feet south**	**West Phoenix No. 4**	**70**	**63**
I10-41	**B**	**64**	**340 feet north**	**Westcroft Place**	**72**	**60**
I10-42	**B**	**64**	**250 feet north**	**Isaac Infill**	**72**	**62**

Table 4. Noise Analysis Results

Receiver ID	Activity Category	ADOT Noise Abatement Criteria (L_{Aeq1h})	Distance (in feet) and Direction from Centerline	Neighborhood or Area	Unmitigated Future Build Noise Level (dBA L_{eq})	Mitigated Future Build Noise Level (dBA L_{eq})
I10-43	B	64	360 feet north	Westcroft Place Plat 2	65	60
I10-44	B	64	260 feet north	El Retiro Block 1 and 2	69	62
I10-45	**B**	**64**	**240 feet north**	**Sharon Gardens**	**72**	**62**
I10-46	B	64	370 feet south	Westcroft Place Plat 2	67	62
I10-47	**B**	**64**	**220 feet south**	**Westcroft Place Plat 2**	**70**	**62**
I10-48	B	64	330 feet south	El Retiro Block 1 and 2	67	62
I10-49	**B**	**64**	**280 feet south**	**North Willow Square**	**71**	**62**
I10-50	**B**	**64**	**370 feet south**	**North Willow Square**	**71**	**62**
I10-51	B	64	370 feet south	North Willow Square Plat 2	66	59
W71 Alternative						
55	B	64	415 feet east	Laveen Meadows	72	65[a]
55a	B	64	305 feet west	Laveen Meadows Parcel 3	74	66[a]
55b	B	64	450 feet west	Laveen Meadows Parcel 2	71	59
55c	B	64	590 feet east	Laveen Meadows Parcel 15	71	64[a]
55d	C	64	2,000 feet east	Laveen Meadows Elementary School	64	58
56	B	64	590 feet east	Rancho Grande	70	64[a]
57	B	64	1,040 feet west	75th Avenue and Baseline Road	66	63
57a	B	64	400 feet west	Laveen Ranch	72	62
58	**B**	**64**	**410 feet west**	**75th Avenue and Vineyard Road**	**74**	**62**
58a	**B**	**64**	**410 feet east**	**Laveen Farms Phase 1**	**74**	**62**
58b	**B**	**64**	**425 feet east**	**Laveen Farms Phase 1**	**74**	**63**
59	**B**	**64**	**435 feet west**	**Western Heritage Estates**	**72**	**62**
60	**B**	**64**	**890 feet east**	**Western Heritage Estates 2**	**68**	**61**

Table 4. Noise Analysis Results

Receiver ID	Activity Category	ADOT Noise Abatement Criteria (L_{Aeq1h})	Distance (in feet) and Direction from Centerline	Neighborhood or Area	Unmitigated Future Build Noise Level (dBA L_{eq})	Mitigated Future Build Noise Level (dBA L_{eq})
61	**B**	**64**	**930 feet east**	**Western Heritage Estates 2**	**67**	**62**
61a	B	64	1,150 feet east	Sienna Vista	66	62
62	**B**	**64**	**495 feet west**	**Sienna Vista**	**72**	**65[a]**
63	**B**	**64**	**290 feet west**	**Marbella**	**74**	**61**
64	B	64	1,160 feet east	71st Avenue and Elwood Street	66	59
64a	**B**	**64**	**345 feet east**	**Sienna Vista**	**74**	**63**
65	**B**	**64**	**260 feet west**	**Suncrest at Estrella Village**	**76**	**63**
65a	**B**	**64**	**410 feet west**	**Travertine at Estrella Village**	**72**	**60**
66	B	64	1,440 feet east	Santa Marie Townsite	64	59
66a	**B**	**64**	**445 feet east**	**Sienna Vista**	**70**	**61**
67	**C**	**64**	**535 feet east**	**Santa Maria Elementary School**	**71**	**66[a]**
68	**B**	**64**	**600 feet east**	**Valle Eldorado**	**71**	**61**
68a	**B**	**64**	**385 feet east**	**Valle Eldorado**	**74**	**63**
69	**B**	**64**	**460 feet east**	**Westridge Park 4**	**70**	**66[a]**
69a	B	64	1,135 feet east	Western Acres	65	60
70	B	64	400 feet east	Westridge Park 2	69	63
Interstate 10 with W71 Alternative						
I10-1	B	64	1,350 feet north	Sheely Farms Parcel 3	61	61
I10-2	B	64	1,180 feet north	Apartments – McDowell Road and 93rd Avenue	61	61
I10-3	B	64	510 feet south	Tolsun Farms	66	61
I10-4	B	64	520 feet south	Tolsun Farms	68	62
I10-5	B	64	1,440 feet north	Westpoint	60	60
I10-6	**E**	**69**	**470 feet north**	**EconoLodge**	**70**	**70[d]**
I10-7	B	64	1,440 feet north	Amberlea Cottages	60	60
I10-8	B	64	460 feet north	Legacy Suites Apartments	63	58
I10-9	B	64	410 feet north	Daravante	63	56
I10-10	B	64	380 feet north	Daravante	66	56
I10-11	B	64	440 feet north	Hampton Square Apartments	66	60

Table 4. Noise Analysis Results

Receiver ID	Activity Category	ADOT Noise Abatement Criteria (L_{Aeq1h})	Distance (in feet) and Direction from Centerline	Neighborhood or Area	Unmitigated Future Build Noise Level (dBA L_{eq})	Mitigated Future Build Noise Level (dBA L_{eq})
I10-12	B	64	420 feet north	Hampton Square Apartments	65	58
I10-13	B	64	390 feet north	Sunpointe Apartments	64	58
I10-14	B	64	420 feet north	Las Gardenias Apartments	63	59
I10-15	B	64	460 feet north	Las Gardenias Apartments	64	61
I10-16	B	64	490 feet north	Westover Parc Condominiums	63	58
I10-17	B	64	440 feet north	Apartments – McDowell Road and 85th Avenue	62	58
I10-18	B	64	420 feet north	Apartments – McDowell Road and 84th Avenue	61	59
I10-19	B	64	410 feet north	Apartments – McDowell Road and 83rd Avenue	61	57
I10-20	B	64	400 feet north	Avanti Apartments	63	57
I10-21	B	64	500 feet north	Avanti Apartments	63	58
I10-22	B	64	340 feet south	La Terraza	64	60
I10-23	**B**	**64**	**280 feet south**	**Patio Homes West**	**70**	**61**
I10-24	B	64	350 feet south	Patio Homes West	64	61
I10-25	B	64	430 feet north	Apartments – McDowell Road and 57th Avenue	65	61
I10-26	B	64	390 feet north	Apartments – McDowell Road and 56th Avenue	68	60
I10-27	**B**	**64**	**360 feet north**	**Hallcraft Villas West Condominiums**	**72**	**60**
I10-28	**B**	**64**	**380 feet north**	**Hallcraft Villas West Condominiums**	**72**	**61**
I10-29	B	64	320 feet north	Winona Park 1	69	60
I10-30	B	64	250 feet north	Winona Park 6A	67	61
I10-31	B	64	250 feet north	Winona Park 6A	67	61
I10-32	B	64	310 feet south	Winona Park 2	69	61

Table 4. Noise Analysis Results

Receiver ID	Activity Category	ADOT Noise Abatement Criteria (L_{Aeq1h})	Distance (in feet) and Direction from Centerline	Neighborhood or Area	Unmitigated Future Build Noise Level (dBA L_{eq})	Mitigated Future Build Noise Level (dBA L_{eq})
I10-33	B	64	270 feet south	Deluxe Mobile Home Park	67	61
I10-34	B	64	280 feet south	Deluxe Mobile Home Park	66	61
I10-35	B	64	300 feet north	Franmar Manor	68	61
I10-36	**B**	**64**	**300 feet north**	**West View Manor**	**72**	**61**
I10-37	**B**	**64**	**310 feet north**	**West View Manor**	**71**	**61**
I10-38	B	64	270 feet south	West Phoenix No. 4	67	61
I10-39	**B**	**64**	**220 feet south**	**West Phoenix No. 4**	**72**	**62**
I10-40	**B**	**64**	**370 feet south**	**West Phoenix No. 4**	**70**	**62**
I10-41	**B**	**64**	**340 feet north**	**Westcroft Place**	**72**	**60**
I10-42	**B**	**64**	**250 feet north**	**Isaac Infill**	**72**	**61**
I10-43	B	64	360 feet north	Westcroft Place Plat 2	65	60
I10-44	**B**	**64**	**260 feet north**	**El Retiro Block 1 and 2**	**70**	**62**
I10-45	**B**	**64**	**240 feet north**	**Sharon Gardens**	**72**	**62**
I10-46	B	64	370 feet south	Westcroft Place Plat 2	67	62
I10-47	B	64	220 feet south	Westcroft Place Plat 2	69	61
I10-48	B	64	330 feet south	El Retiro Block 1 and 2	67	62
I10-49	**B**	**64**	**280 feet south**	**North Willow Square**	**71**	**62**
I10-50	**B**	**64**	**370 feet south**	**North Willow Square**	**71**	**62**
I10-51	B	64	370 feet south	North Willow Square Plat 2	66	59
W101 Alternative Western Option						
55	B	64	410 feet east	Laveen Meadows	72	63
55d	B	64	545 feet east	Laveen Meadows Parcel 15	71	63
57	B	64	820 feet west	75th Avenue and Baseline Road	68	63
57b	B	64	800 feet east	Laveen Ranch	69	63
57c	B	64	670 feet east	Laveen Ranch	70	59
71	B	64	2,270 feet west	Community, 78th Avenue and Baseline Road	61	60

Table 4. Noise Analysis Results

Receiver ID	Activity Category	ADOT Noise Abatement Criteria (L_{Aeq1h})	Distance (in feet) and Direction from Centerline	Neighborhood or Area	Unmitigated Future Build Noise Level (dBA L_{eq})	Mitigated Future Build Noise Level (dBA L_{eq})
72	**B**	**64**	**945 feet east**	**75th Avenue and Southern Avenue**	**69**	**60**
73	B	64	1,750 feet west	95th Avenue and Broadway Road	63	62
73a	B	64	535 feet east	93rd Avenue and Broadway Road	71	66[a]
73b	B	64	745 feet east	89th Avenue and Broadway Road	70	63
73c	B	64	450 feet east	87th Avenue and Broadway Road	73	62
73d	B	64	950 feet east	84th Avenue and Broadway Road	68	60
74	B	64	1,040 feet east	Tivoli	68	62
75	B	64	615 feet east	Country Place Parcel 26	71	62
76	B	64	275 feet west	Country Place Parcel 25	75	62
76a	B	64	925 feet west	99th Avenue and Illini Street	68	62
77	B	64	485 feet east	Country Place Parcel 22	71	62
78	B	64	350 feet west	Country Place Parcel 21	72	60
78a	B	64	1,080 feet west	Country Place Phase 4	66	61
78b	B	64	1,705 feet west	Country Place Phase 4	63	58
79	B	64	485 feet east	Country Place Parcel 23	72	69[a]
80	**C**	**64**	**445 feet east**	**Tolleson High School**	**73**	**63**
80a	B	64	1,730 feet east	Tolleson – Goetz Tract Block 100	64	59
81	**B**	**64**	**475 feet east**	**Concord Sundancer Apartments**	**72**	**65[a]**
82	**B**	**64**	**1,090 feet east**	**Villa de Tolleson 1**	**66**	**60**
82a	B	64	1,060 feet east	Parkview Casitas	64	59
82b	**B**	**64**	**380 feet east**	**Sheely Farms Parcel 5**	**69**	**61**

Table 4. Noise Analysis Results

Receiver ID	Activity Category	ADOT Noise Abatement Criteria (L_{Aeq1h})	Distance (in feet) and Direction from Centerline	Neighborhood or Area	Unmitigated Future Build Noise Level (dBA L_{eq})	Mitigated Future Build Noise Level (dBA L_{eq})
86	**B**	**64**	**1,060 feet east**	**75th and Southern avenues**	**68**	**61**
87	**B**	**64**	**400 feet east**	**75th and Southern avenues**	**74**	**63**
Interstate 10 with W101 Alternative (Western, Central, and Eastern Options)[e]						
I10-1	B	64	1,350 feet north	Sheely Farms Parcel 3	63	63
I10-2	B	64	1,180 feet north	Apartments – McDowell Road and 93rd Avenue	62	62
I10-3	B	64	510 feet south	Tolsun Farms	67	61
I10-4	B	64	520 feet south	Tolsun Farms	69	63
I10-5	B	64	1,440 feet north	Westpoint	60	60
I10-6	**E**	**69**	**470 feet north**	**EconoLodge**	**70**	**70**[d]
I10-7	B	64	1,440 feet north	Amberlea Cottages	60	60
I10-8	B	64	460 feet north	Legacy Suites Apartments	63	58
I10-9	B	64	410 feet north	Daravante	63	56
I10-10	B	64	380 feet north	Daravante	66	56
I10-11	B	64	440 feet north	Hampton Square Apartments	62	61
I10-12	B	64	420 feet north	Hampton Square Apartments	62	58
I10-13	B	64	390 feet north	Sunpointe Apartments	63	58
I10-14	B	64	420 feet north	Las Gardenias Apartments	65	59
I10-15	B	64	460 feet north	Las Gardenias Apartments	62	60
I10-16	B	64	490 feet north	Westover Parc Condominiums	61	58
I10-17	B	64	440 feet north	Apartments – McDowell Road and 85th Avenue	61	58
I10-18	B	64	420 feet north	Apartments – McDowell Road and 84th Avenue	61	58
I10-19	B	64	410 feet north	Apartments – McDowell Road and 83rd Avenue	61	57

Table 4. Noise Analysis Results

Receiver ID	Activity Category	ADOT Noise Abatement Criteria (L_{Aeq1h})	Distance (in feet) and Direction from Centerline	Neighborhood or Area	Unmitigated Future Build Noise Level (dBA L_{eq})	Mitigated Future Build Noise Level (dBA L_{eq})
I10-20	B	64	400 feet north	Avanti Apartments	63	57
I10-21	B	64	500 feet north	Avanti Apartments	62	57
I10-22	B	64	340 feet south	La Terraza	64	60
I10-23	**B**	**64**	**280 feet south**	**Patio Homes West**	**70**	**61**
I10-24	B	64	350 feet south	Patio Homes West	64	61
I10-W1	B	64	1,280 feet north	Apartments – McDowell Road and 103rd Avenue	63	63
I10-W2	B	64	1,270 feet north	Crystal Gardens Parcel 2A	63	63
I10-W3	B	64	1,400 feet north	Crystal Point	62	62
I10-W4	E	69	670 feet south	Hotel	66	61
I10-W5	B	64	960 feet north	Crystal Springs Apartments	65	58
I10-W6	B	64	980 feet north	Mobile Home Park – McDowell Rd and 119th Avenue	65	63
I10-W7	B	64	810 feet south	Isolated homes – east of El Mirage Road	66	59
I10-W8	B	64	1,040 feet north	Avondale Friendship Park	63	63
I10-W9	B	64	1,240 feet north	Avondale Friendship Park	62	62
I10-W10	B	64	1,070 feet north	Rio Santa Fe Apartments	64	59
I10-W11	**B**	**64**	**350 feet south**	**Desert Sage Apartments**	**71**	**62**
W101 Alternative Central Option						
83	C	64	2,375 feet west	Union Elementary School	60	55
83a	B	64	1,750 feet west	89th Avenue and Broadway Road	62	58
83b	B	64	1,200 feet west	89th Avenue and Broadway Road	65	60
83c	B	64	330 feet west	Hurley Ranch Parcel 3	75	63
83d	B	64	445 feet west	Hurley Ranch Parcels 1 and 2	71	63
84	B	64	765 feet east	Volterra	70	62
84a	B	64	750 feet east	Volterra	68	63

Table 4. Noise Analysis Results

Receiver ID	Activity Category	ADOT Noise Abatement Criteria (L_{Aeq1h})	Distance (in feet) and Direction from Centerline	Neighborhood or Area	Unmitigated Future Build Noise Level (dBA L_{eq})	Mitigated Future Build Noise Level (dBA L_{eq})
85	**B**	**64**	**835 feet east**	**Ryland at Heritage Point**	**68**	**63**
85a	**B**	**64**	**595 feet west**	**Farmington Park**	**71**	**67[a]**
85b	**B**	**64**	**550 feet west**	**Farmington Park**	**70**	**61**
85c	**B**	**64**	**295 feet west**	**Farmington Park**	**73**	**62**
89a	B	64	580 feet east	84th Avenue and Broadway Road	71	62
89b	B	64	1,805 feet east	83rd Avenue north of Broadway Road	63	58
100	B	64	1,240 feet east	Ryland at Heritage Point	65	60
W101 Alternative Eastern Option						
72	**B**	**64**	**930 feet east**	**75th and Southern avenues**	**69**	**61**
80	**C**	**64**	**490 feet east**	**Tolleson High School**	**72**	**63**
80a	B	64	1,395 feet east	Tolleson – Goetz Tract Block 100	65	61
84a	**B**	**64**	**650 feet west**	**Volterra**	**69**	**59**
86	**B**	**64**	**1,060 feet east**	**75th and Southern avenues**	**68**	**61**
87	**B**	**64**	**400 feet east**	**75th and Southern avenues**	**73**	**63**
88	B	64	1,920 feet east	Estrella Village Manor	62	59
88a	**B**	**64**	**625 feet east**	**Tuscano Phase 2 Parcel C**	**70**	**63**
88b	**B**	**64**	**410 feet east**	**Tuscano Phase 2 Parcel A**	**71**	**60**
89	B	64	1,205 feet west	83rd Avenue and Mobile Street	66	60
89a	B	64	1,460 feet west	84th Avenue and Broadway Road	64	61
89b	**B**	**64**	**550 feet west**	**83rd Avenue north of Broadway Road**	**71**	**62**
89c	**B**	**64**	**400 feet west**	**83rd Avenue north of Broadway Road**	**71**	**61**
90	**B**	**64**	**300 feet west**	**Volterra**	**72**	**62**
91	**B**	**64**	**370 feet east**	**Volterra**	**71**	**62**
92	**B**	**64**	**520 feet east**	**Tuscano Phase 1**	**69**	**60**

Table 4. Noise Analysis Results

Receiver ID	Activity Category	ADOT Noise Abatement Criteria (L_{Aeq1h})	Distance (in feet) and Direction from Centerline	Neighborhood or Area	Unmitigated Future Build Noise Level (dBA L_{eq})	Mitigated Future Build Noise Level (dBA L_{eq})
93	**B**	**64**	**400 feet east**	**Volterra**	**72**	**61**
94	**B**	**64**	**325 feet west**	**Volterra**	**72**	**61**
95	**B**	**64**	**580 feet east**	**Volterra**	**70**	**64[a]**
96	**B**	**64**	**840 feet east**	**Ryland at Heritage Point**	**69**	**64[a]**
97	**B**	**64**	**690 feet east**	**Ryland at Heritage Point**	**70**	**59**
98	**B**	**64**	**520 feet west**	**Farmington Park**	**71**	**63**
98a	**B**	**64**	**330 feet west**	**Farmington Park**	**74**	**62**
99	**B**	**64**	**305 feet west**	**Farmington Park**	**73**	**64[a]**
100	B	64	950 feet east	Ryland at Heritage Point	67	60
100a	**C**	**64**	**450 feet east**	**School at 87th Avenue and Durango Street**	**73**	**63**

Notes: Numerous new receivers were added (along with the original receivers) to represent new development since the initial analysis began in 2003. These receivers are designated with a letter following the receiver number to maintain the sequential numbering system (Appendix B). Bold text indicates that the receiver would experience a "substantial increase" (15 decibels or more) in noise levels.

