NOISE STUDY REPORT

Sammamish Bridge and Road (SR 202) Project

City of Woodinville, Washington

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SUMMARY

The purpose of this Noise Study Report (NSR) is to describe the existing noise environment and identify potential future traffic noise impacts that would occur with implementation of a proposed highway improvement project in Woodinville, Washington. Where traffic noise impacts would occur, the NSR evaluates whether noise abatement would be feasible and reasonable under the requirements of the Federal Highway Administration (FHWA) *Highway Traffic Noise Analysis and Abatement Policy and Guidance* (FHWA 1995) and the Washington State Department of Transportation (WSDOT) *Traffic Noise Analysis and Abatement Policy and Procedures* (WSDOT 2006). Specifically, for each noise receiver in the project area, the NSR describes existing traffic noise levels and predicted future traffic noise levels both without and with implementation of the Sammamish Bridge and Road (SR 202) Project. The NSR also addresses potential construction noise impacts.

The proposed project is located within the City of Woodinville on SR 202 (also known as 175th Street) between Woodinville-Redmond Road NE and 131st Avenue NE (SR 202 Mile Post 0.31 to Mile Post 0.55). This east-west segment of SR 202 spans the Sammamish River and covers a distance of approximately 0.25 miles. At the intersection of 131st Avenue NE there is currently one eastbound through/right-turn lane and two left-turn lanes, and one westbound lane. At the intersection of Woodinville-Redmond Road NE there is currently one westbound through/right-turn lane and one left-turn lane, and one eastbound lane. The center of the project consists of a two-lane bridge (one lane in each direction) that crosses over the Sammamish River. The project includes two railroad crossings—one just east of Woodinville-Redmond Road NE, and the other just east of the bridge.

The primary purpose of the project is to improve traffic circulation in the City of Woodinville by increasing capacity on this section of SR 202 and relieving congestion at the intersections at each end of the project. The proposed project involves widening SR 202 from the intersection of 131st Avenue NE to Woodinville Redmond Road NE (the project corridor) to four lanes by constructing a new two-lane bridge adjacent to the existing two-lane bridge. An additional westbound through lane would be added to the existing configuration at the intersection of 131st Avenue NE, and a westbound right-turn pocket would be added at the Woodinville-Redmond Road NE intersection. An additional eastbound through lane would be added at the Woodinville-Redmond Road NE intersection. The proposed project includes bike lanes, curb and gutter, and sidewalks along both sides of the road.

The project study area is defined as extending 500 feet from the edge of pavement on each side of SR 202 between Woodinville-Redmond Road NE and 131st Avenue NE in accordance with WSDOT's Noise Policy and Procedures (WSDOT 2006). Land in the project study area consists of both developed and undeveloped land. Land use on developed land includes public utilities, commercial areas, a recreation trail, and a city park. No residential Category B receivers are located within the project study area.

Non-residential Category B receivers in the project study area include: the City of Woodinville's Wilmot Gateway Park on the east side of the river south of SR 202, which includes a children's play area and an outdoor amphitheatre; and the Sammamish River Trail, owned and operated by the King County Parks Department. Category C receivers in the project study area include commercial and industrial areas, and public utilities. Category C receivers adjacent to or near the project corridor include McCorry's Restaurant, Mercury's Coffee Company (a coffee stand), and the Woodinville Landing Industrial Park on the west side of the Sammamish River south of SR 202; an ARCO convenience store and gas station, and a Jack-in-the-Box restaurant on the east side of the river south of SR 202; and Elliot Tire Store and a King County pump station on the east side of the river north of SR 202. Land on the west side of the river north of SR 202 is undeveloped and includes property owned by the Woodinville Water District, and undeveloped property currently used as a storage yard.

Noise level measurements and traffic data were recorded at two locations adjacent to the project corridor for use in validating the FHWA Traffic Noise Model, version 2.5 (TNM). A total of 10 receivers were modeled within the project study area. Noise levels were predicted for the worst-case peak-hour traffic volumes (the PM peak hour) for the existing (2011) condition, and for the design year (2030) no build and build conditions.

Based on the modeling conducted, the predicted noise levels for the worst-case peak-hour indicate that traffic noise impacts are not currently occurring within the project study area (i.e., noise levels do not currently approach or exceed the Noise Abatement Criteria [NAC]) at assessed receivers. Existing noise levels at Category B receivers within the project study area, the Wilmot Gateway Park outdoor amphitheatre seating area and children's play area, range from 53 to 56 dBA L_{eq}[h] respectively, well below the NAC impact approach criteria of 66 dBA L_{eq}[h]. Existing noise levels at Category C receivers within the project study area range from 54 dBA L_{eq}[h] at the Woodinville Landing Industrial Park to 67 dBA L_{eq}[h] at the entrance to McCorry's Restaurant, below the NAC impact approach criteria of 71 dBA L_{eq}[h].

Future traffic noise levels both without and with the proposed project were modeled using projected 2030 traffic volumes to obtain the worst-case noise condition. Under the No Build 2030 condition, no Category B or Category C receivers are predicted to experience noise levels that approach or exceed the NAC or experience a substantial (10 dBA) noise level increase. Noise levels for Category B receivers are predicted to range from 54 to 57 dBA L_{eq}[h], with an increase of 1 dBA L_{eq}[h] over the Existing 2011 condition. Noise levels for Category C receivers are predicted to range from 55 to 68 dBA L_{eq}[h], with an increase of 1 dBA L_{eq}[h] over the Existing 2011 condition.

Under the Build 2030 condition, noise levels at Category B receivers are predicted to range from 57 to 60 dBA L_{eq}[h], with an increase of 4 dBA L_{eq}[h] over the Existing 2011 condition. These noise levels do not approach or exceed the NAC, or result in a substantial noise level increase. Noise levels at Category C receivers are predicted to range from 57 to 72 dBA L_{eq}[h], with changes ranging from 3 to 5 dBA L_{eq}[h]. Two Category C receivers (Receiver 3, Mercury's Coffee Company, and Receiver 9, Elliot Tire Store) would experience noise levels that approach or exceed the NAC. No Category C receivers would experience a substantial noise level increase over the Existing 2011 condition.

Receiver 3 represents the drive-through windows for Mercury's Coffee Company, and Receiver 9 represents the entrance to the Elliot Tire Store. While these areas can be considered outdoor areas of human use, the use is transitory in nature and would not benefit from a reduction in noise level. No areas of frequent outdoor human use in the project study area would experience traffic noise impacts under any of the modeled conditions; thus, no abatement measures are evaluated in this NSR.

During construction of the proposed project, construction vehicles and equipment would temporarily increase noise levels in the project area. Construction noise levels could reach up to 95 dBA at 50 feet from the source for the noisiest types of construction equipment. Businesses and recreational areas immediately adjacent to the project corridor are expected to experience moderate noise impacts during the construction, which is anticipated to last approximately 9 months. Because construction vehicle and equipment sounds (usually point source) decrease about 6 dBA per every doubling of the distance, residential, commercial, and recreational areas farther from the project corridor would experience progressively less construction noise. However, minor construction noise impacts could extend up to 1 mile from the project corridor, depending upon intervening topography and landscape features. Construction noise impacts would be minimized by complying with construction noise regulations contained in the City of Woodinville Municipal Code Chapter 8.08 (Noise Regulation), limiting nighttime construction activities, and using the best available noise abatement technology on construction equipment.

The initial noise analysis and draft report were essentially completed near the end of June 2011. This January 2012 version of the report reflects revisions based on review comments from WSDOT (dated December 2011) and subsequent discussions with WSDOT.

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LIST OF ABBREVIATED TERMS

CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Level
dB	decibel(s)
dBA	A-weighted decibel(s)
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
Hz	hertz
iMAP	Interactive Mapping Tool
kHz	kilohertz
L_{dn}	Day-Night Level
L_{eq}	Equivalent Sound Level
L_{eq}[h]	Equivalent Sound Level over 1 hour
L_{max}	Maximum Sound Level
L_{xx}	Percentile-Exceeded Sound Level
mPa	micro-Pascals
mph	miles per hour
NAC	noise abatement criteria
NEPA	National Environmental Policy Act
NSR	Noise Study Report
PSRC	Puget Sound Regional Council
RV	recreation vehicle
SEL	sound exposure level
SLM	Sound Level Meter
SPL	sound pressure level
SR	State Route
TNM	FHWA Traffic Noise Model – Version 2.5
vph	vehicles per hour
WSDOT	Washington State Department of Transportation

CHAPTER 1. INTRODUCTION

1.1 PURPOSE OF THE NOISE STUDY REPORT

The purpose of the Noise Study Report (NSR) is to evaluate noise impacts and abatement under the requirements of Title 23, Part 772 of the Code of Federal Regulations (23 CFR 772) *"Procedures for Abatement of Highway Traffic Noise and Construction Noise."* 23 CFR 772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement for federal and federal-aid highway projects. According to 23 CFR 772.3, all highway projects that are developed in conformance with this regulation are deemed to be in conformance with Federal Highway Administration (FHWA) noise standards.