[a] Further mitigation would require a noise wall taller than 20 feet, which would not conform to the Arizona Department of Transportation Noise Abatement Policy.

[b] Traffic noise from nearby cross street prevented further noise reduction at this receiver.

[c] Gila River Indian Community

[d] Mitigation was not considered at some Activity Category E land uses because outdoor areas of frequent human use were not present.

[e] The noise analysis results are the same for all of the W101 Alternative Options.

W59 Alternative

Predicted peak-hour noise levels along the W59 Alternative and I-10 (Papago Freeway) ranged from 61 dBA L_{eq} to 78 dBA L_{eq} at the 84 receivers analyzed (see Figures 2 and 3, and Table 4). The predicted noise levels at 72 of the 84 receivers would approach or exceed the ADOT mitigation criterion and would be eligible for consideration of noise abatement. Twenty of the affected receivers are predicted to experience "substantial increases" of 15 dBA or more over existing noise levels in the 2035 peak noise hour (indicated by bold text in Table 4).

W71 Alternative

Predicted peak-hour noise levels along the W71 Alternative and I-10 ranged from 60 dBA L_{eq} to 76 dBA L_{eq} at the 80 receivers analyzed (see Figures 2 and 3, and Table 4). The projected noise levels at 67 of the 80 receivers would approach or exceed the ADOT mitigation criterion. Thirty of the affected receivers are predicted to experience "substantial increases" of 15 dBA or more over existing noise levels in the 2035

peak noise hour (indicated by bold text in Table 4). The majority of the 67 affected receivers along this alternative and I-10 would be eligible for consideration of noise abatement. The EconoLodge motel represented by receiver I10-6 does not have outdoor use areas and thus would not be considered for mitigation.

W101 Alternative

Predicted future peak-hour noise levels along I-10 (Papago Freeway) for the W101 Alternative ranged from 60 dBA L_{eq} to 71 dBA L_{eq} at the 35 receivers analyzed (see Figure 2 and Table 4). The projected noise levels at 12 of the 35 receivers would approach or exceed the ADOT mitigation criterion. Three of the affected receivers are predicted to experience "substantial increases" of 15 dBA or more over existing noise levels in the 2035 peak noise hour (indicated by bold text in Table 4). The affected receivers along I-10 would be eligible for consideration of noise abatement.

W101 Alternative Western Option

Predicted future peak-hour noise levels along the W101 Alternative Western Option ranged from 61 dBA L_{eq} to 75 dBA L_{eq} at the 29 receivers analyzed (see Figures 2 and 3, and Table 4). The projected noise levels at 26 of the 29 receivers would approach or exceed the ADOT mitigation criterion. Seven of the affected receivers are predicted to experience "substantial increases" of 15 dBA or more over existing noise levels in the 2035 peak noise hour (indicated by bold text in Table 4). The 26 affected receivers along this alternative would be eligible for consideration of noise abatement.

W101 Alternative Central Option

Predicted future peak-hour noise levels along the W101 Alternative Central Option ranged from 60 dBA L_{eq} to 75 dBA L_{eq} at the 14 receivers analyzed (see Figures 2 and 3, and Table 4). The projected noise levels at 11 of the 14 receivers would approach or exceed the ADOT mitigation criterion. Four of the affected receivers are predicted to experience "substantial increases" of 15 dBA or more over existing noise levels in the 2035 peak noise hour (indicated by bold text in Table 4). The 11 affected receivers along this option would be eligible for consideration of noise abatement.

W101 Alternative Eastern Option

Predicted future peak-hour noise levels along the W101 Alternative Eastern Option ranged from 62 dBA L_{eq} to 74 dBA L_{eq} at the 26 receivers analyzed (see Figures 2 and 3, and Table 4). The projected noise levels at 25 of the 26 receivers would approach or exceed the ADOT mitigation criterion. Twenty-one of the affected receivers are predicted to experience "substantial increases" of 15 dBA or more over existing noise levels in the 2035 peak noise hour (indicated by bold text in Table 4). The 25 affected receivers along this option would be eligible for noise abatement considerations.

E1 Alternative

Most of the 44 receivers along this portion of the SMTC are located along the existing Pecos Road, with some additional receivers located between 43rd and 55th avenues.

Predicted future peak-hour noise levels along the E1 Alternative ranged from 63 dBA L_{eq} to 77 dBA L_{eq} at the 44 receivers analyzed (see Figures 4 and 5, and Table 4). The projected noise level at 42 of the 44 receivers would exceed the ADOT mitigation criterion. Forty-one of the affected receivers are predicted to experience "substantial increases" of 15 dBA or more over existing noise levels in the 2035 peak noise hour (indicated by bold text in Table 4). The majority of the 42 affected receivers along this alternative (including one on Gila River Indian Community land [Receiver 34]), would be eligible for consideration of noise abatement. The Vee Quiva Casino represented by Receiver 30 does not have outdoor use areas and thus would not be considered for mitigation.

Noise Analysis Responsiveness to Children's Health

Sensitive receivers for noise are already included in the noise analysis in accordance with State and federal guidance, and the analysis has addressed requirements under the National Environmental Policy Act. As stated on page 3-1, over 220 sensitive receivers were evaluated at exterior locations from a traffic noise perspective. All of the receivers represent noise-sensitive land uses in proximity to the proposed project, including homes, schools, and parks, and these receivers would have higher noise levels than similar facilities more distant from the proposed freeway.

In response to comments by the U.S. Environmental Protection Agency, each modeled school was reexamined to determine whether noise impacts would result from the proposed freeway and whether appropriate mitigation of these impacts was provided. Of the nine schools modeled in the analysis for the Draft and Final Environmental Impact Statements, all were predicted to exceed the ADOT NAC (see Table 4). Mitigation, in the form of noise walls, was proposed for all schools. After applying this mitigation, all schools except one were mitigated according to ADOT's NAP. According to ADOT's NAP, noise mitigation should achieve a reduction of 5 to 7 dBA and should result in a noise level of less than 64 dBA for residential and similar areas. These criteria were not reached for one school (receiver 67, Santa Maria Elementary School) because the NAP limits wall heights to 20 feet. A wall taller than 20 feet would be required to bring noise levels at this receiver down to 64 dBA. However, a 5-dBA reduction would be provided by the 20-foot wall proposed in this area. It is important to note that this receiver would be affected only by the W71 Alternative, which is not the Preferred Alternative.

The ADOT NAP also states that noise abatement shall be considered if "substantial increases" (defined as a 15-dBA or greater increase) are predicted. Of the nine schools modeled, substantial increases were predicted at six schools. As discussed above, however, noise walls would reduce noise levels at all schools according to the ADOT NAP, with the exception of Santa Maria Elementary School, which would be affected only by the W71 Alternative, which is not the Preferred Alternative. According to FHWA's 1995 *Highway Traffic Noise Analysis and Abatement Policy and Guidance*, in most cases, if the exterior area can be protected, the interior will also be protected.

Noise Levels on Undeveloped Land

The 2035 unmitigated noise levels were predicted for each action alternative at a distance of approximately 300 feet from the edge of the right-of-way (R/W) to provide an indication of peak traffic noise levels on undeveloped land (activity category G).

Noise levels for undeveloped land were predicted using a simplified two-dimensional TNM model run. The simplified TNM runs conservatively assume that the roadway is a straight line and that there are no topographical effects on traffic noise propagation. The noise levels at 300 feet from the R/W were calculated to inform local government officials, as required by the NAP. Table 5 presents the noise levels for each action alternative segment. It should be noted that the predicted noise levels at 300 feet from the R/W are for information only. More detailed noise analyses should be performed for specific future proposed developments.

Table 5. Activity Category G Noise Levels

Action Alternative	Segment Start	Segment End	Noise Level at 300 ft. (L_{Aeq1h} – dBA)
W59	Interstate 10 (Papago Freeway)	Van Buren Street	73
	Van Buren Street	Buckeye Road	74
	Buckeye Road	Broadway Road	74
	Broadway Road	Southern Avenue	74
	Southern Avenue	Baseline Road	74
	Dobbins Road	Elliot Road	73
	Elliot Road	Southern end	73
Interstate 10 – W59	Western end	South Mountain Freeway	78
	South Mountain Freeway	Eastern end	77
W71	Interstate 10	Van Buren Street	73
	Van Buren Street	Buckeye Road	74
	Buckeye Road	Lower Buckeye Road	74
	Lower Buckeye Road	Broadway Road	73
	Broadway Road	Southern Avenue	73
	Southern Avenue	Baseline Road	73
	Baseline Road	Dobbins Road	73
	Dobbins Road	Elliot Road	73
Interstate 10 – W71	Western end	South Mountain Freeway	76
	South Mountain Freeway	Eastern end	77
W101	North of Van Buren Street	Van Buren Street	74
	Van Buren Street	Buckeye Road	74

Table 5. Activity Category G Noise Levels

Action Alternative	Segment Start	Segment End	Noise Level at 300 ft. (L_{Aeq1h} – dBA)
	Buckeye Road	Lower Buckeye Road	73
	Lower Buckeye Road	Broadway Road	74
	Broadway Road	Baseline Road	74
Interstate 10 – W101	Western end	South Mountain Freeway	76
	South Mountain Freeway	Eastern end	76
E1	Western end	40th Street	73
	40th Street	24th Street	73
	24th Street	Desert Foothills Parkway	73
	Desert Foothills Parkway	17th Avenue	73
	17th Avenue	51st Avenue	73

No-Action Alternative

Noise impacts from the No-Action Alternative would be caused by vehicle traffic along arterial and other area surface streets. Based on projected growth throughout the region, traffic congestion would increase under this alternative; such congestion would reduce travel speeds and thereby reduce traffic noise levels during peak periods. As such, the No-Action Alternative would generally result in lower overall noise levels at the selected receivers than would any of the action alternatives, because a freeway would not be build near these receivers, but would result in higher noise levels at other locations, such as along arterial streets, especially during peak LOS C traffic conditions. Noise from this alternative would be generated by traffic on neighborhood and arterial streets, as well as nontraffic noise sources and other general neighborhood activity. Therefore, it is difficult to quantify the predicted noise levels from the No-Action Alternative.

Construction Noise

Short-term noise impacts may be experienced during the construction of any part of the proposed improvements along the SMTC. Quantification of such impacts is difficult without data on this project's construction schedule and equipment use. Therefore, several assumptions were made to predict the approximate noise level at the R/W. These predictions are based on the noisiest equipment expected to be used during each construction stage of a typical roadway project. Data on construction equipment noise are available from the U.S. Department of Transportation document *FHWA Highway Construction Noise Handbook* (2006).

An analysis was conducted during a freeway construction project in Arizona that assessed the collective impact of construction noise (Higgins & Associates 1998). The maximum noise levels (L_{max}) were

calculated at the R/W line. The distance between the R/W and the construction activity was estimated based on the type of work being performed.

The results of the preliminary estimates, shown in Table 6, indicate that sensitive receivers could be substantially affected by construction noise if the receivers are immediately adjacent to the R/W. The highest noise levels would occur during the grading/earthwork phase of construction.

Table 6. Construction Equipment Noise

Phase	Equipment	Equipment L_{max}	Feet to Right-of-way	L_{max} at Right-of-way
Site Clearing	Dozer Backhoe	82 dBA 78 dBA	50 50	83 dBA
Grading/Earthwork	Scraper Grader	84 dBA 85 dBA	75 75	85 dBA
Foundation	Backhoe Loader	78 dBA 79 dBA	100 100	78 dBA
Base Preparation	Compactor Dozer	83 dBA 82 dBA	100 100	82 dBA

4. Mitigation

This section describes potential mitigation measures for ADOT to consider as future commitments to be implemented as part of the project to avoid, reduce, or otherwise mitigate environmental impacts associated with the project. The discussion of these measures in this report does not obligate ADOT to these specific measures. ADOT, along with FHWA, may choose to modify, delete, or add measures to mitigate impacts.

Noise mitigation was evaluated for receivers where predicted 2035 peak noise levels approach or exceed the appropriate activity category NAC, or where 2035 peak noise levels substantially exceed existing levels. Noise mitigation, in the form of noise walls or earth berms, is discussed for each of the action alternatives and options. Noise walls and earth berms are the most common type of noise mitigation used along ADOT freeways. Noise barrier locations for the Western and Eastern Sections are shown in Figures 6–9. Other noise mitigation strategies are discussed later in this section and could be applied in addition to or instead of standard noise walls or earth berms.

According to ADOT policy, the noise reduction design goal for benefited receptors closest to a transportation facility is 7 dBA; however, a noise reduction of only 5 dBA is required for a receptor to be considered "benefited" by the mitigation. Mitigation should result in a noise level below the NAC approach level (ADOT 2011). For example, for residential land uses, noise mitigation should reduce noise levels by at least 5 dBA and result in noise levels below 64 dBA. Some of the receptors along the SMTC would be affected by noise from adjacent surface streets in addition to that from the proposed SMTC. For some of these receptors, the proposed noise barriers would achieve a 5 dBA reduction, but the mitigated noise level would remain at or above the 64 dBA NAC approach level. For many of these receptors, however, the proposed noise barriers would achieve only a 3 to 4 dBA reduction because the dominant noise source at the receptors would be the local arterial street rather than the SMTC. It would not be feasible to achieve additional noise reduction because of the impact from the local streets. Noise barriers would need to be constructed outside the proposed R/W of the SMTC to effectively reduce noise levels from local streets at these receptors. It would not be feasible to construct noise barriers outside the R/W.

For some receptors along the SMTC, a barrier as high as 20 feet would provide more than 5 dBA of noise reduction, but a noise level below 64 dBA could not be achieved. According to ADOT policy, barriers generally will not be constructed higher than 20 feet because of safety, structural, and wind load considerations. Therefore, no further noise reduction would be provided.

The freeway main line would be elevated through most of the corridor and each noise barrier would be placed on the freeway embankment, near the edge of shoulder, to take advantage of the elevated profile. Placing a noise barrier on an elevated section of freeway would result in a lower wall height to achieve the same noise reduction. Where feasible, noise barriers should be constructed as early as possible in the construction phasing to shield adjacent properties from construction-related noise impacts.

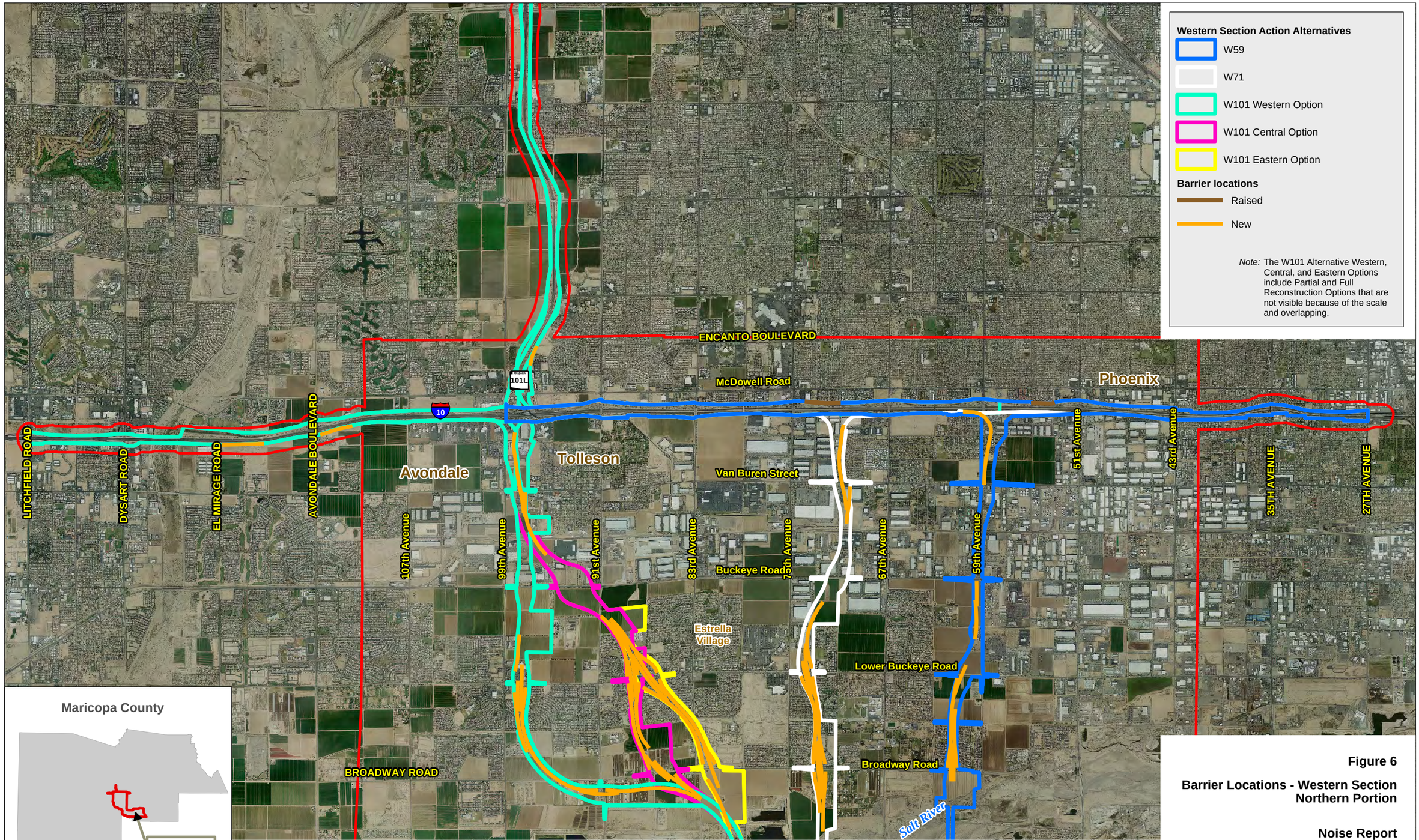

Figure 6

Barrier Locations - Western Section Northern Portion

Noise Report

Aerial photography date: July 2013

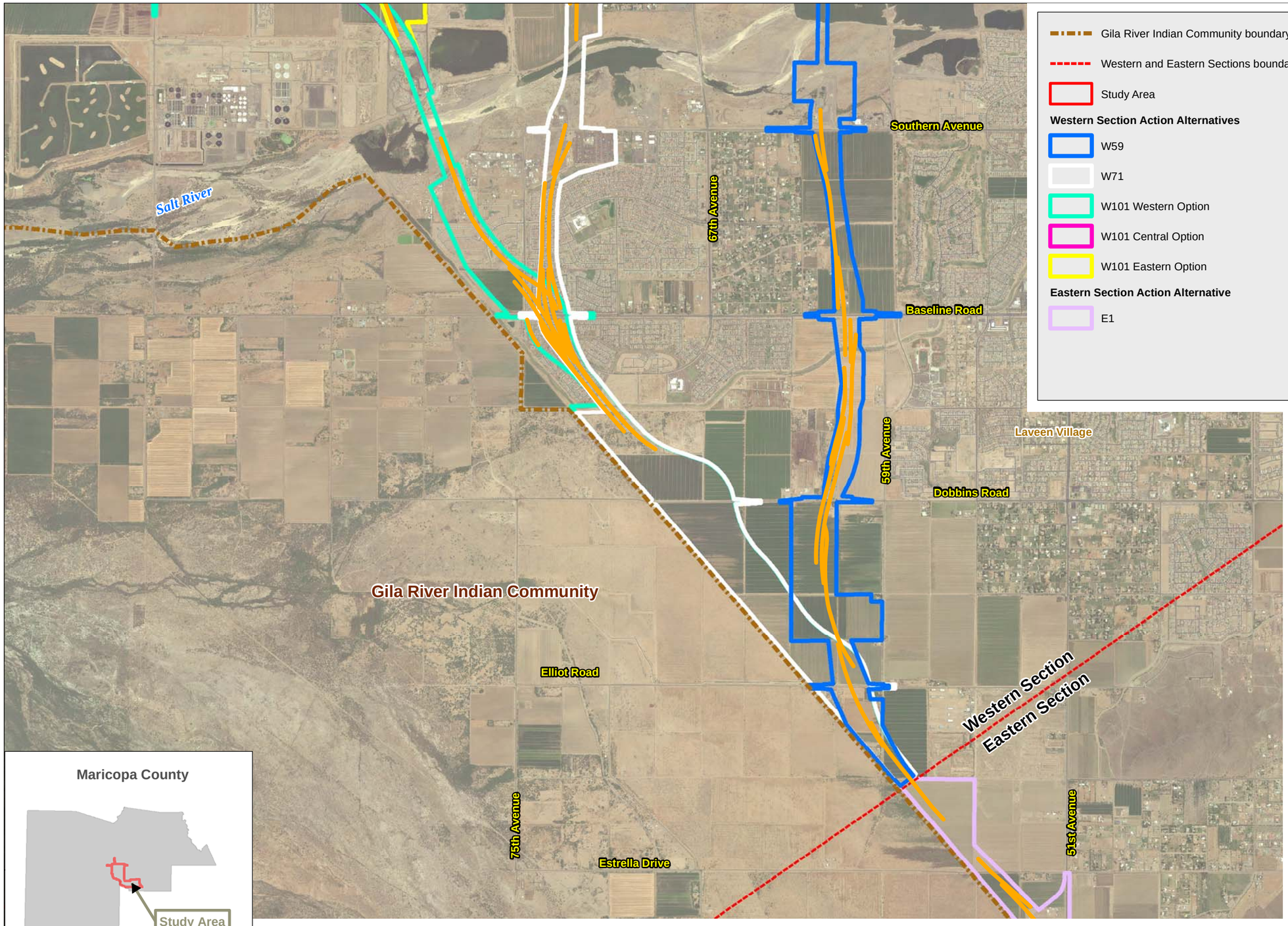

Figure 7

Barrier Locations - Western Section Southern Portion

Noise Report

Aerial photography date: July 2010

Western Section
Eastern Section
47th Avenue
43rd Avenue
Phoenix
South Mountain
Park/Preserve
Chandler Boulevard
17th Avenue
59th Avenue
51st Avenue
Pecos Road
Gila River Indian Community

Gila River Indian Community boundary
Noise barrier location
Western and Eastern Sections boundary
Study Area

Western Section Action Alternatives

W59
W71
W101 Western Option
W101 Central Option
W101 Eastern Option

Eastern Section Action Alternative

E1

Maricopa County

Study Area

South Mountain Transportation Corridor
Federal-aid Project Number: NH-202-D(ADY)
ADOT Project Number: 202L MA 054 H5764 01L
E:\Projects\AZ\ADOT\SouthMtn\GRIC_Alignment\map_docs\mxd\NoE2_120220\Noise_8_e_w_Final.mxd

0 2,000 4,000 feet

N

Figure 8

Barrier Locations - Eastern Section Western Portion

Noise Report

Aerial photography date: July 2010

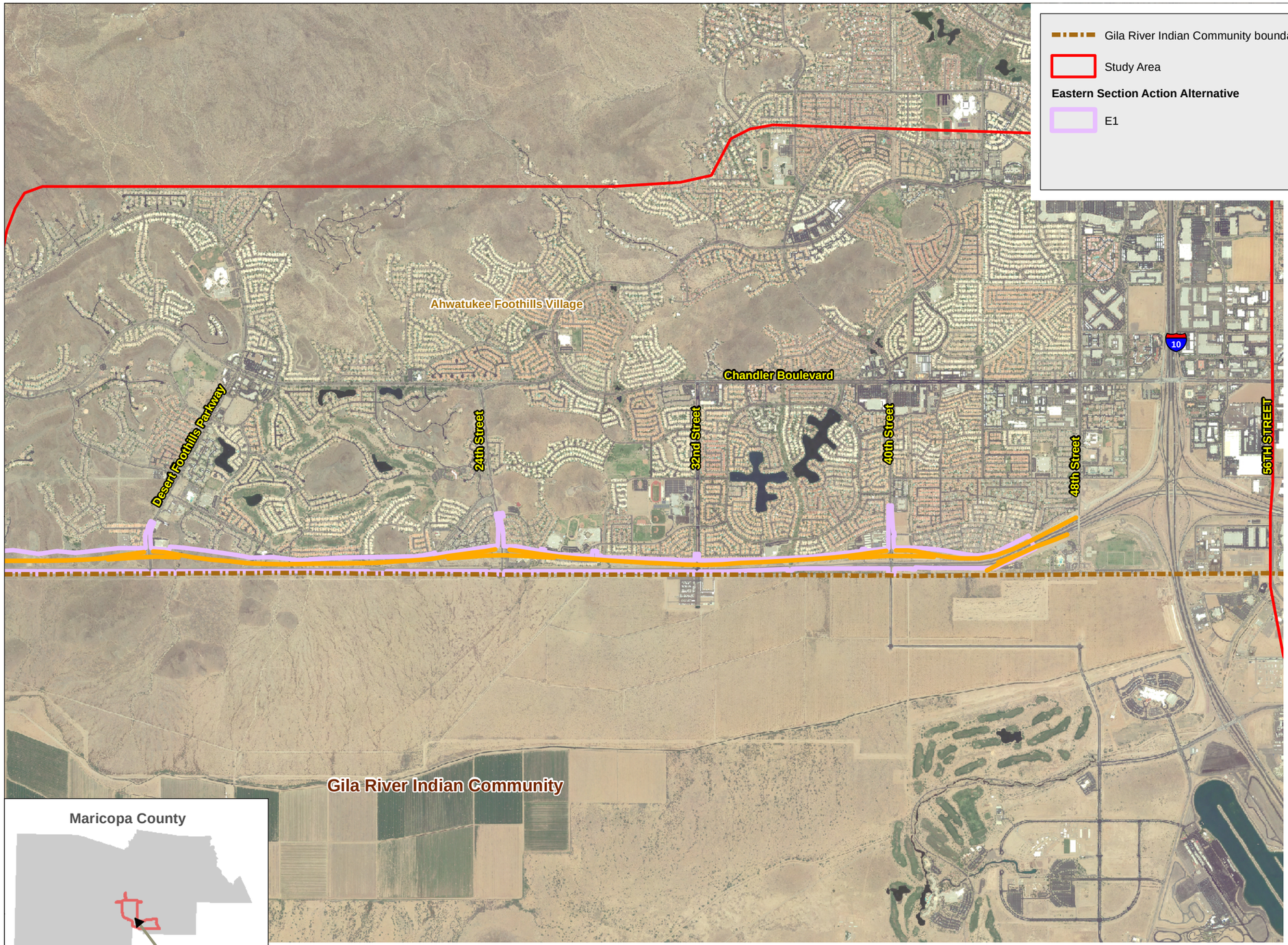

Figure 9

Barrier Locations - Eastern Section Eastern Portion

Noise Report

Aerial photography date: July 2010

This noise analysis is based on preliminary design and traffic information. Numerous assumptions were made to complete the analysis. As the proposed design of the SMTC further develops, additional noise analyses would need to be conducted. The results of this analysis and the mitigation recommendations contained in this report should not be considered final and would need to be verified and refined as the SMTC design progresses.

W59 Alternative

Nineteen new barriers and one raised barrier (see Figures 6 and 7) would be needed to reduce noise levels in accordance with the ADOT NAP along the W59 Alternative and I-10 (Papago Freeway). The barriers would range in height from 10 to 20 feet and would reduce noise levels at the 84 receivers to between 58 dBA L_{eq} and 72 dBA L_{eq}. The noise level at three of the receivers (R54c, R54d, and R54e) would not be reduced in full accordance with the ADOT NAP because of noise impacts from adjacent arterial streets. These receivers would achieve noise reductions of 1 dBA to 3 dBA, and would still be higher than 64 dBA. The barriers would total approximately 751,900 square feet in area. Using the standard $35 per square foot of barrier recommended by ADOT, the cost of noise mitigation for the W59 Alternative would be approximately $26.3 million. See Appendix C for a summary of mitigation specifics for each alternative.

W71 Alternative

Eighteen new barriers and one raised barrier (see Figures 6 and 7) would be needed to reduce noise levels in accordance with the ADOT NAP along the W71 Alternative and I-10 (Papago Freeway). The barriers would range in height from 10 to 20 feet and would reduce noise levels at the 80 receivers to between 58 dBA L_{eq} and 66 dBA L_{eq}. The noise level at seven of the receivers (R55, R55a, R55c, R56, R62, R67, and R69), even with a 20-foot-high noise barrier, would not be reduced to less than the approach threshold of 64 dBA, which is ADOT's goal for reducing traffic noise on new roadway projects. All of these receivers (with the exception of R69), however, would experience at least a 5-dBA reduction in the projected noise level. The reduction at R69 is predicted to be 4 dBA. The barriers would total approximately 1,045,100 square feet in area. Using the standard $35 per square foot recommended by ADOT, the cost of noise mitigation for the W71 Alternative would be approximately $36.6 million (See Appendix C).

W101 Alternative

For the W101 Alternative and Options along I-10 (Papago Freeway), two new barriers (see Figure 6) would be needed to reduce noise levels in accordance with the ADOT NAP. The barriers would range in height from 10 to 15 feet and would reduce noise levels at two receivers (I10-W4 and I10-W7) to between 59 dBA L_{eq} and 61 dBA L_{eq}. The barriers would total approximately 53,100 square feet in area. Using the standard $35 per square foot recommended by ADOT, the cost of noise mitigation for the W71 Alternative would be approximately $1.9 million (See Appendix C).

W101 Alternative Western Option

Seventeen barriers (see Figures 6 and 7) would be needed to reduce noise levels in accordance with the ADOT NAP along the W101 Alternative Western Option. The barriers would range in height from 10 to 20 feet and would reduce noise levels at the 29 receivers to between 58 dBA L_{eq} and 69 dBA L_{eq}. The noise level at three of the receivers (R73a, R79, and R81), even with a 20-foot-high noise barrier, would not be reduced to less than the approach threshold of 64 dBA. Receivers R73a and R81 would experience at least a 5-dBA reduction in the projected noise level. Noise level reductions at R79 are predicted to be only 3 dBA. The barriers would total approximately 841,000 square feet in area. Using the standard $35 per square foot recommended by ADOT, the cost of noise mitigation for the W101 Alternative Western Option would be approximately $29.4 million (See Appendix C).

W101 Alternative Central Option

Twenty barriers (see Figures 6 and 7) would be needed to reduce noise levels in accordance with the ADOT NAP along the W101 Alternative Central Option. The barriers would range in height from 10 to 20 feet and would reduce noise levels at the 14 receivers to between 55 dBA L_{eq} and 67 dBA L_{eq}. The noise level at one of the receivers (R85a) would not be able to be reduced in full accordance with the ADOT NAP because of noise impacts from adjacent arterial streets, and would experience only a 4-dBA reduction in the projected noise level. The barriers would total approximately 841,500 square feet in area. Using the standard $35 per square foot recommended by ADOT, the cost of noise mitigation for the W101 Alternative Central Option would be approximately $29.5 million (See Appendix C).

W101 Alternative Eastern Option

Sixteen barriers (see Figures 6 and 7) would be needed to reduce noise levels in accordance with the ADOT NAP along the W101 Alternative Eastern Option. The barriers would range in height from 10 to 20 feet and would reduce noise levels at the 26 receivers to between 59 dBA L_{eq} and 64 dBA L_{eq}. The noise level at one of the receivers (R89a) would not be reduced in full accordance with the ADOT NAP because of noise impacts from adjacent arterial streets. Noise levels at this receiver would be reduced to a sound level below 64 dBA, but would achieve a noise reduction of only 3 dBA. The noise level at three of the receivers (R95, R96, and R99), even with a 20-foot-high noise barrier, would not be reduced to less than the approach threshold of 64 dBA. These receivers, however, would experience at least a 5-dBA reduction in the projected noise level. The barriers would total approximately 872,800 square feet in area. Using the standard $35 per square foot recommended by ADOT, the cost of the noise mitigation for the W101 Alternative Eastern Option would be approximately $30.5 million (See Appendix C).

E1 Alternative

Twenty barriers (see Figures 8 and 9) would be needed to reduce noise levels in accordance with the ADOT NAP along the E1 Alternative. The barriers would range in height from 8 to 20 feet and would reduce noise levels at the 44 receivers to between 59 dBA L_{eq} and 69 dBA L_{eq}. The noise levels at four of the receivers (R15, R16, R22a, and R33) would not be reduced in full accordance with the ADOT NAP even with a 20-foot-high noise barrier. With the exception of R16, each of these receivers, however,

would receive at least a 5-dBA reduction in projected noise levels. Noise level reductions at R16 are predicted to be only 4 dBA. Additionally, the noise level at R16 would not be reduced in full accordance with the ADOT NAP because of noise impacts from adjacent arterial streets. The barriers would total approximately 1,356,200 square feet in area. Using the standard $35 per square foot recommended by ADOT, the cost of the noise mitigation for the E1 Alternative would be approximately $47.5 million (See Appendix C).

No-Action Alternative

The No-Action Alternative assumes that the proposed action would not be selected. According to FHWA regulations and ADOT policy, noise mitigation can be provided only as part of a Type 1 construction project, which is one that adds a transportation facility on a new alignment or increases the capacity of an existing transportation facility. Consequently, under the No-Action Alternative, noise mitigation would not be provided for any of the receivers (See Appendix C).

Other Possible Mitigation Strategies

Noise mitigation strategies typically consist of placing a noise barrier, such as a concrete or masonry wall or an earth berm, along the main line or at the R/W line of a transportation corridor. Noise barriers are usually the most feasible and cost-effective mitigation strategy for highway transportation noise impacts.

A number of mitigation strategies are available that could be used instead of, or in addition to, noise barriers. These involve elements of the SMTC alignment, design features, and restrictions on the use of the SMTC.

Depressing the Freeway

For most alignments of each of the action alternatives, the proposed freeway would be elevated above the natural grade of the surrounding land. This elevated profile would allow noise to carry farther, creating noise impacts at greater distances from the freeway. Depressing the profile of the freeway below grade may result in reduced traffic noise levels adjacent to depressed sections (FHWA 1980). However, it would be necessary to also construct at-grade noise barriers to achieve noise reduction goals at receiver locations adjacent to depressed freeway sections. This strategy would also reduce the visual impacts associated with high noise walls on elevated freeways (FHWA 1994). A major disadvantage of this strategy, however, would be the substantially added construction cost of depressing the freeway, including possible acquisition of R/W and provision of drainage facilities (pumping systems and retention basins).

Rubberized Asphalt Pavement Surface

Until recently, new freeways constructed by ADOT were composed of concrete pavement. ADOT has embarked on a multiyear pilot program in cooperation with FHWA to overlay the metropolitan Phoenix freeway system with a rubberized asphalt pavement surface. The rubberized asphalt paving program seeks to reduce freeway traffic noise levels by at least 4 dBA (ADOT 2014). At this point in the pilot study, such results appear to be achievable.

ADOT would overlay the proposed action's concrete pavement with rubberized asphalt, but is not making any predictions at this time regarding expected noise reductions. Noise modeling during the final design phase would reflect the most current FHWA modeling criteria, which may include rubberized asphalt.

Truck Traffic Restrictions or Reduced Posted Speed Limits

Discussions regarding reduction of transportation noise impacts have at times focused on restricting truck traffic entirely or during certain hours of the day and on reducing the posted speed limit of a transportation facility. Reducing weight limits is another potential noise reduction strategy. In theory, all of these strategies would reduce the noise impacts to adjacent properties because trucks produce higher noise levels than automobiles and because higher speeds generate more noise than lower speeds (FHWA 1976). None of these strategies would, however, be consistent with the purpose and need for the proposed action and, therefore, are not feasible for the proposed freeway.

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Appendix A

Methodology and Assumptions

The introduction of a new or expanded roadway into an area may introduce or increase traffic-generated noise into that area. To assess the change, it is necessary to first determine the nature of the existing noise environment. This assessment begins by selecting representative sites adjacent to the various alignment alternatives within the Study Area and recording the relevant existing noise level, called the ambient noise level. During the measurement phase, other factors that may affect the noise levels are noted. These factors may include atmospheric conditions (wind, temperature, humidity), industrial and commercial noise, and other noise sources, such as lawnmowers, aircraft, animals, trains, etc. Predicted traffic noise levels are developed and evaluated against the NAC using the noise prediction model, TNM 2.5.

TNM 2.5 Modeling

The noise prediction model TNM 2.5 was used for noise computations. The model translates the roads into a series of endpoints on a three-dimensional X, Y, Z coordinate system. This program was developed to comply with the FHWA noise regulations and is considered the current standard for road noise analysis (FHWA 2004).

Model validation and industry experience indicate that TNM 2.5 typically predicts noise levels within 3 dB of measured values. In general, the level of accuracy is higher for receivers located near the road (within a few hundred feet) than for more distant receivers, largely because of the effects of wind and temperature gradients.

Noise computations were completed for the three Western Section action alternatives (W59, W71, and W101) and the Eastern Section (E1) action alternative and for the various future build options for the W101 Alternative. A qualitative noise assessment was completed for the No-Action Alternative.

The main line road, ramps, and cross streets of the proposed freeway were all defined by a series of road segment endpoints. Land uses with areas of outdoor use (predominantly residences, schools, and parks) were represented by receivers, which were identified as single points and assigned an elevation 5 feet above the ground to simulate the height of human hearing.