The Washington State Department of Transportation (WSDOT) *"Traffic Noise Analysis and Abatement Policy and Procedures"* (WSDOT 2006) provides WSDOT policy for implementing 23 CFR 772 in Washington. The WSDOT policy and procedures provide criteria for conducting traffic noise level analysis, determining noise impacts, and evaluating noise abatement measures.

The initial noise analysis and draft report were essentially completed near the end of June 2011. This January 2012 version of the report reflects revisions based on review comments from WSDOT (dated December 2011) and subsequent discussions with WSDOT.

1.2 PROJECT PURPOSE AND NEED

The purpose of the project is to improve traffic circulation in the City of Woodinville by increasing capacity on State Route (SR) 202 between Woodinville-Redmond Road NE and 131st Avenue NE and relieving congestion at the intersections at each end of the project.

Within the project limits, the existing SR 202 roadway section and bridge vary between a two-lane roadway at the signalized intersection with Woodinville-Redmond Road NE and a four-lane roadway, consisting of two through lanes and double left-turn lanes at the intersection of 131st Avenue NE. The roadway section varies in width with lanes that are 11 to 12 feet and shoulders between 2 to 6 feet. The existing bridge supports two 12-foot lanes, a 3-foot sidewalk on the north side and a 5-foot sidewalk on the south side of the bridge. The SR 202 roadway section is classified as an Urban Minor Arterial with a posted speed limit of 35 miles per hour (mph).

SR 202 serves as one of only five entrances to the downtown core of the City of Woodinville. Traffic and development have significantly increased in the area since the SR 202 roadway section and bridge within the project limits were built in 1963; during peak traffic hours, vehicles currently back up in both directions beyond the bridge to the intersections at Woodinville-Redmond Road NE and 131st Avenue NE.

To improve congestion, the City is proposing to widen the existing two-lane road (SR 202 between 131st Avenue NE and Woodinville-Redmond Road), including constructing a new two-lane bridge adjacent to the existing two-lane bridge, to accommodate a new four-lane section. The project would include bike lanes and curb, gutter, and sidewalk on both sides of the road. The new four-lane roadway section would augment intersection improvement projects at both ends of the proposed project.

CHAPTER 2. PROJECT DESCRIPTION

2.1 Project Location

The proposed project is located on SR 202 (also known as 175th Street) within the City of Woodinville, in King County, Washington. The project corridor extends approximately 0.25 miles from Woodinville-Redmond Road NE to 131st Avenue NE (SR 202 Mile Post 0.31 to Mile Post 0.55). This east-west segment of SR 202 spans the Sammamish River and covers a distance of approximately 0.25 miles. At the intersection of 131st Avenue NE there is currently one eastbound through/right-turn lane and two left-turn lanes, and one westbound lane. At the intersection of Woodinville-Redmond Road NE there is currently one westbound through/right-turn lane and one left-turn lane, and one eastbound lane. The center of the project consists of a two-lane bridge (one lane in each direction) that crosses over the Sammamish River. The project includes two railroad crossings—one just east of Woodinville-Redmond Road NE, and the other just east of the bridge.

The project study area extends 500 feet from the edge of pavement on each side of SR 202 from Woodinville-Redmond Road NE to 131st Avenue NE in accordance with WSDOT's Noise Policy and Procedures (WSDOT 2006). Figure 1 illustrates the project corridor and study area.

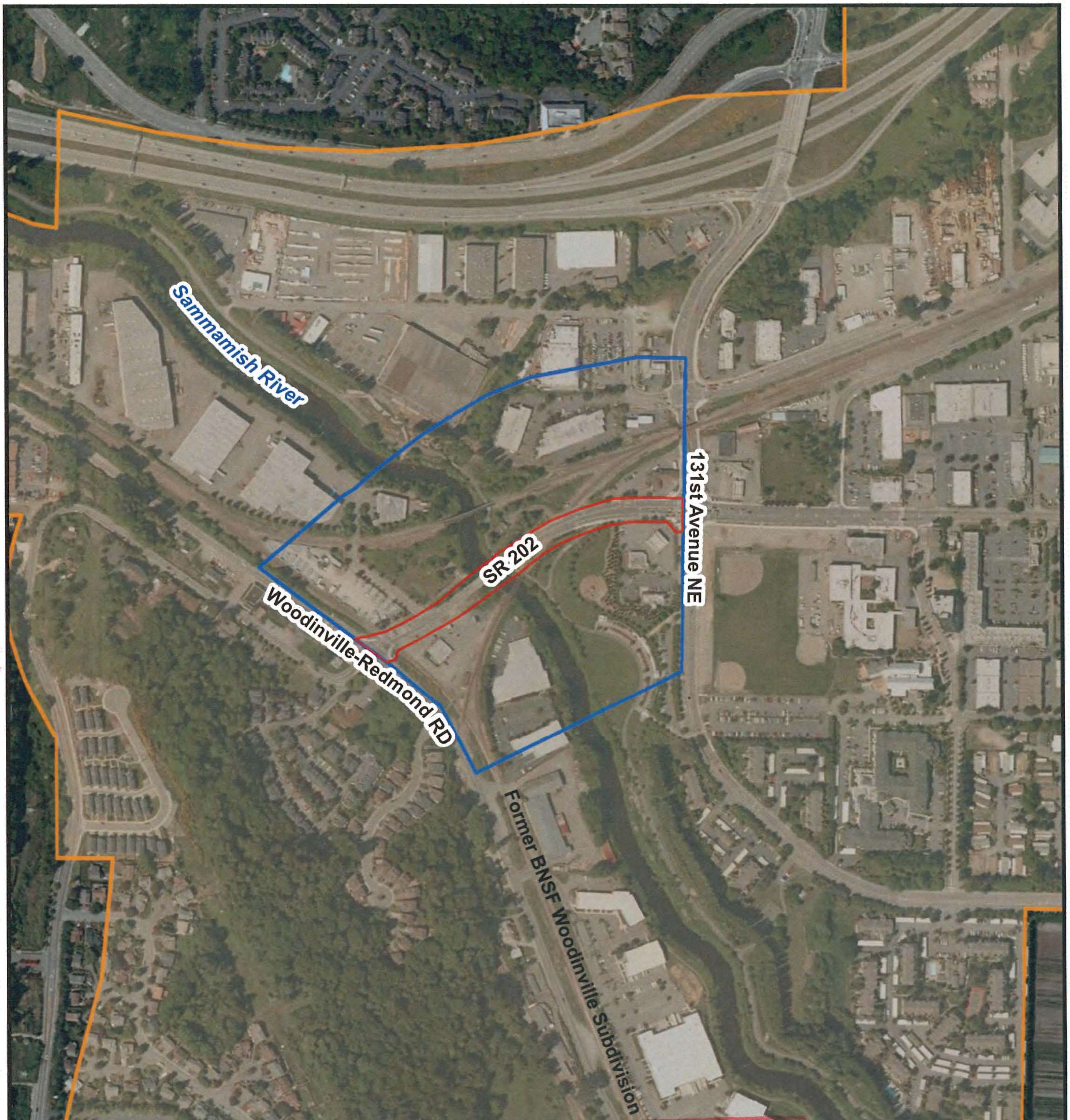
2.2 Project Description

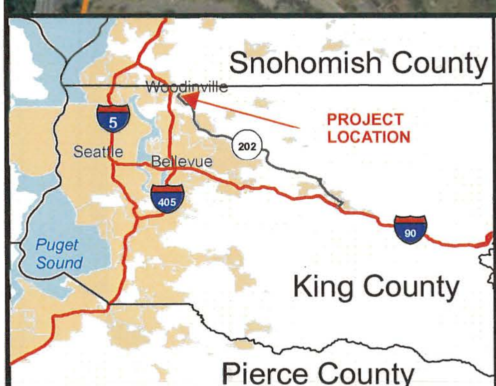
The proposed project involves widening SR 202 from the intersection of 131st Avenue NE to Woodinville Redmond Road NE (the project corridor) to four lanes by constructing a new two-lane bridge adjacent to the existing two-lane bridge. An additional westbound through lane would be added to the existing configuration at the intersection of 131st Avenue NE, and a westbound right-turn pocket would be added at the Woodinville-Redmond Road NE intersection. An additional eastbound through lane would be added at the Woodinville-Redmond Road NE intersection. The proposed project includes bike lanes, curb and gutter, and sidewalks along both sides of the road.

The existing roadway profile would be maintained. The existing roadway and bridge would become the westbound lanes, and the new roadway and bridge would become the eastbound lanes. Figure 2 illustrates the proposed project. The roadway lanes would vary in width from 11 to 13 feet. Bike lanes would extend the length of the project corridor on both sides of the road and vary in width from 4 to 5 feet. Sidewalks would also extend the length of the project corridor and vary in width from 5 to 8 feet.

The intersections of SR 202 with Woodinville-Redmond Road NE and 131st Avenue NE are both signalized. The signal at the intersection of Woodinville-Redmond Road NE would be upgraded.

Project construction is expected to begin in March 2013 and last for 9 months. The majority of construction would occur during daylight hours. A few days of night work may be necessary to set the bridge girders.