To determine the noise produced by traffic on each road segment, the model requires traffic volumes and operating speeds. Future year (2035) peak-hour traffic volumes were used for the analysis. Operating speeds were assumed to be 70 mph on the main line, 45 mph on the ramps, and 40 to 45 mph on the cross streets. Operating speeds are typically modeled at 5 mph above the posted speed limit because higher speeds result in higher noise levels.

Additionally, vehicles were defined as cars and light trucks (four wheels), medium-sized trucks and recreational vehicles (six wheels), and heavy trucks (more than eight wheels). Each vehicle type generates noise from different heights above the road; this is known as the source height (Coulson 1996). The future

truck percentage on SMTC was based on other MAG traffic projections and typical truck percentages on similar facilities and was assumed to be 11 percent, with an allocation of 5 percentage points for medium-sized trucks and 6 percentage points for heavy trucks. The glossary further defines the vehicle types, including the weight classifications for medium-sized and heavy trucks.

TNM 2.5 individually calculated the noise contribution from each road segment to each receiver and then determined the cumulative effect of all road sources for each receiver. Noise calculations were conducted for each receiver, assuming no noise mitigation as a base condition.

While the TNM 2.5 model has been calibrated and tested against actual noise measurements for several years, it should be noted that it is still a noise prediction model. Based on the assumptions stated in this report, it "predicts" noise levels along the project route for the design year for this project (2035). Actual noise levels at that time may differ somewhat because of a number of factors including changes in roadway design, traffic volumes, or vehicle mix and speeds.

Level of Service Traffic and Noise Levels

Traffic engineers describe the flow of traffic with a series of conditions called level of service (LOS). LOS A depicts free-flowing traffic able to travel at or above the posted speed limit with little or no difficulty in changing lanes. Conditions become more congested as the LOS progresses through the alphabet to LOS F, representing stop-and-go traffic conditions. From a traffic noise perspective, the LOS C condition usually represents the worst hourly traffic noise impacts because traffic speeds are at or near the posted speed limit and lane capacity is high. Although more vehicles may be accommodated when LOS D is achieved, the lower speeds drastically reduce tire noise, a major source of traffic noise.

Future traffic volumes contained in the traffic study for this project were near or slightly higher than LOS C conditions for much of the corridor. Consequently, future traffic volumes contained in the traffic study were used in the analysis for both directions.

Future Noise Levels

Noise levels in the Study Area were evaluated for more than 220 receivers located along the various action alternatives and options. The receivers are generally located within about 1,000 feet of the R/W. Future noise levels were evaluated for the three Western Section action alternatives, the Eastern Section action alternative, and the No-Action Alternative.

Descriptions of Sensitive Noise Receiver Areas

Receivers were identified within the proposed Study Area to assess impacts from the proposed improvements. The receivers were distributed throughout the corridor along noise-sensitive land uses.

Receivers were selected based on their proximity to the proposed SMTC and their land use.

Noise Analysis Procedure

Preliminary design plans, aerial photographs, and field reconnaissance were used to determine the approximate locations and land use activities near the roadway. Standard English units of measurement were used throughout this project.

As noted earlier, noise levels are affected by traffic volumes, operating speeds, and traffic mix (percentage of automobiles, medium-sized trucks, heavy trucks, buses, and motorcycles). These variables were used in TNM 2.5 to predict future noise levels at the receiver locations. Traffic volumes and speeds used in the modeling for this project represent worst-case traffic conditions.

Noise analyses typically use projected future peak-hour traffic conditions to determine where noise mitigation should be included. The future peak-hour traffic conditions, which typically consist of the highest traffic volumes that the freeway can accommodate at freeway speeds, would produce the highest noise levels that are anticipated at properties near the future freeway. Because higher traffic volumes produce higher noise levels, noise levels from the freeway at other times of the day and night would be lower than during the peak hour. Noise mitigation designed to reduce peak-hour noise levels would effectively reduce noise levels at other times of the day and at night.

Unmitigated noise levels for design year traffic and road conditions were determined and compared with the appropriate NAC to determine whether traffic noise mitigation should be considered. Noise abatement was considered where needed and was included in the model to calculate the mitigated noise levels at the receivers and determine the approximate height and length of the noise abatement (barrier).

This noise analysis is based on preliminary design and traffic information. Numerous assumptions were made to complete the analysis. As the proposed design of the SMTC further develops, additional noise analyses would need to be conducted. The results of this analysis and the recommendations contained in this report should not be considered final and would need to be verified and refined as the SMTC design progresses.

Appendix B

TNM Output

HDR Engineering, Inc.
ARB

16 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain Transportation Corridor
RUN: E1 with Chandler Extension - unmitigated
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R4	4	25	0.0	68.1	64	68.1	15	Snd Lvl	68.1	0.0	5	-5.0
R5	5	12	0.0	75.8	64	75.8	15	Snd Lvl	75.8	0.0	5	-5.0
R8	8	4	0.0	74.1	64	74.1	15	Snd Lvl	74.1	0.0	5	-5.0
R9	9	11	0.0	70.3	64	70.3	15	Snd Lvl	70.3	0.0	5	-5.0
R10	10	48	0.0	71.8	64	71.8	15	Snd Lvl	71.8	0.0	5	-5.0
R11	11	11	0.0	74.1	64	74.1	15	Snd Lvl	74.1	0.0	5	-5.0
R12	12	7	0.0	74.0	64	74.0	15	Snd Lvl	74.0	0.0	5	-5.0
R13	13	33	0.0	75.2	64	75.2	15	Snd Lvl	75.2	0.0	5	-5.0
R14	14	9	0.0	74.5	64	74.5	15	Snd Lvl	74.5	0.0	5	-5.0
R15	15	8	0.0	73.3	64	73.3	15	Snd Lvl	73.3	0.0	5	-5.0
R16	16	8	0.0	73.0	64	73.0	15	Snd Lvl	73.0	0.0	5	-5.0
R17	17	12	0.0	69.7	64	69.7	15	Snd Lvl	69.7	0.0	5	-5.0
R18	18	12	0.0	73.2	64	73.2	15	Snd Lvl	73.2	0.0	5	-5.0
R19	19	14	0.0	71.7	64	71.7	15	Snd Lvl	71.7	0.0	5	-5.0
R20	20	7	0.0	72.3	64	72.3	15	Snd Lvl	72.3	0.0	5	-5.0
R22	22	16	0.0	65.1	64	65.1	15	Snd Lvl	65.1	0.0	5	-5.0
R23	23	13	0.0	64.1	64	64.1	15	Snd Lvl	64.1	0.0	5	-5.0
R26	26	10	0.0	75.7	64	75.7	15	Snd Lvl	75.7	0.0	5	-5.0
R26A	27	10	0.0	75.3	64	75.3	15	Snd Lvl	75.3	0.0	5	-5.0
R28	29	2	0.0	71.5	64	71.5	15	Snd Lvl	71.5	0.0	5	-5.0
R30	31	1	0.0	67.3	64	67.3	15	Snd Lvl	67.3	0.0	5	-5.0
R32	33	3	0.0	63.1	64	63.1	15	----	63.1	0.0	5	-5.0
R33	34	1	0.0	73.9	64	73.9	15	Snd Lvl	73.9	0.0	5	-5.0

R34	35	3	0.0	66.9	64	66.9	15	Snd Lvl	66.9	0.0	5	-5.0
R35	36	1	0.0	67.8	64	67.8	15	Snd Lvl	67.8	0.0	5	-5.0
R22a	38	15	0.0	70.5	64	70.5	15	Snd Lvl	70.5	0.0	5	-5.0
R35a	39	1	0.0	69.3	64	69.3	15	Snd Lvl	69.3	0.0	5	-5.0
R1a - Pecos Park	40	1	0.0	72.9	64	72.9	15	Snd Lvl	72.9	0.0	5	-5.0
R1b - Pecos Park	41	1	0.0	75.3	64	75.3	15	Snd Lvl	75.3	0.0	5	-5.0
R1c - Pecos Park	42	1	0.0	72.6	64	72.6	15	Snd Lvl	72.6	0.0	5	-5.0
R31-REV	43	3	0.0	69.2	64	69.2	15	Snd Lvl	69.2	0.0	5	-5.0
R29-REV	44	1	0.0	73.5	64	73.5	15	Snd Lvl	73.5	0.0	5	-5.0
R27-REV	45	2	0.0	72.1	64	72.1	15	Snd Lvl	72.1	0.0	5	-5.0
R25-REV	46	11	0.0	75.7	64	75.7	15	Snd Lvl	75.7	0.0	5	-5.0
R24-REV	47	11	0.0	77.0	64	77.0	15	Snd Lvl	77.0	0.0	5	-5.0
R21-REV	48	7	0.0	74.3	64	74.3	15	Snd Lvl	74.3	0.0	5	-5.0
R21a	49	8	0.0	72.9	64	72.9	15	Snd Lvl	72.9	0.0	5	-5.0
R7-REV	54	18	0.0	75.0	64	75.0	15	Snd Lvl	75.0	0.0	5	-5.0
R6-REV	55	15	0.0	73.9	64	73.9	15	Snd Lvl	73.9	0.0	5	-5.0
R3-REV	56	12	0.0	71.8	64	71.8	15	Snd Lvl	71.8	0.0	5	-5.0
R2-REV	57	12	0.0	76.1	64	76.1	15	Snd Lvl	76.1	0.0	5	-5.0
R1-REV	58	8	0.0	76.6	64	76.6	15	Snd Lvl	76.6	0.0	5	-5.0
R1	63	10	0.0	75.0	64	75.0	15	Snd Lvl	75.0	0.0	5	-5.0
R2	64	12	0.0	74.8	64	74.8	15	Snd Lvl	74.8	0.0	5	-5.0
R3	65	18	0.0	71.0	64	71.0	15	Snd Lvl	71.0	0.0	5	-5.0
R6	66	16	0.0	71.4	64	71.4	15	Snd Lvl	71.4	0.0	5	-5.0
R7	67	18	0.0	73.2	64	73.2	15	Snd Lvl	73.2	0.0	5	-5.0
R21	68	16	0.0	72.8	64	72.8	15	Snd Lvl	72.8	0.0	5	-5.0
R24	69	8	0.0	74.2	64	74.2	15	Snd Lvl	74.2	0.0	5	-5.0
R25	70	12	0.0	73.2	64	73.2	15	Snd Lvl	73.2	0.0	5	-5.0
R27	71	2	0.0	75.0	64	75.0	15	Snd Lvl	75.0	0.0	5	-5.0
R29	72	2	0.0	74.8	64	74.8	15	Snd Lvl	74.8	0.0	5	-5.0
R31	73	2	0.0	73.0	64	73.0	15	Snd Lvl	73.0	0.0	5	-5.0
R24b	74	10	0.0	68.8	64	68.8	15	Snd Lvl	68.8	0.0	5	-5.0
R24a	75	9	0.0	66.6	64	66.6	15	Snd Lvl	66.6	0.0	5	-5.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	543	0.0	0.0	0.0
All Impacted	540	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HDR Engineering, Inc.
ARB

16 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain Transportation Corridor
RUN: E1 with Chandler Extension - mitigated
BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R4	4	25	0.0	67.6	64	67.6	15	Snd Lvl	62.4	5.2	5	0.2
R5	5	12	0.0	76.1	64	76.1	15	Snd Lvl	62.5	13.6	5	8.6
R8	8	4	0.0	74.1	64	74.1	15	Snd Lvl	61.2	12.9	5	7.9
R9	9	11	0.0	70.4	64	70.4	15	Snd Lvl	62.5	7.9	5	2.9
R10	10	48	0.0	71.7	64	71.7	15	Snd Lvl	62.2	9.5	5	4.5
R11	11	11	0.0	74.1	64	74.1	15	Snd Lvl	62.4	11.7	5	6.7
R12	12	7	0.0	74.0	64	74.0	15	Snd Lvl	62.0	12.0	5	7.0
R13	13	33	0.0	75.2	64	75.2	15	Snd Lvl	62.1	13.1	5	8.1
R14	14	9	0.0	74.8	64	74.8	15	Snd Lvl	62.4	12.4	5	7.4
R15	15	8	0.0	73.3	64	73.3	15	Snd Lvl	67.4	5.9	5	0.9
R16	16	8	0.0	71.9	64	71.9	15	Snd Lvl	69.4	2.5	5	-2.5
R17	17	12	0.0	69.0	64	69.0	15	Snd Lvl	61.8	7.2	5	2.2
R18	18	12	0.0	72.8	64	72.8	15	Snd Lvl	62.1	10.7	5	5.7
R19	19	14	0.0	71.0	64	71.0	15	Snd Lvl	60.8	10.2	5	5.2
R20	20	7	0.0	72.3	64	72.3	15	Snd Lvl	61.2	11.1	5	6.1
R22	22	16	0.0	65.1	64	65.1	15	Snd Lvl	60.9	4.2	5	-0.8
R23	23	13	0.0	64.0	64	64.0	15	Snd Lvl	59.8	4.2	5	-0.8
R26	26	10	0.0	74.4	64	74.4	15	Snd Lvl	61.6	12.8	5	7.8
R26A	27	10	0.0	75.3	64	75.3	15	Snd Lvl	62.5	12.8	5	7.8
R28	29	2	0.0	71.5	64	71.5	15	Snd Lvl	60.7	10.8	5	5.8
R30	31	1	0.0	67.1	64	67.1	15	Snd Lvl	66.9	0.2	5	-4.8
R32	33	3	0.0	62.7	64	62.7	15	----	58.6	4.1	5	-0.9
R33	34	1	0.0	73.9	64	73.9	15	Snd Lvl	68.0	5.9	5	0.9

R34	35	3	0.0	65.8	64	65.8	15	Snd Lvl	61.6	4.2	5	-0.8
R35	36	1	0.0	67.4	64	67.4	15	Snd Lvl	61.9	5.5	5	0.5
R22a	38	15	0.0	70.1	64	70.1	15	Snd Lvl	63.6	6.5	5	1.5
R35a	39	1	0.0	69.4	64	69.4	15	Snd Lvl	62.4	7.0	5	2.0
R1a - Pecos Park	40	1	0.0	72.9	64	72.9	15	Snd Lvl	61.1	11.8	5	6.8
R1b - Pecos Park	41	1	0.0	75.3	64	75.3	15	Snd Lvl	62.0	13.3	5	8.3
R1c - Pecos Park	42	1	0.0	72.8	64	72.8	15	Snd Lvl	60.2	12.6	5	7.6
R31-REV	43	3	0.0	68.4	64	68.4	15	Snd Lvl	59.6	8.8	5	3.8
R29-REV	44	1	0.0	73.2	64	73.2	15	Snd Lvl	61.7	11.5	5	6.5
R27-REV	45	2	0.0	72.1	64	72.1	15	Snd Lvl	61.3	10.8	5	5.8
R25-REV	46	11	0.0	75.1	64	75.1	15	Snd Lvl	62.2	12.9	5	7.9
R24-REV	47	11	0.0	76.2	64	76.2	15	Snd Lvl	62.6	13.6	5	8.6
R21-REV	48	7	0.0	74.2	64	74.2	15	Snd Lvl	62.2	12.0	5	7.0
R21a	49	8	0.0	72.9	64	72.9	15	Snd Lvl	60.7	12.2	5	7.2
R7-REV	54	18	0.0	74.2	64	74.2	15	Snd Lvl	62.5	11.7	5	6.7
R6-REV	55	15	0.0	74.1	64	74.1	15	Snd Lvl	63.0	11.1	5	6.1
R3-REV	56	12	0.0	71.8	64	71.8	15	Snd Lvl	60.7	11.1	5	6.1
R2-REV	57	12	0.0	76.2	64	76.2	15	Snd Lvl	62.3	13.9	5	8.9
R1-REV	58	8	0.0	76.6	64	76.6	15	Snd Lvl	62.7	13.9	5	8.9
R1	63	10	0.0	75.0	64	75.0	15	Snd Lvl	61.9	13.1	5	8.1
R2	64	12	0.0	74.8	64	74.8	15	Snd Lvl	61.5	13.3	5	8.3
R3	65	18	0.0	70.9	64	70.9	15	Snd Lvl	60.4	10.5	5	5.5
R6	66	16	0.0	72.1	64	72.1	15	Snd Lvl	62.1	10.0	5	5.0
R7	67	18	0.0	71.6	64	71.6	15	Snd Lvl	61.2	10.4	5	5.4
R21	68	16	0.0	72.8	64	72.8	15	Snd Lvl	60.8	12.0	5	7.0
R24	69	8	0.0	77.2	64	77.2	15	Snd Lvl	62.2	15.0	5	10.0
R25	70	12	0.0	72.0	64	72.0	15	Snd Lvl	60.2	11.8	5	6.8
R27	71	2	0.0	75.1	64	75.1	15	Snd Lvl	62.3	12.8	5	7.8
R29	72	2	0.0	73.6	64	73.6	15	Snd Lvl	62.6	11.0	5	6.0
R31	73	2	0.0	70.2	64	70.2	15	Snd Lvl	61.7	8.5	5	3.5
R24b	74	10	0.0	70.8	64	70.8	15	Snd Lvl	61.1	9.7	5	4.7
R24a	75	9	0.0	71.7	64	71.7	15	Snd Lvl	59.8	11.9	5	6.9

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	543	0.2	10.1	15.0
All Impacted	540	0.2	10.2	15.0
All that meet NR Goal	499	5.2	10.9	15.0

HDR Engineering, Inc.
DDW

16 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain EIS
RUN: SM - Dobbins Road area
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R36	1	1	0.0	69.4	64	69.4	15	Snd Lvl	64.0	5.4	5	0.4
R37	2	1	0.0	65.9	64	65.9	15	Snd Lvl	60.4	5.5	5	0.5
R38 - Hackin	3	1	0.0	64.4	64	64.4	15	Snd Lvl	58.4	6.0	5	1.0
R39 - Hudson	4	1	0.0	65.6	64	65.6	15	Snd Lvl	58.1	7.5	5	2.5
R40a	5	1	0.0	66.9	64	66.9	15	Snd Lvl	60.2	6.7	5	1.7
R40b	6	1	0.0	65.2	64	65.2	15	Snd Lvl	59.1	6.1	5	1.1
R40c	7	1	0.0	72.6	64	72.6	15	Snd Lvl	62.8	9.8	5	4.8
R41	8	1	0.0	74.2	64	74.2	15	Snd Lvl	63.5	10.7	5	5.7
R42	9	1	0.0	69.1	64	69.1	15	Snd Lvl	62.3	6.8	5	1.8
R43a	10	1	0.0	63.1	64	63.1	15	----	58.0	5.1	5	0.1
R43	11	1	0.0	66.7	64	66.7	15	Snd Lvl	61.0	5.7	5	0.7
R44	12	1	0.0	67.5	64	67.5	15	Snd Lvl	61.2	6.3	5	1.3
R44a	13	1	0.0	62.8	64	62.8	15	----	61.6	1.2	5	-3.8
R45	14	1	0.0	70.7	64	70.7	15	Snd Lvl	62.8	7.9	5	2.9

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	14	1.2	6.5	10.7
All Impacted	12	5.4	7.0	10.7
All that meet NR Goal	13	5.1	6.9	10.7

HDR
ARB

16 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SM
RUN: W59 - Shift to 61st - Unmitigated
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R36	1	1	0.0	69.7	64	69.7	15	Snd Lvl	69.7	0.0	5	-5.0
R37	2	1	0.0	67.9	64	67.9	15	Snd Lvl	67.9	0.0	5	-5.0
R38	3	1	0.0	68.0	64	68.0	15	Snd Lvl	68.0	0.0	5	-5.0
R39	4	1	0.0	65.2	64	65.2	15	Snd Lvl	65.2	0.0	5	-5.0
R40	5	1	0.0	65.4	64	65.4	15	Snd Lvl	65.4	0.0	5	-5.0
R41	6	1	0.0	72.1	64	72.1	15	Snd Lvl	72.1	0.0	5	-5.0
R42	7	1	0.0	68.0	64	68.0	15	Snd Lvl	68.0	0.0	5	-5.0
R43a	8	1	0.0	62.1	64	62.1	15	----	62.1	0.0	5	-5.0
R43	9	1	0.0	66.5	64	66.5	15	Snd Lvl	66.5	0.0	5	-5.0
R44	10	1	0.0	67.6	64	67.6	15	Snd Lvl	67.6	0.0	5	-5.0
R45	11	1	0.0	71.1	64	71.1	15	Snd Lvl	71.1	0.0	5	-5.0
R46	12	1	0.0	77.5	64	77.5	15	Snd Lvl	77.5	0.0	5	-5.0
R44a	13	1	0.0	62.6	64	62.6	15	----	62.6	0.0	5	-5.0
R47	14	1	0.0	68.5	64	68.5	15	Snd Lvl	68.5	0.0	5	-5.0
R48	15	1	0.0	67.5	64	67.5	15	Snd Lvl	67.5	0.0	5	-5.0
R49a	16	1	0.0	71.0	64	71.0	15	Snd Lvl	71.0	0.0	5	-5.0
R50	17	1	0.0	73.4	64	73.4	15	Snd Lvl	73.4	0.0	5	-5.0
R50a	18	1	0.0	74.8	64	74.8	15	Snd Lvl	74.8	0.0	5	-5.0
R49	19	1	0.0	71.0	64	71.0	15	Snd Lvl	71.0	0.0	5	-5.0
R49b	20	1	0.0	73.6	64	73.6	15	Snd Lvl	73.6	0.0	5	-5.0
R51	21	1	0.0	76.4	64	76.4	15	Snd Lvl	76.4	0.0	5	-5.0
R52	22	1	0.0	65.5	64	65.5	15	Snd Lvl	65.5	0.0	5	-5.0
R53	23	1	0.0	64.8	64	64.8	15	Snd Lvl	64.8	0.0	5	-5.0

R53a	24	1	0.0	62.4	64	62.4	15	----	62.4	0.0	5	-5.0
R53b	25	1	0.0	61.1	64	61.1	15	----	61.1	0.0	5	-5.0
R53c	26	1	0.0	64.5	64	64.5	15	Snd Lvl	64.5	0.0	5	-5.0
R53d	27	1	0.0	64.9	64	64.9	15	Snd Lvl	64.9	0.0	5	-5.0
R54a - take	29	1	0.0	69.9	64	69.9	15	Snd Lvl	69.9	0.0	5	-5.0
R54b	30	1	0.0	71.6	64	71.6	15	Snd Lvl	71.6	0.0	5	-5.0
R54c	31	1	0.0	72.1	64	72.1	15	Snd Lvl	72.1	0.0	5	-5.0
R54d	32	1	0.0	70.5	64	70.5	15	Snd Lvl	70.5	0.0	5	-5.0
R54e	33	1	0.0	71.3	64	71.3	15	Snd Lvl	71.3	0.0	5	-5.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	32	0.0	0.0	0.0
All Impacted	28	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HDR
DDW

17 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SM
RUN: W59
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R36	1	1	0.0	69.5	64	69.5	15	Snd Lvl	60.6	8.9	5	3.9
R37	2	1	0.0	68.0	64	68.0	15	Snd Lvl	61.2	6.8	5	1.8
R38	3	1	0.0	68.1	64	68.1	15	Snd Lvl	61.5	6.6	5	1.6
R39	4	1	0.0	65.1	64	65.1	15	Snd Lvl	61.3	3.8	5	-1.2
R40	5	1	0.0	64.5	64	64.5	15	Snd Lvl	60.8	3.7	5	-1.3
R41	6	1	0.0	72.1	64	72.1	15	Snd Lvl	62.6	9.5	5	4.5
R42	7	1	0.0	68.0	64	68.0	15	Snd Lvl	62.9	5.1	5	0.1
R43a	8	1	0.0	62.0	64	62.0	15	----	57.3	4.7	5	-0.3
R43	9	1	0.0	65.5	64	65.5	15	Snd Lvl	60.4	5.1	5	0.1
R44	10	1	0.0	66.3	64	66.3	15	Snd Lvl	59.8	6.5	5	1.5
R45	11	1	0.0	70.6	64	70.6	15	Snd Lvl	60.4	10.2	5	5.2
R46	12	1	0.0	77.8	64	77.8	15	Snd Lvl	63.1	14.7	5	9.7
R44a	13	1	0.0	62.6	64	62.6	15	----	62.4	0.2	5	-4.8
R47	14	1	0.0	67.8	64	67.8	15	Snd Lvl	60.9	6.9	5	1.9
R48	15	1	0.0	67.1	64	67.1	15	Snd Lvl	62.3	4.8	5	-0.2
R49a	16	1	0.0	70.4	64	70.4	15	Snd Lvl	63.7	6.7	5	1.7
R50	17	1	0.0	73.4	64	73.4	15	Snd Lvl	61.6	11.8	5	6.8
R50a	18	1	0.0	74.2	64	74.2	15	Snd Lvl	63.9	10.3	5	5.3
R49	19	1	0.0	70.3	64	70.3	15	Snd Lvl	63.5	6.8	5	1.8
R49b	20	1	0.0	73.1	64	73.1	15	Snd Lvl	61.0	12.1	5	7.1
R51	21	1	0.0	76.4	64	76.4	15	Snd Lvl	63.3	13.1	5	8.1
R52	22	1	0.0	65.4	64	65.4	15	Snd Lvl	58.3	7.1	5	2.1
R53	23	1	0.0	64.9	64	64.9	15	Snd Lvl	59.5	5.4	5	0.4

R53a	24	1	0.0	62.5	64	62.5	15	----	58.6	3.9	5	-1.1
R53b	25	1	0.0	61.1	64	61.1	15	----	57.9	3.2	5	-1.8
R53c	26	1	0.0	64.5	64	64.5	15	Snd Lvl	60.2	4.3	5	-0.7
R53d	27	1	0.0	64.8	64	64.8	15	Snd Lvl	60.1	4.7	5	-0.3
R54a - take	29	1	0.0	69.2	64	69.2	15	Snd Lvl	69.2	0.0	5	-5.0
R54b	30	1	0.0	71.3	64	71.3	15	Snd Lvl	66.9	4.4	5	-0.6
R54c	31	1	0.0	72.4	64	72.4	15	Snd Lvl	68.7	3.7	5	-1.3
R54d	32	1	0.0	70.5	64	70.5	15	Snd Lvl	68.7	1.8	5	-3.2
R54e	33	1	0.0	71.1	64	71.1	15	Snd Lvl	69.5	1.6	5	-3.4

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	32	0.0	6.2	14.7
All Impacted	28	0.0	6.7	14.7
All that meet NR Goal	18	5.1	8.5	14.7

HDR
ARB

16 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SM
RUN: W59 with 61st - R48 Unmitigated
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R36	1	1	0.0	69.7	64	69.7	15	Snd Lvl	69.7	0.0	5	-5.0
R37	2	1	0.0	67.9	64	67.9	15	Snd Lvl	67.9	0.0	5	-5.0
R38	3	1	0.0	68.0	64	68.0	15	Snd Lvl	68.0	0.0	5	-5.0
R39	4	1	0.0	65.2	64	65.2	15	Snd Lvl	65.2	0.0	5	-5.0
R40	5	1	0.0	65.4	64	65.4	15	Snd Lvl	65.4	0.0	5	-5.0
R41	6	1	0.0	72.1	64	72.1	15	Snd Lvl	72.1	0.0	5	-5.0
R42	7	1	0.0	68.0	64	68.0	15	Snd Lvl	68.0	0.0	5	-5.0
R43a	8	1	0.0	62.1	64	62.1	15	----	62.1	0.0	5	-5.0
R43	9	1	0.0	66.5	64	66.5	15	Snd Lvl	66.5	0.0	5	-5.0
R44	10	1	0.0	67.7	64	67.7	15	Snd Lvl	67.7	0.0	5	-5.0
R45	11	1	0.0	71.1	64	71.1	15	Snd Lvl	71.1	0.0	5	-5.0
R46	12	1	0.0	77.8	64	77.8	15	Snd Lvl	77.8	0.0	5	-5.0
R44a	13	1	0.0	62.6	64	62.6	15	----	62.6	0.0	5	-5.0
R47	14	1	0.0	68.5	64	68.5	15	Snd Lvl	68.5	0.0	5	-5.0
R48	15	1	0.0	67.5	64	67.5	15	Snd Lvl	67.5	0.0	5	-5.0
R49a	16	1	0.0	71.0	64	71.0	15	Snd Lvl	71.0	0.0	5	-5.0
R50	17	1	0.0	73.4	64	73.4	15	Snd Lvl	73.4	0.0	5	-5.0
R50a	18	1	0.0	74.8	64	74.8	15	Snd Lvl	74.8	0.0	5	-5.0
R49	19	1	0.0	71.0	64	71.0	15	Snd Lvl	71.0	0.0	5	-5.0
R49b	20	1	0.0	73.6	64	73.6	15	Snd Lvl	73.6	0.0	5	-5.0
R51	21	1	0.0	76.4	64	76.4	15	Snd Lvl	76.4	0.0	5	-5.0
R52	22	1	0.0	65.5	64	65.5	15	Snd Lvl	65.5	0.0	5	-5.0
R53	23	1	0.0	64.8	64	64.8	15	Snd Lvl	64.8	0.0	5	-5.0

R53a	24	1	0.0	62.4	64	62.4	15	----	62.4	0.0	5	-5.0
R53b	25	1	0.0	61.1	64	61.1	15	----	61.1	0.0	5	-5.0
R53c	26	1	0.0	64.5	64	64.5	15	Snd Lvl	64.5	0.0	5	-5.0
R53d	27	1	0.0	64.9	64	64.9	15	Snd Lvl	64.9	0.0	5	-5.0
R54a - take	29	1	0.0	69.9	64	69.9	15	Snd Lvl	69.9	0.0	5	-5.0
R54b	30	1	0.0	71.6	64	71.6	15	Snd Lvl	71.6	0.0	5	-5.0
R54c	31	1	0.0	72.1	64	72.1	15	Snd Lvl	72.1	0.0	5	-5.0
R54d	32	1	0.0	70.5	64	70.5	15	Snd Lvl	70.5	0.0	5	-5.0
R54e	33	1	0.0	71.3	64	71.3	15	Snd Lvl	71.3	0.0	5	-5.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	32	0.0	0.0	0.0
All Impacted	28	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HDR
ARB

16 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SM
RUN: W59 with 61st - R48 Mitigated
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R36	1	1	0.0	69.7	64	69.7	15	Snd Lvl	69.7	0.0	5	-5.0
R37	2	1	0.0	67.9	64	67.9	15	Snd Lvl	67.9	0.0	5	-5.0
R38	3	1	0.0	68.0	64	68.0	15	Snd Lvl	68.0	0.0	5	-5.0
R39	4	1	0.0	65.2	64	65.2	15	Snd Lvl	65.2	0.0	5	-5.0
R40	5	1	0.0	65.4	64	65.4	15	Snd Lvl	65.4	0.0	5	-5.0
R41	6	1	0.0	72.1	64	72.1	15	Snd Lvl	72.1	0.0	5	-5.0
R42	7	1	0.0	68.0	64	68.0	15	Snd Lvl	68.0	0.0	5	-5.0
R43a	8	1	0.0	62.1	64	62.1	15	----	61.8	0.3	5	-4.7
R43	9	1	0.0	66.6	64	66.6	15	Snd Lvl	66.1	0.5	5	-4.5
R44	10	1	0.0	67.7	64	67.7	15	Snd Lvl	66.6	1.1	5	-3.9
R45	11	1	0.0	71.2	64	71.2	15	Snd Lvl	69.1	2.1	5	-2.9
R46	12	1	0.0	77.9	64	77.9	15	Snd Lvl	65.1	12.8	5	7.8
R44a	13	1	0.0	62.6	64	62.6	15	----	62.6	0.0	5	-5.0
R47	14	1	0.0	67.8	64	67.8	15	Snd Lvl	61.4	6.4	5	1.4
R48	15	1	0.0	67.0	64	67.0	15	Snd Lvl	62.5	4.5	5	-0.5
R49a	16	1	0.0	70.4	64	70.4	15	Snd Lvl	63.9	6.5	5	1.5
R50	17	1	0.0	73.4	64	73.4	15	Snd Lvl	62.4	11.0	5	6.0
R50a	18	1	0.0	74.2	64	74.2	15	Snd Lvl	64.1	10.1	5	5.1
R49	19	1	0.0	70.3	64	70.3	15	Snd Lvl	63.8	6.5	5	1.5
R49b	20	1	0.0	73.1	64	73.1	15	Snd Lvl	61.9	11.2	5	6.2
R51	21	1	0.0	76.4	64	76.4	15	Snd Lvl	63.4	13.0	5	8.0
R52	22	1	0.0	65.4	64	65.4	15	Snd Lvl	58.4	7.0	5	2.0
R53	23	1	0.0	64.9	64	64.9	15	Snd Lvl	59.5	5.4	5	0.4

R53a	24	1	0.0	62.5	64	62.5	15	----	58.6	3.9	5	-1.1
R53b	25	1	0.0	61.1	64	61.1	15	----	58.0	3.1	5	-1.9
R53c	26	1	0.0	64.5	64	64.5	15	Snd Lvl	60.2	4.3	5	-0.7
R53d	27	1	0.0	64.8	64	64.8	15	Snd Lvl	60.1	4.7	5	-0.3
R54a - take	29	1	0.0	69.2	64	69.2	15	Snd Lvl	69.2	0.0	5	-5.0
R54b	30	1	0.0	71.3	64	71.3	15	Snd Lvl	66.9	4.4	5	-0.6
R54c	31	1	0.0	72.4	64	72.4	15	Snd Lvl	68.7	3.7	5	-1.3
R54d	32	1	0.0	70.5	64	70.5	15	Snd Lvl	68.7	1.8	5	-3.2
R54e	33	1	0.0	71.1	64	71.1	15	Snd Lvl	69.5	1.6	5	-3.4

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	32	0.0	3.9	13.0
All Impacted	28	0.0	4.2	13.0
All that meet NR Goal	10	5.4	9.0	13.0

HDR Engineering, Inc.
ARB

16 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain EIS
RUN: I-10 - W59 Alternative - No Mitigation
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	62.9	64	62.9	15	----	62.9	0.0	5	-5.0
Receiver2	2	1	0.0	62.4	64	62.4	15	----	62.4	0.0	5	-5.0
Receiver3	3	1	0.0	68.3	64	68.3	15	Snd Lvl	62.6	5.7	5	0.7
Receiver4	4	1	0.0	70.1	64	70.1	15	Snd Lvl	64.2	5.9	5	0.9
Receiver5	5	1	0.0	61.7	64	61.7	15	----	61.7	0.0	5	-5.0
Receiver6	6	1	0.0	71.5	64	71.5	15	Snd Lvl	71.5	0.0	5	-5.0
Receiver7	7	1	0.0	61.8	64	61.8	15	----	61.8	0.0	5	-5.0
Receiver8	8	1	0.0	64.8	64	64.8	15	Snd Lvl	59.8	5.0	5	0.0
Receiver9	9	1	0.0	65.0	64	65.0	15	Snd Lvl	57.5	7.5	5	2.5
Receiver10	10	1	0.0	68.3	64	68.3	15	Snd Lvl	57.9	10.4	5	5.4
Receiver11	11	1	0.0	63.8	64	63.8	15	----	62.6	1.2	5	-3.8
Receiver12	12	1	0.0	63.5	64	63.5	15	----	60.2	3.3	5	-1.7
Receiver13	13	1	0.0	64.9	64	64.9	15	Snd Lvl	60.3	4.6	5	-0.4
Receiver14	14	1	0.0	65.6	64	65.6	15	Snd Lvl	61.1	4.5	5	-0.5
Receiver15	15	1	0.0	65.0	64	65.0	15	Snd Lvl	62.5	2.5	5	-2.5
Receiver16	16	1	0.0	63.3	64	63.3	15	----	60.2	3.1	5	-1.9
Receiver17	17	1	0.0	63.2	64	63.2	15	----	59.6	3.6	5	-1.4
Receiver18	18	1	0.0	62.7	64	62.7	15	----	60.5	2.2	5	-2.8
Receiver19	19	1	0.0	63.0	64	63.0	15	----	59.2	3.8	5	-1.2
Receiver20	20	1	0.0	64.9	64	64.9	15	Snd Lvl	59.1	5.8	5	0.8
Receiver21	21	1	0.0	64.5	64	64.5	15	Snd Lvl	60.1	4.4	5	-0.6
Receiver22	22	1	0.0	65.7	64	65.7	15	Snd Lvl	61.4	4.3	5	-0.7
Receiver23	23	1	0.0	71.6	64	71.6	15	Snd Lvl	63.2	8.4	5	3.4