- Project Corridor
- Study Area
- Woodinville City Limits

0 250 500 Feet

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FIGURE 1. Vicinity Map

Traffic Noise Report

Sammamish Bridge and Road (SR 202) Project
City of Woodinville, Washington

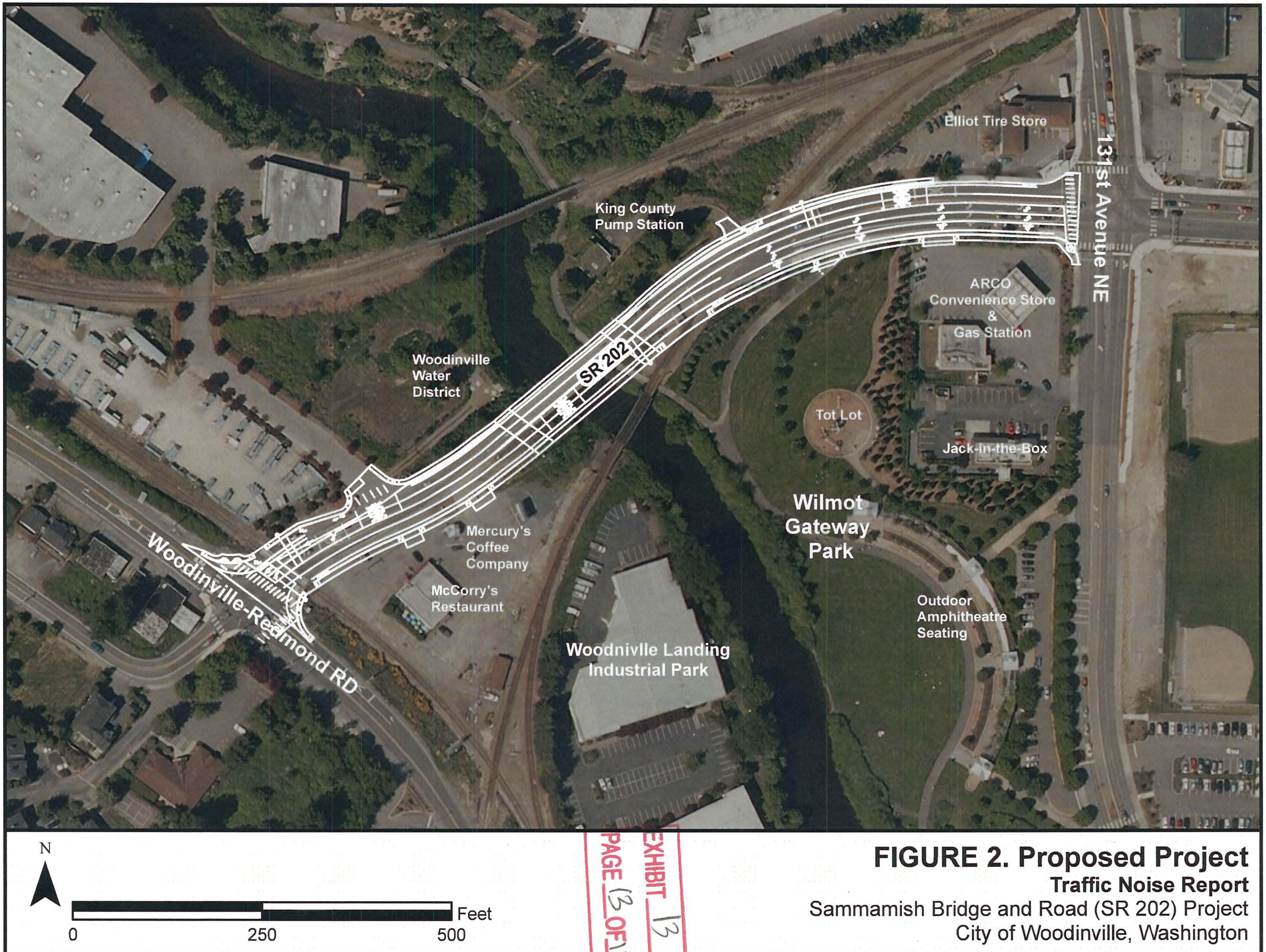

FIGURE 2. Proposed Project

Traffic Noise Report

Sammamish Bridge and Road (SR 202) Project

City of Woodinville, Washington

CHAPTER 3. FUNDAMENTALS OF TRAFFIC NOISE

This section provides a brief discussion of fundamental traffic noise concepts for context.

3.1 Sound, Noise, and Acoustics

Sound is the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determine the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

3.2 Frequency

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz, or thousands of hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

3.3 Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this huge range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB). The threshold of hearing for young people is about 0 dB, which corresponds to 20 mPa.

3.4 Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB—rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dB louder than one source.

3.5 A-Weighted Decibels

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz (the range of human speech) and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an "A-weighted" sound level (expressed in units of dBA) can be computed based on this information.

The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with highway-traffic noise. Noise levels for traffic noise reports are typically reported in terms of A-weighted decibels or dBA.

3.6 Human Response to Changes in Noise Levels

As described above, doubling sound energy results in a 3-dB increase in sound. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness is usually different than what is measured.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-dB changes in sound levels, when exposed to steady, single-frequency ("pure-tone") signals in the midfrequency (1,000 Hz–8,000 Hz) range. In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dB increase in sound would generally be perceived as barely detectable.

3.7 Noise Descriptors

Noise in our daily environment fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random. Some noise levels fluctuate rapidly, but others slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors most commonly used in traffic noise analysis.

Equivalent Sound Level (L_{eq}): L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour A-weighted equivalent sound level (L_{eq}[h]) is the energy average of A-weighted sound levels occurring during a 1-hour period and is the basis for noise abatement criteria (NAC) used by both WSDOT and FHWA.

Percentile-Exceeded Sound Level (L_{xx}): L_{xx} represents the sound level exceeded for a given percentage of a specified period (e.g., L_{10} is the sound level exceeded 10 percent of the time, and L_{90} is the sound level exceeded 90 percent of the time).

Maximum Sound Level (L_{max}): L_{max} is the highest instantaneous sound level measured during a specified period.

Day-Night Level (L_{dn}): L_{dn} is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during nighttime hours between 10 p.m. and 7 a.m.

Community Noise Equivalent Level (CNEL): Similar to L_{dn}, CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during the nighttime hours between 10 p.m. and 7 a.m., and a 5-dB penalty applied to the A-weighted sound levels occurring during evening hours between 7 p.m. and 10 p.m.

The descriptor used to measure traffic-induced sound levels in this study is L_{eq}[h], which is defined as the equivalent A-weighted sound level [the logarithmic sum of sound exposure levels (SELs)] over 1 hour.

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3.8 SOUND PROPAGATION

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dBA for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dBA for each doubling of distance from a line source.

Ground Absorption

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 dBA per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dBA per doubling of distance.

Atmospheric Effects

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) from the highway due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver typically reduces noise by at least 5 dB. Taller barriers increase noise reduction. Vegetation between a highway and receiver is rarely effective in reducing noise because it does not create a solid barrier.

CHAPTER 4. FEDERAL REGULATIONS AND STATE POLICIES

4.1 Federal Regulations and Policies

23 CFR 772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. Under 23 CFR 772.7, projects are categorized as Type I or Type II projects. FHWA defines a Type I project as a proposed federal or federal-aid highway project for the construction of a highway on a new location, or the physical alteration of an existing highway that significantly changes either the horizontal or vertical alignment, or increases the number of through-traffic lanes. A Type II project is a noise barrier retrofit project that involves no changes to highway capacity or alignment.

Type I projects include those that create a completely new noise source, as well as those that increase the volume or speed of traffic or move the traffic closer to a receiver. Type I projects include the addition of an interchange, ramp, auxiliary lane, or truck-climbing lane to an existing highway, or the widening of an existing ramp by a full lane width for its entire length. Projects unrelated to increased noise levels, such as striping, lighting, signing, and landscaping projects, are not considered Type I projects.

Under 23 CFR 772.11, noise abatement must be considered for Type I projects if the project is predicted to result in a traffic noise impact. In such cases, 23 CFR 772 requires that the project sponsor "consider" noise abatement before adoption of the final National Environmental Policy Act (NEPA) document. This process involves the identification of noise abatement measures that are reasonable, feasible, and likely to be incorporated into the project, and of noise impacts for which no apparent solution is available.

23 CFR 772.5 defines noise impacts as "impacts which occur when the predicted traffic noise levels approach or exceed the NAC (Table 1) criteria, or when the predicted traffic noise levels (in the design year) substantially exceed the existing noise levels." 23 CFR 772 does not specifically define the terms "approach" or "substantial increase"; these criteria are defined in the WSDOT's *Traffic Noise Analysis and Abatement Policy and Procedures* (WSDOT 2006), as described below. Additionally, 23 CFR 772 describes "severe" traffic noise impacts but provides no definition. "Severe" is also defined by WSDOT as described below.

Table 1 summarizes NAC corresponding to various land use activity categories. Activity categories and related traffic noise impacts are determined based on the actual land use in a given area.

Table 1. Land Use Activity Categories and Noise Abatement Criteria (NAC).