Receiver24	24	1	0.0	66.4	64	66.4	15	Snd Lvl	63.2	3.2	5	-1.8
Receiver25	25	1	0.0	66.8	64	66.8	15	Snd Lvl	62.5	4.3	5	-0.7
Receiver26	26	1	0.0	68.5	64	68.5	15	Snd Lvl	60.7	7.8	5	2.8
Receiver27	27	1	0.0	71.4	64	71.4	15	Snd Lvl	60.4	11.0	5	6.0
Receiver28	28	1	0.0	72.5	64	72.5	15	Snd Lvl	65.9	6.6	5	1.6
Receiver29	29	1	0.0	68.6	64	68.6	15	Snd Lvl	63.9	4.7	5	-0.3
Receiver30	30	1	0.0	67.2	64	67.2	15	Snd Lvl	60.9	6.3	5	1.3
Receiver31	31	1	0.0	67.2	64	67.2	15	Snd Lvl	61.2	6.0	5	1.0
Receiver32	32	1	0.0	68.4	64	68.4	15	Snd Lvl	63.9	4.5	5	-0.5
Receiver33	33	1	0.0	66.6	64	66.6	15	Snd Lvl	61.1	5.5	5	0.5
Receiver34	34	1	0.0	66.0	64	66.0	15	Snd Lvl	61.0	5.0	5	0.0
Receiver35	35	1	0.0	67.5	64	67.5	15	Snd Lvl	60.6	6.9	5	1.9
Receiver36	36	1	0.0	72.1	64	72.1	15	Snd Lvl	61.5	10.6	5	5.6
Receiver37	37	1	0.0	71.0	64	71.0	15	Snd Lvl	60.8	10.2	5	5.2
Receiver38	38	1	0.0	67.4	64	67.4	15	Snd Lvl	61.1	6.3	5	1.3
Receiver39	39	1	0.0	72.6	64	72.6	15	Snd Lvl	62.8	9.8	5	4.8
Receiver40	40	1	0.0	69.6	64	69.6	15	Snd Lvl	63.3	6.3	5	1.3
Receiver41	41	1	0.0	71.7	64	71.7	15	Snd Lvl	60.3	11.4	5	6.4
Receiver42	42	1	0.0	71.7	64	71.7	15	Snd Lvl	61.5	10.2	5	5.2
Receiver43	43	1	0.0	64.8	64	64.8	15	Snd Lvl	59.8	5.0	5	0.0
Receiver44	44	1	0.0	69.4	64	69.4	15	Snd Lvl	61.7	7.7	5	2.7
Receiver45	45	1	0.0	72.0	64	72.0	15	Snd Lvl	64.9	7.1	5	2.1
Receiver46	46	1	0.0	66.9	64	66.9	15	Snd Lvl	61.7	5.2	5	0.2
Receiver47	47	1	0.0	69.6	64	69.6	15	Snd Lvl	61.6	8.0	5	3.0
Receiver48	48	1	0.0	66.7	64	66.7	15	Snd Lvl	62.0	4.7	5	-0.3
Receiver49	49	1	0.0	70.8	64	70.8	15	Snd Lvl	62.6	8.2	5	3.2
Receiver50	50	1	0.0	70.5	64	70.5	15	Snd Lvl	65.1	5.4	5	0.4
Receiver51	51	1	0.0	66.1	64	66.1	15	Snd Lvl	65.3	0.8	5	-4.2

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	51	0.0	5.4	11.4
All Impacted	41	0.0	6.3	11.4
All that meet NR Goal	29	5.0	7.4	11.4

HDR Engineering, Inc.
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17 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain EIS
RUN: I-10 - W59 Alternative - Mitigated
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	62.9	64	62.9	15	----	62.9	0.0	5	-5.0
Receiver2	2	1	0.0	62.4	64	62.4	15	----	62.4	0.0	5	-5.0
Receiver3	3	1	0.0	68.3	64	68.3	15	Snd Lvl	61.6	6.7	5	1.7
Receiver4	4	1	0.0	70.1	64	70.1	15	Snd Lvl	63.4	6.7	5	1.7
Receiver5	5	1	0.0	61.7	64	61.7	15	----	61.7	0.0	5	-5.0
Receiver6	6	1	0.0	71.5	64	71.5	15	Snd Lvl	71.5	0.0	5	-5.0
Receiver7	7	1	0.0	61.8	64	61.8	15	----	61.8	0.0	5	-5.0
Receiver8	8	1	0.0	64.8	64	64.8	15	Snd Lvl	59.8	5.0	5	0.0
Receiver9	9	1	0.0	65.0	64	65.0	15	Snd Lvl	57.5	7.5	5	2.5
Receiver10	10	1	0.0	68.3	64	68.3	15	Snd Lvl	57.9	10.4	5	5.4
Receiver11	11	1	0.0	63.8	64	63.8	15	----	62.6	1.2	5	-3.8
Receiver12	12	1	0.0	63.5	64	63.5	15	----	60.2	3.3	5	-1.7
Receiver13	13	1	0.0	64.9	64	64.9	15	Snd Lvl	60.3	4.6	5	-0.4
Receiver14	14	1	0.0	65.6	64	65.6	15	Snd Lvl	61.1	4.5	5	-0.5
Receiver15	15	1	0.0	65.0	64	65.0	15	Snd Lvl	62.5	2.5	5	-2.5
Receiver16	16	1	0.0	63.3	64	63.3	15	----	60.2	3.1	5	-1.9
Receiver17	17	1	0.0	63.2	64	63.2	15	----	59.6	3.6	5	-1.4
Receiver18	18	1	0.0	62.7	64	62.7	15	----	60.5	2.2	5	-2.8
Receiver19	19	1	0.0	63.0	64	63.0	15	----	59.2	3.8	5	-1.2
Receiver20	20	1	0.0	65.0	64	65.0	15	Snd Lvl	59.2	5.8	5	0.8
Receiver21	21	1	0.0	64.8	64	64.8	15	Snd Lvl	59.9	4.9	5	-0.1
Receiver22	22	1	0.0	65.7	64	65.7	15	Snd Lvl	61.5	4.2	5	-0.8
Receiver23	23	1	0.0	71.8	64	71.8	15	Snd Lvl	63.3	8.5	5	3.5

Receiver24	24	1	0.0	66.0	64	66.0	15	Snd Lvl	63.0	3.0	5	-2.0
Receiver25	25	1	0.0	66.7	64	66.7	15	Snd Lvl	62.4	4.3	5	-0.7
Receiver26	26	1	0.0	68.4	64	68.4	15	Snd Lvl	60.5	7.9	5	2.9
Receiver27	27	1	0.0	71.2	64	71.2	15	Snd Lvl	58.7	12.5	5	7.5
Receiver28	28	1	0.0	68.2	64	68.2	15	Snd Lvl	61.9	6.3	5	1.3
Receiver29	29	1	0.0	69.1	64	69.1	15	Snd Lvl	60.0	9.1	5	4.1
Receiver30	30	1	0.0	67.2	64	67.2	15	Snd Lvl	60.9	6.3	5	1.3
Receiver31	31	1	0.0	67.2	64	67.2	15	Snd Lvl	61.1	6.1	5	1.1
Receiver32	32	1	0.0	69.5	64	69.5	15	Snd Lvl	61.0	8.5	5	3.5
Receiver33	33	1	0.0	66.7	64	66.7	15	Snd Lvl	61.1	5.6	5	0.6
Receiver34	34	1	0.0	66.0	64	66.0	15	Snd Lvl	61.0	5.0	5	0.0
Receiver35	35	1	0.0	67.5	64	67.5	15	Snd Lvl	60.6	6.9	5	1.9
Receiver36	36	1	0.0	72.1	64	72.1	15	Snd Lvl	61.4	10.7	5	5.7
Receiver37	37	1	0.0	71.0	64	71.0	15	Snd Lvl	60.8	10.2	5	5.2
Receiver38	38	1	0.0	67.4	64	67.4	15	Snd Lvl	61.1	6.3	5	1.3
Receiver39	39	1	0.0	71.7	64	71.7	15	Snd Lvl	62.5	9.2	5	4.2
Receiver40	40	1	0.0	69.4	64	69.4	15	Snd Lvl	62.5	6.9	5	1.9
Receiver41	41	1	0.0	71.7	64	71.7	15	Snd Lvl	60.3	11.4	5	6.4
Receiver42	42	1	0.0	71.7	64	71.7	15	Snd Lvl	61.5	10.2	5	5.2
Receiver43	43	1	0.0	64.8	64	64.8	15	Snd Lvl	59.8	5.0	5	0.0
Receiver44	44	1	0.0	69.4	64	69.4	15	Snd Lvl	61.6	7.8	5	2.8
Receiver45	45	1	0.0	72.0	64	72.0	15	Snd Lvl	62.1	9.9	5	4.9
Receiver46	46	1	0.0	66.9	64	66.9	15	Snd Lvl	61.6	5.3	5	0.3
Receiver47	47	1	0.0	69.6	64	69.6	15	Snd Lvl	61.6	8.0	5	3.0
Receiver48	48	1	0.0	66.6	64	66.6	15	Snd Lvl	61.9	4.7	5	-0.3
Receiver49	49	1	0.0	70.8	64	70.8	15	Snd Lvl	62.3	8.5	5	3.5
Receiver50	50	1	0.0	70.9	64	70.9	15	Snd Lvl	62.3	8.6	5	3.6
Receiver51	51	1	0.0	65.8	64	65.8	15	Snd Lvl	59.4	6.4	5	1.4

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	51	0.0	5.9	12.5
All Impacted	41	0.0	6.9	12.5
All that meet NR Goal	32	5.0	7.8	12.5

HDR Engineering, Inc.
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17 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain Transportation Corridor
RUN: W71 only
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R55	1	30	0.0	71.6	64	71.6	15	Snd Lvl	64.9	6.7	5	1.7
R55a	2	30	0.0	74.0	64	74.0	15	Snd Lvl	65.5	8.5	5	3.5
R55b	3	30	0.0	70.9	64	70.9	15	Snd Lvl	64.3	6.6	5	1.6
R55c	4	30	0.0	67.3	64	67.3	15	Snd Lvl	61.6	5.7	5	0.7
R56	5	3	0.0	62.3	64	62.3	15	----	57.7	4.6	5	-0.4
R57	6	1	0.0	65.6	64	65.6	15	Snd Lvl	62.7	2.9	5	-2.1
R57a	7	30	0.0	72.8	64	72.8	15	Snd Lvl	69.9	2.9	5	-2.1
R58	8	1	0.0	71.0	64	71.0	15	Snd Lvl	62.0	9.0	5	4.0
R58a	9	40	0.0	61.9	64	61.9	15	----	57.9	4.0	5	-1.0
R59	10	3	0.0	72.9	64	72.9	15	Snd Lvl	62.0	10.9	5	5.9
R60	11	8	0.0	68.3	64	68.3	15	Snd Lvl	61.3	7.0	5	2.0
R61	12	8	0.0	67.3	64	67.3	15	Snd Lvl	62.3	5.0	5	0.0
R61a	13	30	0.0	65.4	64	65.4	15	Snd Lvl	61.6	3.8	5	-1.2
R62	14	40	0.0	70.8	64	70.8	15	Snd Lvl	64.8	6.0	5	1.0
R63	15	40	0.0	68.6	64	68.6	15	Snd Lvl	60.7	7.9	5	2.9
R64	16	3	0.0	65.3	64	65.3	15	Snd Lvl	59.1	6.2	5	1.2
R64a	17	40	0.0	74.3	64	74.3	15	Snd Lvl	63.0	11.3	5	6.3
R65	18	40	0.0	75.7	64	75.7	15	Snd Lvl	62.7	13.0	5	8.0
R65a	19	10	0.0	70.8	64	70.8	15	Snd Lvl	60.3	10.5	5	5.5
R66	20	20	0.0	63.8	64	63.8	15	----	59.2	4.6	5	-0.4
R66a	21	40	0.0	70.1	64	70.1	15	Snd Lvl	61.2	8.9	5	3.9
R67	22	1	0.0	70.1	64	70.1	15	Snd Lvl	66.0	4.1	5	-0.9
R68	23	10	0.0	69.6	64	69.6	15	Snd Lvl	61.2	8.4	5	3.4

R68a	24	10	0.0	73.7	64	73.7	15	Snd Lvl	63.0	10.7	5	5.7
R69a	25	10	0.0	65.3	64	65.3	15	Snd Lvl	60.2	5.1	5	0.1
R69	26	20	0.0	69.5	64	69.5	15	Snd Lvl	66.0	3.5	5	-1.5
R70	27	20	0.0	69.8	64	69.8	15	Snd Lvl	62.5	7.3	5	2.3
R55a-Rev	29	30	0.0	73.3	64	73.3	15	Snd Lvl	65.6	7.7	5	2.7
R55b-Rev	30	30	0.0	70.3	64	70.3	15	Snd Lvl	59.3	11.0	5	6.0
R55c-Rev	31	30	0.0	70.3	64	70.3	15	Snd Lvl	63.8	6.5	5	1.5
R56-Rev	32	30	0.0	70.0	64	70.0	15	Snd Lvl	64.3	5.7	5	0.7
R57a-Rev	33	20	0.0	70.4	64	70.4	15	Snd Lvl	62.4	8.0	5	3.0
R58a-Rev	34	40	0.0	73.1	64	73.1	15	Snd Lvl	62.1	11.0	5	6.0
R58b-Rev	35	40	0.0	73.7	64	73.7	15	Snd Lvl	62.9	10.8	5	5.8
R55d - Laveen Meadows Elem	38	1	0.0	62.8	64	62.8	15	----	57.7	5.1	5	0.1

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	769	2.9	7.2	13.0
All Impacted	705	2.9	7.5	13.0
All that meet NR Goal	624	5.0	8.2	13.0

HDR Engineering, Inc.
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16 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain Transportation Corridor
RUN: W71 (only) - Unmitigated
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R55	1	30	0.0	71.5	64	71.5	15	Snd Lvl	71.5	0.0	5	-5.0
R55a	2	30	0.0	75.5	64	75.5	15	Snd Lvl	75.5	0.0	5	-5.0
R55b	3	30	0.0	73.0	64	73.0	15	Snd Lvl	73.0	0.0	5	-5.0
R55c	4	30	0.0	67.8	64	67.8	15	Snd Lvl	67.8	0.0	5	-5.0
R56	5	3	0.0	63.0	64	63.0	15	----	63.0	0.0	5	-5.0
R57	6	1	0.0	66.3	64	66.3	15	Snd Lvl	66.3	0.0	5	-5.0
R57a	7	30	0.0	75.8	64	75.8	15	Snd Lvl	75.8	0.0	5	-5.0
R58	8	1	0.0	74.4	64	74.4	15	Snd Lvl	74.4	0.0	5	-5.0
R58a	9	40	0.0	62.3	64	62.3	15	----	62.3	0.0	5	-5.0
R59	10	3	0.0	72.4	64	72.4	15	Snd Lvl	72.4	0.0	5	-5.0
R60	11	8	0.0	68.1	64	68.1	15	Snd Lvl	68.1	0.0	5	-5.0
R61	12	8	0.0	67.0	64	67.0	15	Snd Lvl	67.0	0.0	5	-5.0
R61a	13	30	0.0	65.7	64	65.7	15	Snd Lvl	65.7	0.0	5	-5.0
R62	14	40	0.0	71.7	64	71.7	15	Snd Lvl	71.7	0.0	5	-5.0
R63	15	40	0.0	74.3	64	74.3	15	Snd Lvl	74.3	0.0	5	-5.0
R64	16	3	0.0	65.9	64	65.9	15	Snd Lvl	65.9	0.0	5	-5.0
R64a	17	40	0.0	74.1	64	74.1	15	Snd Lvl	74.1	0.0	5	-5.0
R65	18	40	0.0	76.0	64	76.0	15	Snd Lvl	76.0	0.0	5	-5.0
R65a	19	10	0.0	71.6	64	71.6	15	Snd Lvl	71.6	0.0	5	-5.0
R66	20	20	0.0	63.9	64	63.9	15	----	63.9	0.0	5	-5.0
R66a	21	40	0.0	70.0	64	70.0	15	Snd Lvl	70.0	0.0	5	-5.0
R67	22	1	0.0	70.9	64	70.9	15	Snd Lvl	70.9	0.0	5	-5.0
R68	23	10	0.0	70.8	64	70.8	15	Snd Lvl	70.8	0.0	5	-5.0

R68a	24	10	0.0	74.0	64	74.0	15	Snd Lvl	74.0	0.0	5	-5.0
R69a	25	10	0.0	65.1	64	65.1	15	Snd Lvl	65.1	0.0	5	-5.0
R69	26	20	0.0	69.9	64	69.9	15	Snd Lvl	69.9	0.0	5	-5.0
R70	27	20	0.0	69.2	64	69.2	15	Snd Lvl	69.2	0.0	5	-5.0
R55a-Rev	29	30	0.0	74.3	64	74.3	15	Snd Lvl	74.3	0.0	5	-5.0
R55b-Rev	30	30	0.0	71.2	64	71.2	15	Snd Lvl	71.2	0.0	5	-5.0
R55c-Rev	31	30	0.0	70.5	64	70.5	15	Snd Lvl	70.5	0.0	5	-5.0
R56-Rev	32	30	0.0	70.3	64	70.3	15	Snd Lvl	70.3	0.0	5	-5.0
R57a-Rev	33	20	0.0	71.9	64	71.9	15	Snd Lvl	71.9	0.0	5	-5.0
R58a-Rev	34	40	0.0	73.7	64	73.7	15	Snd Lvl	73.7	0.0	5	-5.0
R58b-Rev	35	40	0.0	73.7	64	73.7	15	Snd Lvl	73.7	0.0	5	-5.0
R55x - Laveen Meadows Elem	38	1	0.0	64.3	64	64.3	15	Snd Lvl	64.3	0.0	5	-5.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	769	0.0	0.0	0.0
All Impacted	706	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HDR Engineering, Inc.
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16 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain EIS
RUN: I-10 - W71 Alternative - Unmitigated
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	61.4	64	61.4	15	----	61.4	0.0	5	-5.0
Receiver2	2	1	0.0	60.6	64	60.6	15	----	60.6	0.0	5	-5.0
Receiver3	3	1	0.0	66.1	64	66.1	15	Snd Lvl	60.4	5.7	5	0.7
Receiver4	4	1	0.0	68.0	64	68.0	15	Snd Lvl	62.0	6.0	5	1.0
Receiver5	5	1	0.0	59.5	64	59.5	15	----	59.5	0.0	5	-5.0
Receiver6	6	1	0.0	69.5	64	69.5	15	Snd Lvl	69.5	0.0	5	-5.0
Receiver7	7	1	0.0	59.7	64	59.7	15	----	59.7	0.0	5	-5.0
Receiver8	8	1	0.0	62.7	64	62.7	15	----	57.7	5.0	5	0.0
Receiver9	9	1	0.0	62.8	64	62.8	15	----	55.4	7.4	5	2.4
Receiver10	10	1	0.0	66.4	64	66.4	15	Snd Lvl	56.0	10.4	5	5.4
Receiver11	11	1	0.0	66.0	64	66.0	15	Snd Lvl	63.3	2.7	5	-2.3
Receiver12	12	1	0.0	65.4	64	65.4	15	Snd Lvl	58.6	6.8	5	1.8
Receiver13	13	1	0.0	64.1	64	64.1	15	Snd Lvl	58.4	5.7	5	0.7
Receiver14	14	1	0.0	63.0	64	63.0	15	----	59.5	3.5	5	-1.5
Receiver15	15	1	0.0	64.0	64	64.0	15	Snd Lvl	60.7	3.3	5	-1.7
Receiver16	16	1	0.0	62.6	64	62.6	15	----	58.4	4.2	5	-0.8
Receiver17	17	1	0.0	61.8	64	61.8	15	----	57.7	4.1	5	-0.9
Receiver18	18	1	0.0	60.9	64	60.9	15	----	58.5	2.4	5	-2.6
Receiver19	19	1	0.0	61.1	64	61.1	15	----	57.3	3.8	5	-1.2
Receiver20	20	1	0.0	63.0	64	63.0	15	----	57.4	5.6	5	0.6
Receiver21	21	1	0.0	62.5	64	62.5	15	----	57.9	4.6	5	-0.4
Receiver22	22	1	0.0	63.9	64	63.9	15	----	59.8	4.1	5	-0.9
Receiver23	23	1	0.0	69.8	64	69.8	15	Snd Lvl	61.0	8.8	5	3.8