Activity Category	NAC L_{eq}[h](dBA)	Description of Activity Category
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.(1)(3)
C	72 (exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	-	Undeveloped lands.
E	52 (interior)(2)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: FHWA 1995; endnote source WSDOT 2006

(1) Bicycle and pedestrian facilities which serve a transportation purpose and qualify as a transportation facility shall not be evaluated for noise impacts or mitigation.
(2) Interior noise mitigation will only be considered for public institutions such as schools, hospitals and libraries and analysis of exterior sound mitigation is determined to be unreasonable or infeasible.
(3) Activity category B also includes such uses as campgrounds, RV parks, and cemeteries (ref. p).

In identifying noise impacts, primary consideration is given to exterior areas of frequent human use. Where there are no exterior activities, or where the exterior activities are far from the roadway or physically shielded in a manner that prevents an impact on exterior activities, the interior criterion (Activity Category E) is used as the basis for determining a noise impact.

4.2 State Regulations and Policies

WSDOT's *Traffic Noise Analysis and Abatement Policy and Procedures* (WSDOT 2006) specify the policies and procedures to be used by agencies that sponsor new construction or reconstruction of federal or federal-aid highway projects, and provide detailed technical guidance for the evaluation of highway traffic noise. This includes field measurement methods, noise modeling methods, and report preparation guidance.

The NAC specified in WSDOT's policies and procedures are the same as those specified in 23 CFR 772. WSDOT defines "approach" to be 1 dBA below the NAC and defines "substantially" as a 10 dBA increase over existing noise levels (WSDOT 2006). For example, traffic noise impacts for Activity Category B (residences, schools, etc.) would occur if predicted noise levels were equal or greater than 66 dBA (L_{eq}[h]). A severe impact is defined as a 30 dBA increase over existing levels or a level greater than 80 dBA (L_{eq}[h]) (WSDOT 2006).

The project proponent is required to consider mitigation options when the proposed project meets or exceeds FHWA/WSDOT standards and criteria regardless of whether or not the standards and criteria were met or exceeded under the "existing" condition or under the "no build" condition. Where the criteria are exceeded by a lesser degree as a result of the proposed project than under the "existing" condition, the project proponent is still required to consider mitigation options.

CHAPTER 5. STUDY METHODS AND PROCEDURES

5.1 FIELD DATA COLLECTION

Five 15-minute noise measurements and simultaneous traffic data for each individual noise measurement were collected at two validation sites adjacent to the project corridor on April 28, 2011 for use in validating the Traffic Noise Model (TNM).

Noise measurements were recorded using a Larson and Davis Type 1 Sound Level Meter (SLM) (model LXT 1) with the following parameters:

- Descriptor: L_{eq}
- Integration rate: fast (1 second)
- Sample rate: 15 minutes
- Weighting: A

The microphone was placed 5 feet off the ground, at least 10 feet from a building wall, and at least 16 feet from the edge of pavement. SLM calibration was checked with a Larson Davis calibrator before and after use. Pre-measurement and post-measurement calibration results were within factory calibration and no corrections were made to the results.

The noise measurements and associated traffic data were recorded between the hours of 10:00 a.m. and 4:00 p.m. while traffic was free flowing. The timing and source of other noises perceptible above the traffic noise were also noted.

Traffic data recorded during each 15-minute noise measurement included the total number of vehicles traveling in each direction (east bound and west bound), and were recorded by vehicle type: automobile, medium truck (2 axles and 6 tires), heavy truck (greater than 2 axles and 6 tires), bus, or motorbike. Average traffic speed was collected by driving the project corridor.

Detailed field measurement data, including noise levels, traffic data, and other observations, are provided in Appendix A.

5.2 TRAFFIC NOISE MODEL (TNM)

Noise measurements and traffic data collected in the field were used to validate the TNM prior to using the model to predict existing and future noise levels. Once the TNM was validated, the model was used to predict existing (2011) and future traffic noise levels at specific receiver locations within the project study area. The future build and no build conditions were modeled for the year 2030.

Traffic Noise Model Inputs

Inputs to the TNM include:

- The three-dimensional coordinates of roadways, noise receivers, and topographic features that would affect noise propagation.
- Vehicle per hour (vph) and speeds, by type of vehicle.
- Absorption factors based on modeled ground type.

Existing and proposed elevation data along the project corridor and at receiver sites were obtained from AECOM 30% design drawings of the proposed work (2-foot contours) and from King County's online Interactive Mapping Tool (iMAP) (5-foot contours).

Traffic Noise Model Validation

The traffic data recorded during each 15-minute noise measurement were multiplied by 4 to obtain vph for each noise measurement. Each noise measurement (dBA L_{eq}[h]) and its associated traffic data (vph) were entered into the TNM to compare noise measurements recorded in the field with those calculated by the TNM.

The acceptable margin of error between field noise measurements and noise level results calculated by the TNM is plus or minus 2 dBA. The difference between each of the five noise measurements (three at site 1 and two at site 2) and the noise level results calculated by the TNM were within 2 dBA, and modeling of the existing and future noise levels could therefore proceed.

Modeled Receivers

Land use information used to assign Land Use Activity Categories for modeled receivers was obtained from aerial photography, site visits, and parcel information reviewed via King County's online iMAP.

A total of 10 receivers (not including the two validation sites) were modeled within the project study area (see Figure 3, Receiver Locations). These included businesses adjacent to or near the project corridor and two locations at the Wilmot Gateway Park. Two receivers (both at the park) are characterized as Activity Category B (Category B), and eight (all businesses) are characterized as Active Category (Category C). For Category B receivers, the impact criterion is 66 dBA. For Category C receivers, the impact criterion is 71 dBA.

Receivers were chosen based on the following factors:

- Proximity to the existing and proposed roadway. Sites most likely to be impacted were favored.

- Location along the corridor. Receivers were selected along the length of the project corridor and within approximately 500 feet from the roadway.
- Primary area of outdoor use. Receivers were placed at sites where most outdoor use is likely to take place.

Traffic Data

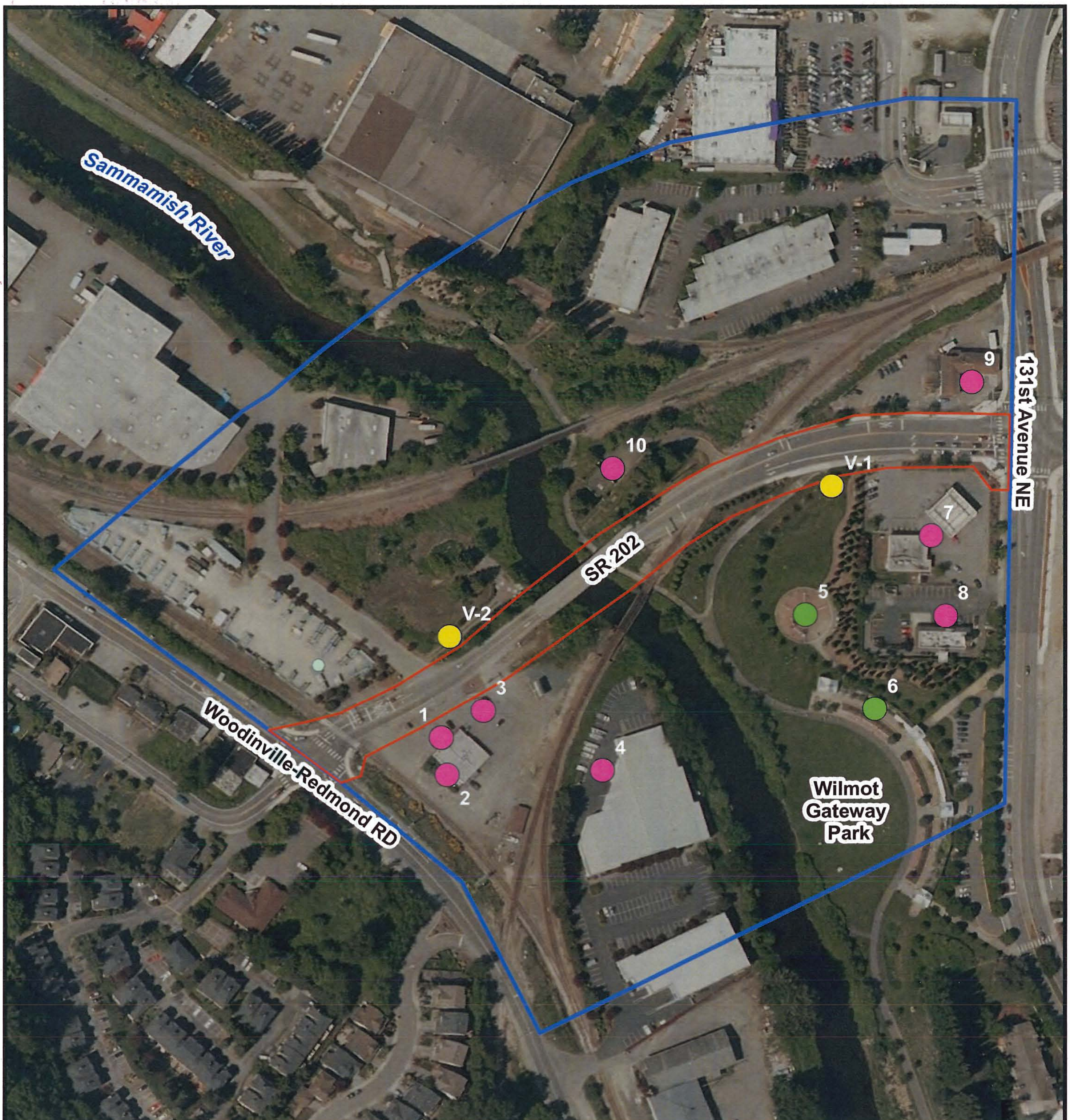
AECOM conducted a traffic study for the City of Woodinville in 2008 that evaluated whether a four-lane bridge was needed over the Sammamish River to support the projected traffic demand and improve safety (AECOM 2008). The PM Peak Hour traffic volumes used in the AECOM (2008) study were based on actual turning movement counts collected by the City in 2007 at three project corridor intersections (described below). The Puget Sound Regional Council (PSRC) traffic model was used to derive forecast traffic volumes for several scenarios, including the following:

- Year 2007 Baseline scenario with the existing lane configuration, in which intersection improvements at 131st Avenue NE/SR 202 and 127th Place NE/SR 202 were included.
- Year 2022 Baseline scenario with the existing lane configuration, in which the intersection improvements at 131st Avenue NE/SR 202 and 127th Place NE/SR 202 were included. This scenario maintained a two-lane bridge in its current configuration. Year 2022 Build scenario with a four-lane bridge over the Sammamish River, including the intersection improveme^{nt}s at 131st Avenue NE/SR 2^{02} and 127th Place NE/SR 202.

The Existing 2011 and No Build 2030 PM Peak hour traffic volumes used in the TNM for this traffic noise study were obtained from a straight line interpolation of the 2007 and 2022 Baseline scenario ^{PM} Peak hour traffic volume^{s} for the project corridor used in the AECOM (2008) Traffic Study. The Build 2030 PM Peak hour traffic volumes used in the TNM for this traffic noise study were obtained from a straight line interpolation of the 2007 Baseline scenario and 2022 Build scenario PM Peak hour traffic volumes for the project corridor that were used in the AECOM (2008) Traffic Study.

Vehicle composition percentages were assumed to be the same as those recorded in the field on April 28, 2011 at Validation Site 2, which was recorded during the afternoon hours (between 3 p.m. and 4 p.m.). Vehicle speed on SR 202 was modeled based on the posted speed limit of 35 mph.

Traffic data used in the TNM are contained in Appendix B.



Project Corridor
Study Area
Receivers
Category B
Category C
Validation Sites

EXHIBIT 13
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FIGURE 3. Receiver Locations

Traffic Noise Report
Sammamish Bridge and Road (SR 202) Project
City of Woodinville, Washington

0 250 500 Feet
N

EXHIBIT 13
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CHAPTER 6. TRAFFIC NOISE MODEL RESULTS

6.1 Measured Noise Levels and TNM Validation

Noise measurements were conducted at two receiver sites (Validation Sites 1 and 2) on April 28, 2011 (Figure 3). The SLM was placed 5 feet above the existing ground elevation at each site. Noise measurements were recorded between 10:00 a.m. and 4:00 p.m. Weather conditions were clear and warm, with a slight breeze. The dominant noise source at both noise measurement sites was vehicular traffic.

WSDOT requires that noise levels recorded in the field and noise levels calculated by the TNM are within 2 dBA of each other. Three sound level measurements were recorded at Validation Site 1, and two sound level measurements were recorded at Validation Site 2; all five measurements were used to validate the TNM. Table 2 presents the measured and modeled results for the validation model and the differences between the two values. These results were within the acceptable margin of error, and modeling of all receivers under all conditions (existing, no build, and build) could proceed.

Table 2. Results for the Validation Model.

Receiver Number	Measurement Number	Measured Results (dBA)L_{eq}[h]	Modeled Results (dBA)L_{eq}[h]	Difference between Measured and Modeled Results (dBA)L_{eq}[h]
V-1	1	64	65	1
V-1	2	63	64	1
V-1	3	63	65	2
V-2	1	63	64	1
V-2	2	64	64	0

6.2 Modeled Existing and Future Noise Levels

Traffic noise levels were modeled for the Existing 2011, No Build 2030, and Build 2030 conditions. TNM input and output data are included in Appendix C. Noise level results for each condition are summarized below.

Modeled Existing 2011 Noise Levels

Of the ten receivers analyzed, none are currently experiencing noise levels that meet or exceed the NAC impact approach. L_{eq}[h] calculated for Category B receivers under the Existing 2011 condition ranges from 53 dBA to 56 dBA, well below the NAC impact approach criteria of 66 dBA. L_{eq}[h] calculated for Category C receivers range from 54 dBA to 67 dBA, below the NAC impact approach criteria of 71 dBA L_{eq}[h]. Refer to Table 3 for the TNM calculated existing noise levels at all ten receivers.

Modeled No Build 2030 Noise Levels

Of the ten receivers analyzed, none are predicted to experience noise levels under the No Build 2030 condition that meet or exceed the NAC impact approach criteria or experience a substantial (10 dBA) noise level increase. L_{eq}[h] predicted for Category B receivers under the No Build 2030 condition ranges from 54 dBA to 57 dBA, below the NAC impact approach criteria of 66 dBA. L_{eq}[h] predicted for Category C receivers under the No Build 2030 condition ranges from 55 dBA to 68 dBA, below the NAC impact approach criteria of 71 dBA L_{eq}[h]. Refer to Table 3 for the TNM predicted noise levels at all ten receivers.

Modeled Build 2030 Noise Levels

Of the ten receivers analyzed, two receivers (Receivers 3 and 9) are predicted to meet or exceed the NAC impact approach criteria. None are predicted to experience a substantial noise level increase.

No Category B receivers are predicted to experience noise levels under the Build 2030 condition that meet or exceed the NAC impact approach criteria or experience a substantial noise level increase. L_{eq} predicted for Category B receivers under the Build 2030 condition ranges 57 dBA to 60 dBA, below the NAC impact approach criteria of 66 dBA.

Two Category C receivers (Receivers 3 and 9) are predicted to experience noise levels under the Build 2030 condition that exceed the NAC impact approach criteria of 71 dBA L_{eq}[h]. None are predicted to experience a substantial noise level increase. L_{eq}[h] predicted for Category C receivers under the Build 2030 condition ranges from 57 dBA to 72 dBA. Refer to Table 3 for the TNM predicted noise levels at all ten receivers. Noise levels that approach or exceed NAC are highlighted.

Table 3. Results for the Existing 2011, No Build 2030, and Build 2030 Conditions.

Receiver Number	Description	Existing (2011) (dBA) L_{eq}[h]	No Build (2030) (dBA) L_{eq}[h]	Build (2030) (dBA) L_{eq}[h]	Impact Approach Noise Level Criteria	Impact Substantial Increase Criteria	Increase over Existing
1	McCorry's Restaurant entrance	67	68	70	71	10	3
2	McCorry's Restaurant outdoor seating area	62	63	66	71	10	4
3	Mercury's Coffee Company	67	68	71	71	10	4
4	Woodinville Landing Industrial Park north entrance	54	55	57	71	10	3
5	Wilmot Gateway Park children's play area (tot lot)	56	57	60	66	10	4
6	Wilmot Gateway Park seating area for outdoor amphitheatre	53	54	57	66	10	4
7	ARCO convenience store/gas station entrance	61	62	66	71	10	5
8	Jack-in-the-Box entrance	57	58	61	71	10	4
9	Elliot Tire Store entrance	67	68	72	71	10	5
10	King County pump station entrance	62	62	65	71	10	3

Shaded cells indicate noise levels that approach or exceed NAC.

6.3 Noise Abatement

Noise abatement must be considered where traffic noise impacts are identified. According to FHWA and WSDOT criteria, noise abatement must be considered at impacted receivers where there is an outdoor area of frequent human use and a lowered noise level would be of benefit.

The project proponent is required to consider noise abatement measures when predicted traffic noise levels from the proposed project meet or exceed FHWA / WSDOT criteria / standards regardless of whether or not the criteria / standards were met or exceeded under the Existing 2011 condition or under the No Build 2030 condition. Traffic noise impacts have been identified at two Category C receivers (Receiver 3, Mercury's Coffee Company, and Receiver 9, Elliot Tire Store) that exceed the threshold criteria. Receiver 3 represents the drive-through windows for Mercury's Coffee Company, and Receiver 9 represents the entrance to the Elliot Tire Store. While these areas can be considered areas of outdoor human use, the use is transitory in nature. Thus, since the impacted Category C receivers do not have outdoor areas of frequent human use that would benefit from reduced noise levels, no abatement measures are evaluated.

CHAPTER 7. CONSTRUCTION NOISE

Construction noise for the proposed project is anticipated to be typical of that for road and bridge construction. Construction activities are expected to include: clearing, grubbing, excavation, grading, drilling, laying base course material, and paving. Construction equipment is expected to include: backhoes or bobcats, graders, paving machines, dump trucks, cranes, a drilling rig, concrete pump truck, and concrete trucks. Based on construction equipment noise data tabulated by the U.S. Environmental Protection Agency (EPA) and WSDOT (Table 4), sound levels generated during construction are not expected to exceed 95 dBA at 50 feet from the source.