Receiver24	24	1	0.0	63.7	64	63.7	15	----	61.1	2.6	5	-2.4
Receiver25	25	1	0.0	65.2	64	65.2	15	Snd Lvl	61.2	4.0	5	-1.0
Receiver26	26	1	0.0	68.0	64	68.0	15	Snd Lvl	59.7	8.3	5	3.3
Receiver27	27	1	0.0	71.9	64	71.9	15	Snd Lvl	59.7	12.2	5	7.2
Receiver28	28	1	0.0	72.0	64	72.0	15	Snd Lvl	60.5	11.5	5	6.5
Receiver29	29	1	0.0	68.6	64	68.6	15	Snd Lvl	64.0	4.6	5	-0.4
Receiver30	30	1	0.0	67.0	64	67.0	15	Snd Lvl	60.8	6.2	5	1.2
Receiver31	31	1	0.0	67.1	64	67.1	15	Snd Lvl	61.0	6.1	5	1.1
Receiver32	32	1	0.0	68.5	64	68.5	15	Snd Lvl	64.0	4.5	5	-0.5
Receiver33	33	1	0.0	66.7	64	66.7	15	Snd Lvl	60.9	5.8	5	0.8
Receiver34	34	1	0.0	66.0	64	66.0	15	Snd Lvl	60.8	5.2	5	0.2
Receiver35	35	1	0.0	67.7	64	67.7	15	Snd Lvl	60.5	7.2	5	2.2
Receiver36	36	1	0.0	72.0	64	72.0	15	Snd Lvl	61.1	10.9	5	5.9
Receiver37	37	1	0.0	70.8	64	70.8	15	Snd Lvl	60.5	10.3	5	5.3
Receiver38	38	1	0.0	67.1	64	67.1	15	Snd Lvl	61.0	6.1	5	1.1
Receiver39	39	1	0.0	72.2	64	72.2	15	Snd Lvl	62.7	9.5	5	4.5
Receiver40	40	1	0.0	69.7	64	69.7	15	Snd Lvl	63.5	6.2	5	1.2
Receiver41	41	1	0.0	71.8	64	71.8	15	Snd Lvl	60.2	11.6	5	6.6
Receiver42	42	1	0.0	71.9	64	71.9	15	Snd Lvl	61.4	10.5	5	5.5
Receiver43	43	1	0.0	64.6	64	64.6	15	Snd Lvl	59.7	4.9	5	-0.1
Receiver44	44	1	0.0	69.5	64	69.5	15	Snd Lvl	61.6	7.9	5	2.9
Receiver45	45	1	0.0	72.0	64	72.0	15	Snd Lvl	64.6	7.4	5	2.4
Receiver46	46	1	0.0	67.0	64	67.0	15	Snd Lvl	61.6	5.4	5	0.4
Receiver47	47	1	0.0	69.3	64	69.3	15	Snd Lvl	61.5	7.8	5	2.8
Receiver48	48	1	0.0	66.5	64	66.5	15	Snd Lvl	61.9	4.6	5	-0.4
Receiver49	49	1	0.0	70.7	64	70.7	15	Snd Lvl	62.3	8.4	5	3.4
Receiver50	50	1	0.0	70.6	64	70.6	15	Snd Lvl	65.1	5.5	5	0.5
Receiver51	51	1	0.0	65.9	64	65.9	15	Snd Lvl	65.0	0.9	5	-4.1

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	51	0.0	5.7	12.2
All Impacted	36	0.0	6.7	12.2
All that meet NR Goal	30	5.0	7.7	12.2

HDR Engineering, Inc.
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RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain EIS
RUN: I-10 - W71 Alternative - Mitigated
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	61.4	64	61.4	15	----	61.4	0.0	5	-5.0
Receiver2	2	1	0.0	60.6	64	60.6	15	----	60.6	0.0	5	-5.0
Receiver3	3	1	0.0	66.1	64	66.1	15	Snd Lvl	60.5	5.6	5	0.6
Receiver4	4	1	0.0	68.0	64	68.0	15	Snd Lvl	62.0	6.0	5	1.0
Receiver5	5	1	0.0	59.5	64	59.5	15	----	59.5	0.0	5	-5.0
Receiver6	6	1	0.0	69.5	64	69.5	15	Snd Lvl	69.5	0.0	5	-5.0
Receiver7	7	1	0.0	59.7	64	59.7	15	----	59.7	0.0	5	-5.0
Receiver8	8	1	0.0	62.7	64	62.7	15	----	57.8	4.9	5	-0.1
Receiver9	9	1	0.0	63.1	64	63.1	15	----	55.6	7.5	5	2.5
Receiver10	10	1	0.0	67.1	64	67.1	15	Snd Lvl	56.3	10.8	5	5.8
Receiver11	11	1	0.0	65.8	64	65.8	15	Snd Lvl	59.5	6.3	5	1.3
Receiver12	12	1	0.0	65.2	64	65.2	15	Snd Lvl	58.0	7.2	5	2.2
Receiver13	13	1	0.0	64.0	64	64.0	15	Snd Lvl	58.3	5.7	5	0.7
Receiver14	14	1	0.0	63.0	64	63.0	15	----	59.4	3.6	5	-1.4
Receiver15	15	1	0.0	64.0	64	64.0	15	Snd Lvl	60.7	3.3	5	-1.7
Receiver16	16	1	0.0	62.6	64	62.6	15	----	58.4	4.2	5	-0.8
Receiver17	17	1	0.0	61.8	64	61.8	15	----	57.7	4.1	5	-0.9
Receiver18	18	1	0.0	60.9	64	60.9	15	----	58.5	2.4	5	-2.6
Receiver19	19	1	0.0	61.1	64	61.1	15	----	57.3	3.8	5	-1.2
Receiver20	20	1	0.0	63.0	64	63.0	15	----	57.4	5.6	5	0.6
Receiver21	21	1	0.0	62.5	64	62.5	15	----	57.9	4.6	5	-0.4
Receiver22	22	1	0.0	63.9	64	63.9	15	----	59.8	4.1	5	-0.9
Receiver23	23	1	0.0	69.8	64	69.8	15	Snd Lvl	61.1	8.7	5	3.7

Receiver24	24	1	0.0	63.7	64	63.7	15	----	61.1	2.6	5	-2.4
Receiver25	25	1	0.0	65.2	64	65.2	15	Snd Lvl	61.2	4.0	5	-1.0
Receiver26	26	1	0.0	68.0	64	68.0	15	Snd Lvl	59.7	8.3	5	3.3
Receiver27	27	1	0.0	71.9	64	71.9	15	Snd Lvl	59.7	12.2	5	7.2
Receiver28	28	1	0.0	72.0	64	72.0	15	Snd Lvl	60.5	11.5	5	6.5
Receiver29	29	1	0.0	69.2	64	69.2	15	Snd Lvl	59.8	9.4	5	4.4
Receiver30	30	1	0.0	67.0	64	67.0	15	Snd Lvl	60.8	6.2	5	1.2
Receiver31	31	1	0.0	67.1	64	67.1	15	Snd Lvl	61.0	6.1	5	1.1
Receiver32	32	1	0.0	69.5	64	69.5	15	Snd Lvl	60.8	8.7	5	3.7
Receiver33	33	1	0.0	66.7	64	66.7	15	Snd Lvl	60.9	5.8	5	0.8
Receiver34	34	1	0.0	66.0	64	66.0	15	Snd Lvl	60.8	5.2	5	0.2
Receiver35	35	1	0.0	67.7	64	67.7	15	Snd Lvl	60.5	7.2	5	2.2
Receiver36	36	1	0.0	72.0	64	72.0	15	Snd Lvl	61.1	10.9	5	5.9
Receiver37	37	1	0.0	70.8	64	70.8	15	Snd Lvl	60.5	10.3	5	5.3
Receiver38	38	1	0.0	67.1	64	67.1	15	Snd Lvl	61.0	6.1	5	1.1
Receiver39	39	1	0.0	71.4	64	71.4	15	Snd Lvl	62.4	9.0	5	4.0
Receiver40	40	1	0.0	69.5	64	69.5	15	Snd Lvl	62.4	7.1	5	2.1
Receiver41	41	1	0.0	71.8	64	71.8	15	Snd Lvl	60.2	11.6	5	6.6
Receiver42	42	1	0.0	71.9	64	71.9	15	Snd Lvl	61.4	10.5	5	5.5
Receiver43	43	1	0.0	64.6	64	64.6	15	Snd Lvl	59.6	5.0	5	0.0
Receiver44	44	1	0.0	69.5	64	69.5	15	Snd Lvl	61.5	8.0	5	3.0
Receiver45	45	1	0.0	72.0	64	72.0	15	Snd Lvl	61.9	10.1	5	5.1
Receiver46	46	1	0.0	67.0	64	67.0	15	Snd Lvl	61.5	5.5	5	0.5
Receiver47	47	1	0.0	69.3	64	69.3	15	Snd Lvl	61.4	7.9	5	2.9
Receiver48	48	1	0.0	66.5	64	66.5	15	Snd Lvl	61.9	4.6	5	-0.4
Receiver49	49	1	0.0	70.7	64	70.7	15	Snd Lvl	62.1	8.6	5	3.6
Receiver50	50	1	0.0	70.8	64	70.8	15	Snd Lvl	62.0	8.8	5	3.8
Receiver51	51	1	0.0	64.9	64	64.9	15	Snd Lvl	58.9	6.0	5	1.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	51	0.0	6.2	12.2
All Impacted	36	0.0	7.5	12.2
All that meet NR Goal	34	5.0	7.9	12.2

HDR Engineering, Inc.
ARB

17 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain Transportation Corridor
RUN: Alternative W101 only
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R55	2	30	0.0	71.7	64	71.7	15	Snd Lvl	62.5	9.2	5	4.2
R55d	3	30	0.0	70.8	64	70.8	15	Snd Lvl	62.6	8.2	5	3.2
R57	4	1	0.0	68.3	64	68.3	15	Snd Lvl	63.4	4.9	5	-0.1
R57b	5	20	0.0	68.7	64	68.7	15	Snd Lvl	63.3	5.4	5	0.4
R57c	6	20	0.0	69.5	64	69.5	15	Snd Lvl	59.2	10.3	5	5.3
R71	7	30	0.0	61.3	64	61.3	15	----	60.3	1.0	5	-4.0
R72	8	1	0.0	68.8	64	68.8	15	Snd Lvl	59.8	9.0	5	4.0
R86	9	1	0.0	67.6	64	67.6	15	Snd Lvl	60.5	7.1	5	2.1
R87	10	1	0.0	74.4	64	74.4	15	Snd Lvl	62.7	11.7	5	6.7
R73	11	1	0.0	72.5	64	72.5	15	Snd Lvl	72.5	0.0	5	-5.0
R73a	12	3	0.0	70.7	64	70.7	15	Snd Lvl	65.9	4.8	5	-0.2
R73b	13	1	0.0	69.8	64	69.8	15	Snd Lvl	62.8	7.0	5	2.0
R73c	14	1	0.0	73.3	64	73.3	15	Snd Lvl	62.1	11.2	5	6.2
R74	15	20	0.0	67.9	64	67.9	15	Snd Lvl	61.7	6.2	5	1.2
R75	16	30	0.0	71.3	64	71.3	15	Snd Lvl	62.4	8.9	5	3.9
R76	17	30	0.0	75.2	64	75.2	15	Snd Lvl	62.4	12.8	5	7.8
R76a	18	1	0.0	67.8	64	67.8	15	Snd Lvl	62.1	5.7	5	0.7
R77	19	30	0.0	70.8	64	70.8	15	Snd Lvl	62.3	8.5	5	3.5
R78	20	30	0.0	71.7	64	71.7	15	Snd Lvl	60.0	11.7	5	6.7
R79	21	20	0.0	72.2	64	72.2	15	Snd Lvl	69.4	2.8	5	-2.2
R80a	22	30	0.0	64.1	64	64.1	15	Snd Lvl	59.0	5.1	5	0.1
R80	23	1	0.0	72.4	64	72.4	15	Snd Lvl	63.1	9.3	5	4.3
R81	24	20	0.0	71.3	64	71.3	15	Snd Lvl	64.6	6.7	5	1.7

R82	25	30	0.0	65.8	64	65.8	15	Snd Lvl	60.3	5.5	5	0.5
R82a	26	20	0.0	63.7	64	63.7	15	----	59.2	4.5	5	-0.5
R82b	27	20	0.0	68.3	64	68.3	15	Snd Lvl	61.0	7.3	5	2.3
R73d-New	29	1	0.0	67.9	64	67.9	15	Snd Lvl	60.3	7.6	5	2.6
R73-Rev	30	1	0.0	62.7	64	62.7	15	----	61.7	1.0	5	-4.0
R78a	32	7	0.0	65.9	64	65.9	15	Snd Lvl	60.9	5.0	5	0.0
R78b	33	4	0.0	62.9	64	62.9	15	----	58.2	4.7	5	-0.3
R79x - SW City Services	34	1	0.0	69.7	64	69.7	15	Snd Lvl	67.3	2.4	5	-2.6

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	436	0.0	6.6	12.8
All Impacted	381	0.0	7.2	12.8
All that meet NR Goal	355	5.0	8.2	12.8

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Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R55	2	30	0.0	72.0	64	72.0	15	Snd Lvl	72.0	0.0	5	-5.0
R55d	3	30	0.0	70.8	64	70.8	15	Snd Lvl	70.8	0.0	5	-5.0
R57	4	1	0.0	68.4	64	68.4	15	Snd Lvl	68.4	0.0	5	-5.0
R57b	5	20	0.0	69.0	64	69.0	15	Snd Lvl	69.0	0.0	5	-5.0
R57c	6	20	0.0	69.7	64	69.7	15	Snd Lvl	69.7	0.0	5	-5.0
R71	7	30	0.0	61.3	64	61.3	15	----	61.3	0.0	5	-5.0
R72	8	1	0.0	68.8	64	68.8	15	Snd Lvl	68.8	0.0	5	-5.0
R86	9	1	0.0	67.6	64	67.6	15	Snd Lvl	67.6	0.0	5	-5.0
R87	10	1	0.0	74.3	64	74.3	15	Snd Lvl	74.3	0.0	5	-5.0
R73	11	1	0.0	72.5	64	72.5	15	Snd Lvl	72.5	0.0	5	-5.0
R73a	12	3	0.0	70.7	64	70.7	15	Snd Lvl	70.7	0.0	5	-5.0
R73b	13	1	0.0	69.7	64	69.7	15	Snd Lvl	69.7	0.0	5	-5.0
R73c	14	1	0.0	73.2	64	73.2	15	Snd Lvl	73.2	0.0	5	-5.0
R74	15	20	0.0	67.9	64	67.9	15	Snd Lvl	67.9	0.0	5	-5.0
R75	16	30	0.0	71.3	64	71.3	15	Snd Lvl	71.3	0.0	5	-5.0
R76	17	30	0.0	75.3	64	75.3	15	Snd Lvl	75.3	0.0	5	-5.0
R76a	18	1	0.0	67.8	64	67.8	15	Snd Lvl	67.8	0.0	5	-5.0
R77	19	30	0.0	71.1	64	71.1	15	Snd Lvl	71.1	0.0	5	-5.0
R78	20	30	0.0	72.1	64	72.1	15	Snd Lvl	72.1	0.0	5	-5.0
R79	21	20	0.0	72.2	64	72.2	15	Snd Lvl	72.2	0.0	5	-5.0
R80a	22	30	0.0	63.9	64	63.9	15	----	63.9	0.0	5	-5.0
R80	23	1	0.0	72.5	64	72.5	15	Snd Lvl	72.5	0.0	5	-5.0
R81	24	20	0.0	72.3	64	72.3	15	Snd Lvl	72.3	0.0	5	-5.0

R82	25	30	0.0	65.8	64	65.8	15	Snd Lvl	65.8	0.0	5	-5.0
R82a	26	20	0.0	63.9	64	63.9	15	----	63.9	0.0	5	-5.0
R82b	27	20	0.0	69.2	64	69.2	15	Snd Lvl	69.2	0.0	5	-5.0
R73d-New	29	1	0.0	67.9	64	67.9	15	Snd Lvl	67.9	0.0	5	-5.0
R73-Rev	30	1	0.0	62.7	64	62.7	15	----	62.7	0.0	5	-5.0
R78a	32	7	0.0	65.9	64	65.9	15	Snd Lvl	65.9	0.0	5	-5.0
R78b	33	4	0.0	62.8	64	62.8	15	----	62.8	0.0	5	-5.0
R79x - SW City Services	34	1	0.0	69.7	64	69.7	15	Snd Lvl	69.7	0.0	5	-5.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	436	0.0	0.0	0.0
All Impacted	351	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HDR Engineering, Inc.
DDW

17 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain EIS
RUN: I-10 - W101 Alternative
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	62.8	64	62.8	15	----	62.8	0.0	5	-5.0
Receiver2	2	1	0.0	61.8	64	61.8	15	----	61.8	0.0	5	-5.0
Receiver3	3	1	0.0	66.5	64	66.5	15	Snd Lvl	61.1	5.4	5	0.4
Receiver4	4	1	0.0	68.5	64	68.5	15	Snd Lvl	62.6	5.9	5	0.9
Receiver5	5	1	0.0	60.2	64	60.2	15	----	60.2	0.0	5	-5.0
Receiver6	6	1	0.0	70.2	64	70.2	15	Snd Lvl	70.2	0.0	5	-5.0
Receiver7	7	1	0.0	60.4	64	60.4	15	----	60.4	0.0	5	-5.0
Receiver8	8	1	0.0	62.9	64	62.9	15	----	58.3	4.6	5	-0.4
Receiver9	9	1	0.0	63.1	64	63.1	15	----	55.8	7.3	5	2.3
Receiver10	10	1	0.0	66.3	64	66.3	15	Snd Lvl	56.2	10.1	5	5.1
Receiver11	11	1	0.0	61.9	64	61.9	15	----	60.6	1.3	5	-3.7
Receiver12	12	1	0.0	61.5	64	61.5	15	----	58.2	3.3	5	-1.7
Receiver13	13	1	0.0	62.6	64	62.6	15	----	58.2	4.4	5	-0.6
Receiver14	14	1	0.0	64.6	64	64.6	15	Snd Lvl	59.1	5.5	5	0.5
Receiver15	15	1	0.0	62.1	64	62.1	15	----	60.2	1.9	5	-3.1
Receiver16	16	1	0.0	61.3	64	61.3	15	----	58.4	2.9	5	-2.1
Receiver17	17	1	0.0	61.2	64	61.2	15	----	57.6	3.6	5	-1.4
Receiver18	18	1	0.0	60.8	64	60.8	15	----	58.4	2.4	5	-2.6
Receiver19	19	1	0.0	61.0	64	61.0	15	----	57.2	3.8	5	-1.2
Receiver20	20	1	0.0	62.7	64	62.7	15	----	56.8	5.9	5	0.9
Receiver21	21	1	0.0	62.2	64	62.2	15	----	57.4	4.8	5	-0.2
Receiver22	22	1	0.0	63.9	64	63.9	15	----	59.8	4.1	5	-0.9
Receiver23	23	1	0.0	69.6	64	69.6	15	Snd Lvl	61.1	8.5	5	3.5