Businesses and recreational areas immediately adjacent to the project corridor are expected to experience moderate noise impacts during the construction, which is anticipated to last approximately 9 months. Because construction vehicle and equipment sounds (usually point source) decrease about 6 dBA per every doubling of the distance, residential, commercial, and recreational areas farther from the project corridor would experience progressively less construction noise. However, minor construction noise impacts could extend up to 1 mile from the project corridor, depending upon intervening topography and landscape features.

Construction noise impacts on surrounding properties would be minimized by:

- Complying with construction noise regulations contained in Chapter 8.08 (Noise Regulation) of the City of Woodinville Municipal Code.
- Limiting nighttime construction activities.
- Using the best available noise abatement technology on construction equipment.

Table 4. Average Maximum Noise Levels at 50 feet from Common Construction Equipment.

Equipment Description	Impact Device?	Actual Measured Average L_{maxb} at 50 feet
Auger Drill Rig	No	84
Backhoe	No	78
Blasting (rock slope production) [a]	Yes	126
Blasting (mitigated rock fracturing) [a]	Yes	98
Boring Jack Power Unit	No	83
Chain Saw	No	84
Clam Shovel (dropping)	Yes	87
Compactor (ground)	No	83
Compressor (air)	No	78
Concrete Mixer Truck	No	79
Concrete Pump Truck	No	81
Concrete Saw	No	90
Crane	No	81
Dozer	No	82
Drill Rig Truck	No	79

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Equipment Description	Impact Device?	Actual Measured Average L_{max}[b] at 50 feet
Drum Mixer	No	80
Dump Truck	No	76
Excavator	No	81
Flat Bed Truck	No	74
Front End Loader	No	79
Generator	No	81
Generator (<25KVA, VMS signs)	No	73
Gradall	No	83
Grader [a]	No	89
Grapple (on backhoe)	No	87
Horizontal Boring Hydr. Jack	No	82
Impact Pile Driver [a]	Yes	110
Jackhammer	Yes	89
Man Lift	No	75
Mounted Impact Hammer (hoe ram)	Yes	90
Pavement Scarafier	No	90
Paver	No	77
Pickup Truck	No	75
Pneumatic Tools	No	85
Pumps	No	81
Refrigerator Unit	No	73
Rivet Buster/chipping gun	Yes	79
Rock Drill	No	81
Roller	No	80
Sand Blasting (Single Nozzle)	No	96
Scraper	No	84
Shears (on backhoe)	No	96
Slurry Plant	No	78
Slurry Trenching Machine	No	80
Tractor [a]	No	84
Vacuum Excavator (Vac-truck)	No	85
Vacuum Street Sweeper	No	82
Ventilation Fan	No	79
Vibrating Hopper	No	87
Vibratory Concrete Mixer	No	80
Vibratory Pile Driver	No	101
Warning Horn	No	83
Water Jet deleading	No	92
Welder / Torch	No	74

[a] WSDOT Measured data in FHWA's Roadway Construction Noise Mode Database (2005).

[b] L_{max} is the maximum value of a noise level that occurs during a single event.

Source: WSDOT 2010

CHAPTER 8. REFERENCES

23 C.F.R. Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise.*

AECOM. 2008. SR 202 Traffic Analysis Report, Sammamish Bridge and Road (SR 202) Project, NE 177th Place to 127th Place NE. Prepared for the City of Woodinville. August 2008.

FHWA (Federal Highway Administration). 1995. *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* USDOT, FHWA, Office of Environment and Planning, Noise and Air Quality Branch, Washington DC. June 1995.

FHWA. 2004. Transportation Noise Model, Version 2.5. February 2004.

WSDOT (Washington State Department of Transportation). March 2006. Traffic Noise Analysis and Abatement Policy and Procedures. Washington State Department of Transportation. Olympia, Washington.

WSDOT. 2010. Biological Assessment Preparation for Transportation Project, Advanced Training Manual. Olympia, Washington, February 2010.

APPENDIX A. Field Data

Sound Level Data Collection Form

Project / Site Information

PROJECT NO.: 60210385	DATE/TIME: 4/28/2011 AM
PROJECT NAME: Sammamish Bridge	SITE #: Validation Site 1
PERSONNEL: Linda Howard, Glen Mejia	LOCATION: Wilmot Gateway Park

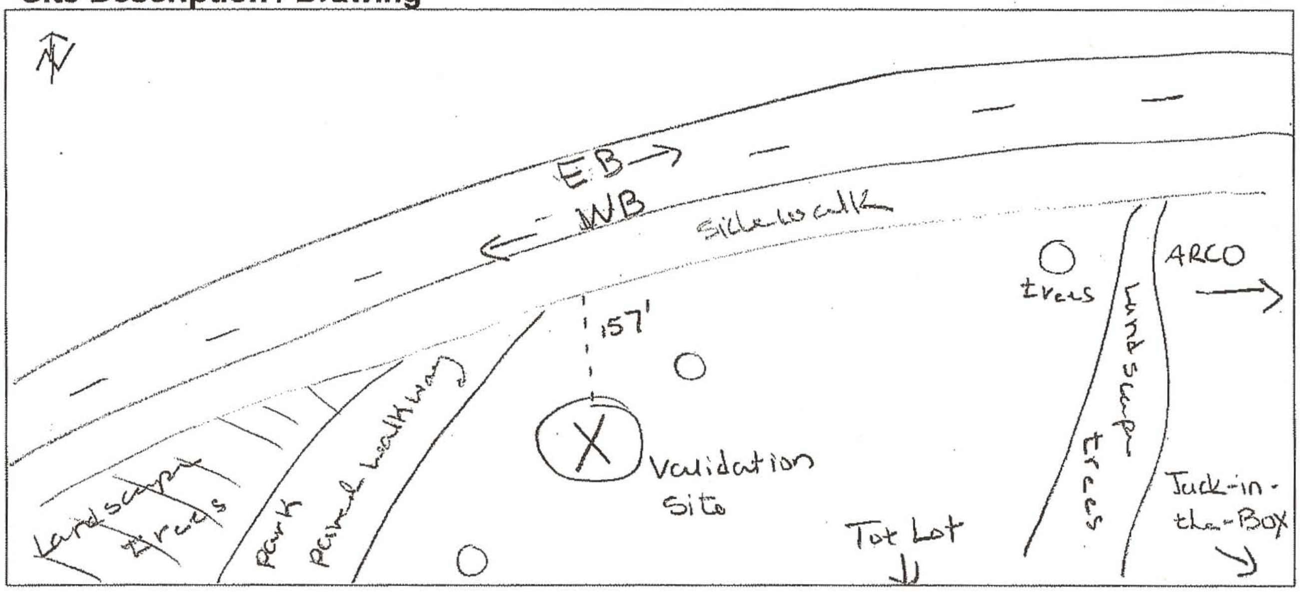
Weather Conditions

REL.HUMIDITY:	
WIND SPEED:	
TEMP: (dry bulb)	(wet bulb)

Equipment Information

EQUIPMENT MODEL: Larson Davis LxT Type 1	SERIAL NO.:
CALIBRATION: (initial) LH (final) LH	
DESCRIPTOR: Leq	INTEGRATION RATE: fast (1 second)
WEIGHTING: A	SAMPLE RATE: 15 minutes

Site Description / Drawing



Field Sound Level Results (Leq)

SOUND LEVEL 1: 64.3	SOUND LEVEL 2: 62.5
SOOUND LEVEL 3: 63.1	SOUND LEVEL 4:

Notes

Ground btwn rd & SLM is park lawn. SLM on slight rise above rd. Dominant noise source is road traffic. No train traffic during noise measurements. Natural sounds – birds.

Sound Level Data Collection Form

Project / Site Information

PROJECT NO.: 60210385	DATE/TIME: 4/28/2011 PM
PROJECT NAME: Sammamish Bridge	SITE #: 2
PERSONNEL: Linda Howard	LOCATION: Woodinville Water District Access Rd.

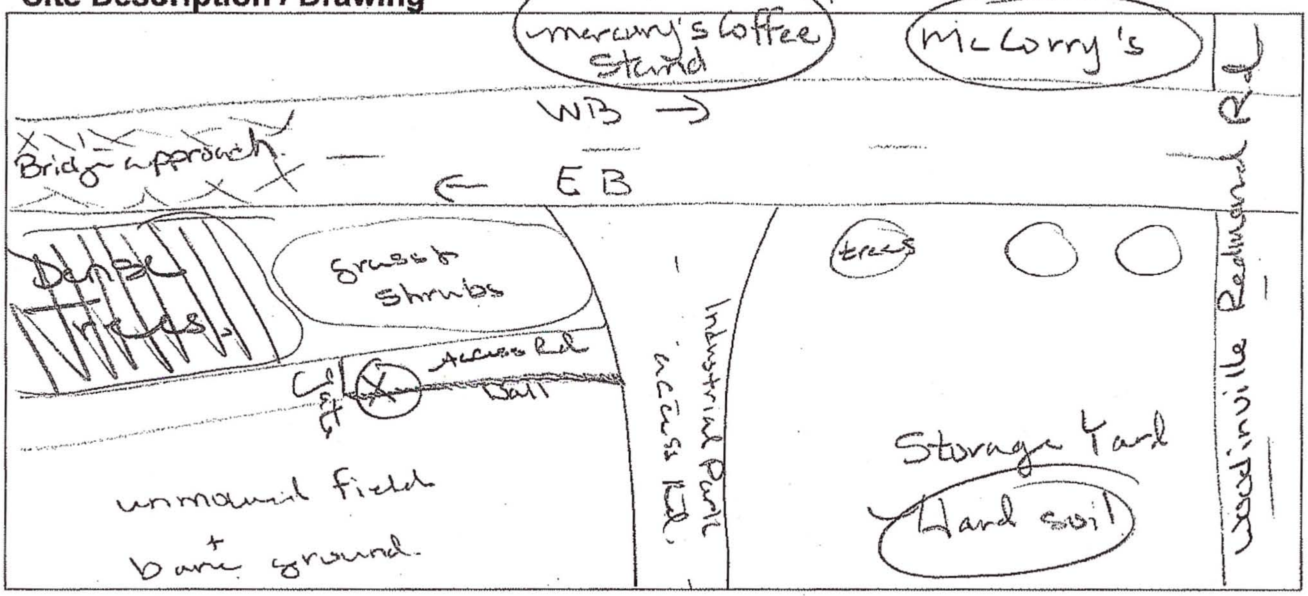
Weather Conditions

REL.HUMIDITY:	
WIND SPEED:	
TEMP: (dry bulb)	(wet bulb)

Equipment Information

EQUIPMENT MODEL: Larson Davis LxT Type I	SERIAL NO.:
CALIBRATION: (initial) LH (final) LN	
DESCRIPTOR: Leq	INTEGRATION RATE: fast (1 second)
WEIGHTING: A	SAMPLE RATE: 15 minutes

Site Description / Drawing



Field Sound Level Results (Leq)

SOUND LEVEL 1: 63.2	SOUND LEVEL 2: 63.7
SOOUND LEVEL 3:	SOUND LEVEL 4:

Notes

Dominant noise source = traffic. Line of site to east blocked by dense trees. Roadway inclines to east.

Linden

Site # 1
Measurement # 1

Direction	Automobiles	Medium Trucks (2 axles / 6 tires)	Heavy Trucks (> 2 axles / > 6 tires)	Buses	Motorbikes
Eastbound					
Westbound ←	91	16	10	1	

Site # 1
Measurement # 2

Direction	Automobiles	Medium Trucks (2 axles / 6 tires)	Heavy Trucks (> 2 axles / > 6 tires)	Buses	Motorbikes
Eastbound					
Westbound ←	109	4	5	1	

Linda

Site # 1
Measurement # 3

Direction	Automobiles	Medium Trucks (2 axles / 6 tires)	Heavy Trucks (> 2 axles / > 6 tires)	Buses	Motorbikes
Eastbound					
Westbound ←	125	7	3	1	

Site # 2
Measurement # 1

Direction	Automobiles	Medium Trucks (2 axles / 6 tires)	Heavy Trucks (> 2 axles / > 6 tires)	Buses	Motorbikes
Eastbound					
Westbound →	134	6	4	1	1

indn

Site # 2
Measurement # 2

Direction	Automobiles	Medium Trucks (2 axles / 6 tires)	Heavy Trucks (> 2 axles / > 6 tires)	Buses	Motorbikes
Eastbound					
Westbound →	126	9	4		

Site #
Measurement #

Direction	Automobiles	Medium Trucks (2 axles / 6 tires)	Heavy Trucks (> 2 axles / > 6 tires)	Buses	Motorbikes
Eastbound					
Westbound					

Glen

Site # 1

Measurement # 1

Direction	Automobiles	Medium Trucks (2 axles / 6 tires)	Heavy Trucks (> 2 axles / > 6 tires)	Buses	Motorbikes
Eastbound →	105	7	2	1	
Westbound ←					

Site # 1

Measurement # 2

Direction	Automobiles	Medium Trucks (2 axles / 6 tires)	Heavy Trucks (> 2 axles / > 6 tires)	Buses	Motorbikes
Eastbound →	129	4 4	4	1	
Westbound ←					

Glen

Site # 1
Measurement # 3

Direction	Automobiles	Medium Trucks (2 axles / 6 tires)	Heavy Trucks (> 2 axles / > 6 tires)	Buses	Motorbikes
Eastbound →	141	12 (III - light trucks w/ trailer)	5	1	
Westbound ←					

Site # 2
Measurement # 1

Direction	Automobiles	Medium Trucks (2 axles / 6 tires)	Heavy Trucks (> 2 axles / > 6 tires)	Buses	Motorbikes
Eastbound ←	153	7	3		
Westbound →					

Glen

Site # 2
Measurement # 2

Direction	Automobiles	Medium Trucks (2 axles / 6 tires)	Heavy Trucks (> 2 axles / > 6 tires)	Buses	Motorbikes
Eastbound ←	146	13	1		
Westbound →					

Site #
Measurement #

Direction	Automobiles	Medium Trucks (2 axles / 6 tires)	Heavy Trucks (> 2 axles / > 6 tires)	Buses	Motorbikes
Eastbound					
Westbound					

APPENDIX B. Traffic Data Used in TNM

Traffic Data Collected in the Field on April 28, 2011. Used to Validate TNM Model.

** traffic volumes collected in 15 minute intervals and multiplied by 4 to obtain vehicle per hour (vph)*

Site 1: Wilmot Gateway Park

	Interval 1		Interval 2		Interval 3	
	WB	EB	WB	EB	WB	EB
Autos	364	420	436	516	500	564
Medium Trucks	64	28	16	16	28	48
Heavy Trucks	40	8	20	16	12	20
Buses	4	4	4	1	4	4
Motorcycles	0	0	0	0	0	0
TOTAL	**472**	**460**	**476**	**549**	**544**	**636**
Measured LAeq	**64.3**		**62.5**		**63.1**	
Predicted LAeq	**65.1**		**64**		**64.7**	

Site 2: Woodinville Water District Access Road

	Interval 1		Interval 2	
	WB	EB	WB	EB
Autos	536	612	504	580
Medium Trucks	24	28	36	52
Heavy Trucks	16	12	16	1
Buses	4	0	4	0
Motorcycles	4	0	0	0
TOTAL	**584**	**652**	**560**	**633**
Measured LAeq	**63.2**		**63.7**	
Predicted LAeq	**63.8**		**63.3**	

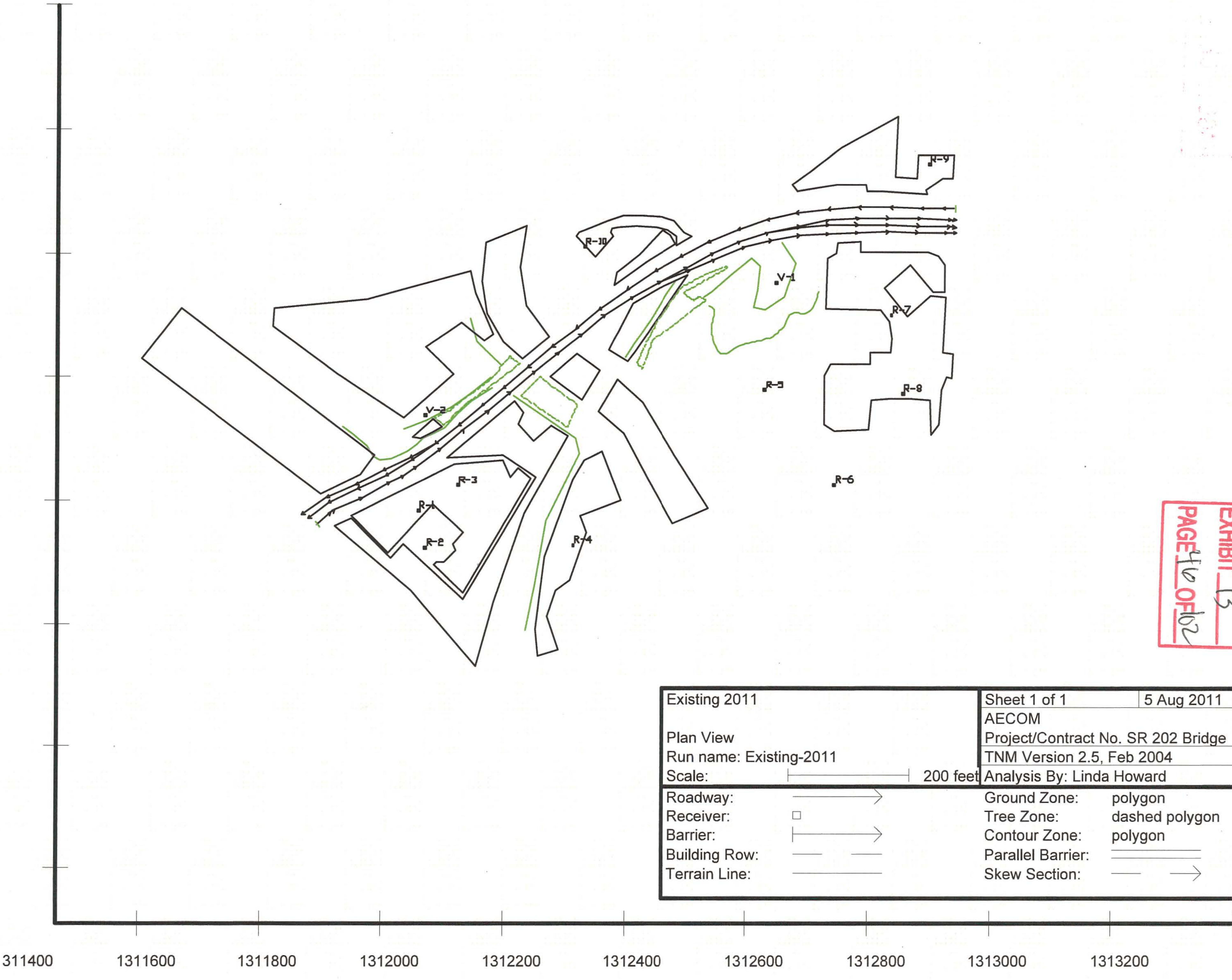
Traffic Data used in TNM to Calculate Existing 2011, No Build 2030, and Build 2030 Conditions