Receiver24	24	1	0.0	64.0	64	64.0	15	Snd Lvl	60.8	3.2	5	-1.8
W1	25	1	0.0	62.7	64	62.7	15	----	62.7	0.0	5	-5.0
W2	26	1	0.0	62.5	64	62.5	15	----	62.5	0.0	5	-5.0
W3	27	1	0.0	62.1	64	62.1	15	----	62.1	0.0	5	-5.0
W4	28	1	0.0	60.7	64	60.7	15	----	60.7	0.0	5	-5.0
W5	29	1	0.0	64.8	64	64.8	15	Snd Lvl	57.7	7.1	5	2.1
W6	30	1	0.0	65.1	64	65.1	15	Snd Lvl	62.6	2.5	5	-2.5
W7	31	1	0.0	58.6	64	58.6	15	----	58.6	0.0	5	-5.0
W8	32	1	0.0	63.2	64	63.2	15	----	62.6	0.6	5	-4.4
W9	33	1	0.0	61.7	64	61.7	15	----	61.6	0.1	5	-4.9
W10	34	1	0.0	64.0	64	64.0	15	Snd Lvl	58.6	5.4	5	0.4
W11	35	1	0.0	71.2	64	71.2	15	Snd Lvl	62.2	9.0	5	4.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	35	0.0	3.2	10.1
All Impacted	11	0.0	5.7	10.1
All that meet NR Goal	10	5.4	7.0	10.1

HDR Engineering, Inc.
DDW

17 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain Transportation Corridor
RUN: Alternative W101C
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R89	1	3	0.0	78.3	64	78.3	15	Snd Lvl	78.3	0.0	5	-5.0
R89a	2	1	0.0	70.3	64	70.3	15	Snd Lvl	61.9	8.4	5	3.4
R83a	3	1	0.0	62.2	64	62.2	15	----	58.3	3.9	5	-1.1
R83b	4	1	0.0	65.1	64	65.1	15	Snd Lvl	60.2	4.9	5	-0.1
R83	5	1	0.0	59.9	64	59.9	15	----	54.7	5.2	5	0.2
R83c	6	20	0.0	75.5	64	75.5	15	Snd Lvl	62.5	13.0	5	8.0
R84	7	30	0.0	69.7	64	69.7	15	Snd Lvl	62.0	7.7	5	2.7
R84a	8	30	0.0	68.1	64	68.1	15	Snd Lvl	62.7	5.4	5	0.4
R83d	9	30	0.0	71.2	64	71.2	15	Snd Lvl	63.4	7.8	5	2.8
R85a	10	20	0.0	71.0	64	71.0	15	Snd Lvl	67.2	3.8	5	-1.2
R85	11	30	0.0	67.8	64	67.8	15	Snd Lvl	63.1	4.7	5	-0.3
R85b	12	30	0.0	70.4	64	70.4	15	Snd Lvl	60.9	9.5	5	4.5
R100	13	20	0.0	65.3	64	65.3	15	Snd Lvl	59.8	5.5	5	0.5
R85c	14	30	0.0	72.3	64	72.3	15	Snd Lvl	61.9	10.4	5	5.4
R89b	16	1	0.0	62.5	64	62.5	15	----	58.2	4.3	5	-0.7
R88a	18	1	0.0	64.0	64	64.0	15	Snd Lvl	59.2	4.8	5	-0.2

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	249	0.0	6.2	13.0
All Impacted	246	0.0	6.6	13.0
All that meet NR Goal	192	5.2	8.1	13.0

HDR Engineering, Inc.
ARB

16 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain Transportation Corridor
RUN: Alternative W101C-Unmitigated
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R89	1	3	0.0	78.3	64	78.3	15	Snd Lvl	78.3	0.0	5	-5.0
R89a	2	1	0.0	70.6	64	70.6	15	Snd Lvl	70.6	0.0	5	-5.0
R83a	3	1	0.0	62.3	64	62.3	15	----	62.3	0.0	5	-5.0
R83b	4	1	0.0	65.3	64	65.3	15	Snd Lvl	65.3	0.0	5	-5.0
R83	5	1	0.0	60.0	64	60.0	15	----	60.0	0.0	5	-5.0
R83c	6	20	0.0	75.4	64	75.4	15	Snd Lvl	75.4	0.0	5	-5.0
R84	7	30	0.0	69.7	64	69.7	15	Snd Lvl	69.7	0.0	5	-5.0
R84a	8	30	0.0	68.1	64	68.1	15	Snd Lvl	68.1	0.0	5	-5.0
R83d	9	30	0.0	71.2	64	71.2	15	Snd Lvl	71.2	0.0	5	-5.0
R85a	10	20	0.0	70.9	64	70.9	15	Snd Lvl	70.9	0.0	5	-5.0
R85	11	30	0.0	67.7	64	67.7	15	Snd Lvl	67.7	0.0	5	-5.0
R85b	12	30	0.0	70.4	64	70.4	15	Snd Lvl	70.4	0.0	5	-5.0
R100	13	20	0.0	65.2	64	65.2	15	Snd Lvl	65.2	0.0	5	-5.0
R85c	14	30	0.0	72.6	64	72.6	15	Snd Lvl	72.6	0.0	5	-5.0
R89b	16	1	0.0	62.8	64	62.8	15	----	62.8	0.0	5	-5.0
R88a	18	1	0.0	64.1	64	64.1	15	Snd Lvl	64.1	0.0	5	-5.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	249	0.0	0.0	0.0
All Impacted	246	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HDR Engineering, Inc.
ARB

17 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain Transportation Corridor
RUN: Alternative W101E
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R72	1	1	0.0	69.4	64	69.4	15	Snd Lvl	61.1	8.3	5	3.3
R86	2	1	0.0	68.0	64	68.0	15	Snd Lvl	61.3	6.7	5	1.7
R87	3	1	0.0	72.7	64	72.7	15	Snd Lvl	62.8	9.9	5	4.9
R89	4	3	0.0	65.6	64	65.6	15	Snd Lvl	60.3	5.3	5	0.3
R89a	5	1	0.0	63.7	64	63.7	15	----	60.9	2.8	5	-2.2
R88	6	20	0.0	62.2	64	62.2	15	----	59.1	3.1	5	-1.9
R89b	7	1	0.0	69.8	64	69.8	15	Snd Lvl	62.2	7.6	5	2.6
R89c	8	1	0.0	69.4	64	69.4	15	Snd Lvl	61.0	8.4	5	3.4
R92	9	20	0.0	69.0	64	69.0	15	Snd Lvl	60.4	8.6	5	3.6
R90	10	20	0.0	71.8	64	71.8	15	Snd Lvl	62.2	9.6	5	4.6
R91	11	20	0.0	71.4	64	71.4	15	Snd Lvl	61.7	9.7	5	4.7
R93	12	20	0.0	71.7	64	71.7	15	Snd Lvl	61.3	10.4	5	5.4
R94	13	20	0.0	70.6	64	70.6	15	Snd Lvl	60.9	9.7	5	4.7
R84a	14	20	0.0	68.1	64	68.1	15	Snd Lvl	59.0	9.1	5	4.1
R95	15	20	0.0	70.1	64	70.1	15	Snd Lvl	63.5	6.6	5	1.6
R96	16	20	0.0	69.3	64	69.3	15	Snd Lvl	64.3	5.0	5	0.0
R98	17	20	0.0	70.5	64	70.5	15	Snd Lvl	63.2	7.3	5	2.3
R97	18	20	0.0	69.4	64	69.4	15	Snd Lvl	59.2	10.2	5	5.2
R98a	19	20	0.0	73.5	64	73.5	15	Snd Lvl	62.4	11.1	5	6.1
R100	20	20	0.0	67.4	64	67.4	15	Snd Lvl	59.9	7.5	5	2.5
R99	21	30	0.0	72.7	64	72.7	15	Snd Lvl	64.1	8.6	5	3.6
R80a	22	30	0.0	65.5	64	65.5	15	Snd Lvl	60.7	4.8	5	-0.2
R80	23	1	0.0	71.3	64	71.3	15	Snd Lvl	63.2	8.1	5	3.1

R88a	25	20	0.0	69.6	64	69.6	15	Snd Lvl	63.1	6.5	5	1.5
R88b	26	20	0.0	69.4	64	69.4	15	Snd Lvl	60.3	9.1	5	4.1
R100a - new school	27	1	0.0	72.7	64	72.7	15	Snd Lvl	62.5	10.2	5	5.2

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	371	2.8	7.9	11.1
All Impacted	350	4.8	8.3	11.1
All that meet NR Goal	320	5.0	8.4	11.1

HDR Engineering, Inc.
ARB

16 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain Transportation Corridor
RUN: Alternative W101E-Unmitigated
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R72	1	1	0.0	69.4	64	69.4	15	Snd Lvl	69.4	0.0	5	-5.0
R86	2	1	0.0	68.0	64	68.0	15	Snd Lvl	68.0	0.0	5	-5.0
R87	3	1	0.0	72.7	64	72.7	15	Snd Lvl	72.7	0.0	5	-5.0
R89	4	3	0.0	65.8	64	65.8	15	Snd Lvl	65.8	0.0	5	-5.0
R89a	5	1	0.0	64.1	64	64.1	15	Snd Lvl	64.1	0.0	5	-5.0
R88	6	20	0.0	62.0	64	62.0	15	----	62.0	0.0	5	-5.0
R89b	7	1	0.0	70.7	64	70.7	15	Snd Lvl	70.7	0.0	5	-5.0
R89c	8	1	0.0	70.8	64	70.8	15	Snd Lvl	70.8	0.0	5	-5.0
R92	9	20	0.0	69.2	64	69.2	15	Snd Lvl	69.2	0.0	5	-5.0
R90	10	20	0.0	72.1	64	72.1	15	Snd Lvl	72.1	0.0	5	-5.0
R91	11	20	0.0	71.3	64	71.3	15	Snd Lvl	71.3	0.0	5	-5.0
R93	12	20	0.0	71.7	64	71.7	15	Snd Lvl	71.7	0.0	5	-5.0
R94	13	20	0.0	71.9	64	71.9	15	Snd Lvl	71.9	0.0	5	-5.0
R84a	14	20	0.0	68.6	64	68.6	15	Snd Lvl	68.6	0.0	5	-5.0
R95	15	20	0.0	70.4	64	70.4	15	Snd Lvl	70.4	0.0	5	-5.0
R96	16	20	0.0	69.4	64	69.4	15	Snd Lvl	69.4	0.0	5	-5.0
R98	17	20	0.0	71.2	64	71.2	15	Snd Lvl	71.2	0.0	5	-5.0
R97	18	20	0.0	69.6	64	69.6	15	Snd Lvl	69.6	0.0	5	-5.0
R98a	19	20	0.0	73.5	64	73.5	15	Snd Lvl	73.5	0.0	5	-5.0
R100	20	20	0.0	67.4	64	67.4	15	Snd Lvl	67.4	0.0	5	-5.0
R99	21	30	0.0	73.3	64	73.3	15	Snd Lvl	73.3	0.0	5	-5.0
R80a	22	30	0.0	65.4	64	65.4	15	Snd Lvl	65.4	0.0	5	-5.0
R80	23	1	0.0	71.9	64	71.9	15	Snd Lvl	71.9	0.0	5	-5.0

R88a	25	20	0.0	69.7	64	69.7	15	Snd Lvl	69.7	0.0	5	-5.0
R88b	26	20	0.0	70.8	64	70.8	15	Snd Lvl	70.8	0.0	5	-5.0
R100a - new school	27	1	0.0	72.7	64	72.7	15	Snd Lvl	72.7	0.0	5	-5.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	371	0.0	0.0	0.0
All Impacted	351	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

RESULTS: SOUND LEVELS

South Mountain Freeway Noise Analysis

HDR Engineering Inc.
Craig Milliken and Dillon Tannler

17 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain Freeway Noise Analysis
RUN: Screening - South Mountain -101 North
BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	5	1	0.0	74.2	66	74.2	10	Snd Lvl	74.2	0.0	8	-8.0
Receiver2	8	1	0.0	73.6	66	73.6	10	Snd Lvl	73.6	0.0	8	-8.0
Receiver3	9	1	0.0	73.3	66	73.3	10	Snd Lvl	73.3	0.0	8	-8.0
Receiver4	10	1	0.0	73.9	66	73.9	10	Snd Lvl	73.9	0.0	8	-8.0
Receiver5	11	1	0.0	73.7	66	73.7	10	Snd Lvl	73.7	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	5	0.0	0.0	0.0
All Impacted	5	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HDR Engineering Inc.
Craig Milliken and Dillon Tannler

17 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain Freeway Noise Analysis
RUN: Screening - South Mountain -W101E1
BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	5	1	0.0	73.0	66	73.0	10	Snd Lvl	73.0	0.0	8	-8.0
Receiver2	8	1	0.0	73.3	66	73.3	10	Snd Lvl	73.3	0.0	8	-8.0
Receiver3	9	1	0.0	73.3	66	73.3	10	Snd Lvl	73.3	0.0	8	-8.0
Receiver4	10	1	0.0	73.3	66	73.3	10	Snd Lvl	73.3	0.0	8	-8.0
Receiver5	11	1	0.0	73.2	66	73.2	10	Snd Lvl	73.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	5	0.0	0.0	0.0
All Impacted	5	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HDR Engineering Inc.
Craig Milliken and Dillon Tannler

17 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain Freeway Noise Analysis
RUN: Screening - South Mountain -59
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	5	1	0.0	72.7	66	72.7	10	Snd Lvl	72.7	0.0	8	-8.0
Receiver2	8	1	0.0	73.9	66	73.9	10	Snd Lvl	73.9	0.0	8	-8.0
Receiver3	9	1	0.0	73.9	66	73.9	10	Snd Lvl	73.9	0.0	8	-8.0
Receiver4	10	1	0.0	73.9	66	73.9	10	Snd Lvl	73.9	0.0	8	-8.0
Receiver5	11	1	0.0	73.9	66	73.9	10	Snd Lvl	73.9	0.0	8	-8.0
Receiver6	13	1	0.0	73.4	66	73.4	10	Snd Lvl	73.4	0.0	8	-8.0
Receiver7	14	1	0.0	72.8	66	72.8	10	Snd Lvl	72.8	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	7	0.0	0.0	0.0
All Impacted	7	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HDR Engineering Inc.
Craig Milliken and Dillon Tannler

17 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain Freeway Noise Analysis
RUN: Screening - South Mountain -71
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	5	1	0.0	73.2	66	73.2	10	Snd Lvl	73.2	0.0	8	-8.0
Receiver2	8	1	0.0	73.5	66	73.5	10	Snd Lvl	73.5	0.0	8	-8.0
Receiver3	9	1	0.0	73.5	66	73.5	10	Snd Lvl	73.5	0.0	8	-8.0
Receiver4	10	1	0.0	73.4	66	73.4	10	Snd Lvl	73.4	0.0	8	-8.0
Receiver5	11	1	0.0	73.4	66	73.4	10	Snd Lvl	73.4	0.0	8	-8.0
Receiver6	13	1	0.0	73.4	66	73.4	10	Snd Lvl	73.4	0.0	8	-8.0
Receiver7	14	1	0.0	73.1	66	73.1	10	Snd Lvl	73.1	0.0	8	-8.0
Receiver8	18	1	0.0	72.7	66	72.7	10	Snd Lvl	72.7	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	8	0.0	0.0	0.0
All Impacted	8	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HDR Engineering Inc.
Craig Milliken and Dillon Tannler

17 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain Freeway Noise Analysis
RUN: Screening - South Mountain -I10-101
BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	5	1	0.0	76.1	66	76.1	10	Snd Lvl	76.1	0.0	8	-8.0
Receiver2	8	1	0.0	76.3	66	76.3	10	Snd Lvl	76.3	0.0	8	-8.0
Receiver3	9	1	0.0	76.6	66	76.6	10	Snd Lvl	76.6	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	3	0.0	0.0	0.0
All Impacted	3	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HDR Engineering Inc.
Craig Milliken and Dillon Tannler

17 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain Freeway Noise Analysis
RUN: Screening - South Mountain -I10-59
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	5	1	0.0	77.7	66	77.7	10	Snd Lvl	77.7	0.0	8	-8.0
Receiver2	8	1	0.0	77.3	66	77.3	10	Snd Lvl	77.3	0.0	8	-8.0
Receiver3	9	1	0.0	76.8	66	76.8	10	Snd Lvl	76.8	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	3	0.0	0.0	0.0
All Impacted	3	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HDR Engineering Inc.
Craig Milliken and Dillon Tannler

17 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain Freeway Noise Analysis
RUN: Screening - South Mountain -I10-71
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	5	1	0.0	76.2	66	76.2	10	Snd Lvl	76.2	0.0	8	-8.0
Receiver2	8	1	0.0	76.5	66	76.5	10	Snd Lvl	76.5	0.0	8	-8.0
Receiver3	9	1	0.0	76.7	66	76.7	10	Snd Lvl	76.7	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	3	0.0	0.0	0.0
All Impacted	3	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HDR Engineering Inc.
Craig Milliken and Dillon Tannler

17 October 2013
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: South Mountain Freeway Noise Analysis
RUN: Screening - South Mountain -I10-101
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	5	1	0.0	76.1	66	76.1	10	Snd Lvl	76.1	0.0	8	-8.0
Receiver2	8	1	0.0	76.3	66	76.3	10	Snd Lvl	76.3	0.0	8	-8.0
Receiver3	9	1	0.0	76.6	66	76.6	10	Snd Lvl	76.6	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	3	0.0	0.0	0.0
All Impacted	3	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Appendix C

Noise Mitigation Summary

Table C-1. Noise Mitigation Summary

Alternative/Option	Number of New Barriers	Number of Raised Existing Barriers	Height Range (feet)	Number of Modeled Affected Receivers	Number of Affected Receivers Benefiting from Barriers[a]	Total Barrier Area (square feet)	Total Barrier Cost (at $35/ square foot)
W59 Alternative	19	1	10–20	84	81	751,900	26,316,500
W71 Alternative	18	1	10–20	80	73	1,045,100	36,578,500
W101 Alternative (along I-10 only)	2	0	10–15	2	2	53,100	1,858,500
W101 Alternative Western Option	17	0	10–20	29	26	841,000	29,435,000
W101 Alternative Central Option	20	0	10–20	14	13	841,500	29,452,500
W101 Alternative Eastern Option	16	0	10–20	26	22	872,800	30,548,000
E1 Alternative	20	0	8–20	44	40	1,356,200	47,467,000
No-Action Alternative	0	0	0	Undetermined	0	0	0

[a] These are the numbers of modeled receivers achieving the noise reduction goals of ADOT's Noise Abatement Policy. Each receiver represents multiple homes that are similarly situated, from a noise standpoint. This is not to be confused with *benefited receptors*, which would be the total number of homes or receptors that are benefited by the barrier and is the basis for the cost per benefited receptor calculations. The determination of benefited receptors and cost calculations would be made during final design of the Selected Alternative.