PM Peak Hour (VPH)

	% Vehicle Composition*		2011		2030 No Build		2030 Build	
			EB	WB	EB	WB	EB	WB
Total VPH	**EB**	**WB**	**981**	**548**	**1316**	**681**	**1039**	**1809**
Autos	92%	90%	903	493	1211	613	956	1628
Medium Trucks	8%	6%	78	33	105	41	83	109
Heavy Trucks	0%	3%	0	16	0	20	0	54
Buses	0%	1%	0	5	0	7	0	18
Motorcycles	0%	0%	0	0	0	0	0	0

* Vehicle composition used in TNM based on PM traffic volumes collected in the field at Validation Site 2, Interval 2

APPENDIX C. TNM Input and Output Data



Existing 2011	Sheet 1 of 1 / 5 Aug 2011
	AECOM
Plan View	Project/Contract No. SR 202 Bridge
Run name: Existing-2011	TNM Version 2.5, Feb 2004
Scale: 200 feet	Analysis By: Linda Howard

Roadway:	Ground Zone: polygon
Receiver: □	Tree Zone: dashed polygon
Barrier:	Contour Zone: polygon
Building Row:	Parallel Barrier:
Terrain Line:	Skew Section:

AECOM
Linda Howard

16 June 2011
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: SR 202 Bridge
RUN: Existing 2011, Val-Site1-1

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

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
EB Thru Lane	12.0	10+50	375	1,311,691.9	277,561.5	45.80	Signal	0.00	100	Average	
		point298	298	1,311,714.6	277,582.2	44.50				Average	
		11+00	299	1,311,720.8	277,586.0	42.90				Average	
		11+50	300	1,311,766.1	277,606.4	41.50				Average	
		12+00	301	1,311,810.9	277,630.0	40.60				Average	
		point379	379	1,311,833.9	277,642.0	40.60				Average	
		12+50	302	1,311,854.4	277,655.4	40.60				Average	
		13+00	303	1,311,894.5	277,685.1	40.80				Average	
		13+50	304	1,311,932.5	277,715.8	41.20				Average	
		14+00	305	1,311,972.8	277,747.4	41.60				Average	
		14+50	306	1,312,008.4	277,777.2	42.70				Average	Y
		15+00	307	1,312,049.1	277,810.7	43.40				Average	Y
		15+50	308	1,312,087.5	277,841.8	44.20				Average	Y
		16+00	309	1,312,125.2	277,872.3	44.90				Average	Y
		16+50	310	1,312,163.4	277,902.5	45.30				Average	
		17+00	311	1,312,210.8	277,931.2	46.40				Average	
		17+50	312	1,312,254.8	277,956.5	46.90				Average	
		18+00	313	1,312,303.0	277,975.7	47.00				Average	
		18+50	314	1,312,344.4	277,992.8	46.70				Average	
		19+00	315	1,312,393.6	278,012.8	45.80				Average	
		19+50	316	1,312,437.6	278,024.4	44.80				Average	
		20+00	317	1,312,484.2	278,032.1	43.50				Average	
		20+50	318	1,312,532.6	278,034.3	41.40				Average	
		21+00	319	1,312,580.8	278,037.2	39.70				Average	
		21+50	320	1,312,630.2	278,037.8	38.20				Average	

		22+00	321	1,312,678.9	278,037.2	37.70				Average	
		22+50	376	1,312,726.5	278,036.5	36.80				Average	
		23+00	322	1,312,741.1	278,036.1	36.00					
EB Outside Left Turn Lane	12.0	17+50	323	1,312,254.8	277,956.5	46.90				Average	
		18+00	324	1,312,299.1	277,980.7	47.00				Average	
		18+50	325	1,312,342.0	278,002.2	46.70				Average	
		19+00	326	1,312,386.2	278,021.6	45.80				Average	
		19+50	327	1,312,432.0	278,036.1	44.80				Average	
		20+00	328	1,312,484.2	278,045.0	43.50				Average	
		20+50	329	1,312,531.5	278,049.5	41.40				Average	
		21+00	330	1,312,578.9	278,050.0	39.70				Average	
		21+50	331	1,312,630.6	278,049.5	38.20				Average	
		22+00	332	1,312,680.4	278,048.0	37.70				Average	
		22+50	333	1,312,729.6	278,046.0	36.80				Average	
		23+00	334	1,312,739.8	278,045.6	36.00					
EB - Inside Left Turn Lane	12.0	19+50	335	1,312,432.0	278,036.1	44.80				Average	
		20+00	336	1,312,484.2	278,047.9	43.50				Average	
		20+50	337	1,312,532.0	278,056.5	41.40				Average	
		21+00	338	1,312,580.9	278,060.4	39.70				Average	
		21+50	339	1,312,629.6	278,060.4	38.20				Average	
		22+00	340	1,312,681.9	278,058.9	37.20				Average	
		22+50	341	1,312,732.1	278,058.0	36.80				Average	
		23+00	342	1,312,739.9	278,057.7	36.00					
WB Thru Lane	12.0	23+00	343	1,312,738.1	278,076.0	36.00	Signal	0.00	100	Average	
		22+50	344	1,312,717.9	278,076.5	36.80				Average	
		22+00	345	1,312,681.5	278,076.5	37.20				Average	
		21+50	346	1,312,631.4	278,077.7	38.20				Average	
		21+00	347	1,312,579.8	278,077.4	39.70				Average	
		20+50	348	1,312,528.9	278,074.7	41.40				Average	
		20+00	349	1,312,477.1	278,068.7	43.50				Average	
		19+50	350	1,312,429.1	278,056.8	44.80				Average	
		19+00	351	1,312,381.1	278,041.2	45.80				Average	
		18+50	352	1,312,331.5	278,019.7	46.70				Average	
		18+00	353	1,312,286.4	277,997.2	47.00				Average	
		17+50	354	1,312,244.9	277,972.9	46.90				Average	
		17+00	355	1,312,198.6	277,943.4	46.40				Average	
		16+50	356	1,312,153.1	277,911.1	45.30				Average	
		16+00	357	1,312,115.0	277,880.6	44.90				Average	Y
		15+50	358	1,312,076.2	277,849.6	44.20				Average	Y

		15+00	359	1,312,036.8	277,816.8	43.40				Average	Y
		14+50	360	1,311,996.2	277,783.3	42.70				Average	Y
		14+00	361	1,311,961.2	277,754.7	41.60				Average	
		13+50	362	1,311,922.8	277,723.1	41.20				Average	
		13+00	363	1,311,884.8	277,693.5	40.80				Average	
		12+50	364	1,311,845.4	277,666.0	40.60				Average	
		12+00	365	1,311,803.5	277,641.8	40.60				Average	
		11+50	366	1,311,757.5	277,619.7	41.50				Average	
		11+00	367	1,311,710.1	277,597.3	42.90				Average	
		10+50	377	1,311,677.5	277,572.2	45.80					
WB - Right Turn Lane	12.0	13+00	369	1,311,884.9	277,693.7	40.80				Average	
		12+50	370	1,311,843.0	277,671.6	40.60				Average	
		12+00	371	1,311,800.0	277,649.6	40.60				Average	
		11+50	372	1,311,754.6	277,627.5	41.50				Average	
		11+00	373	1,311,706.5	277,606.3	42.90				Average	
		10+50	378	1,311,667.0	277,578.7	45.80					

AECOM 16 June 2011
Linda Howard TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: SR 202 Bridge
RUN: Existing 2011, Val-Site1-1

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
EB Thru Lane	10+50	375	420	35	28	35	8	35	4	35	0	0
	point298	298	420	35	28	35	8	35	4	35	0	0
	11+00	299	420	35	28	35	8	35	4	35	0	0
	11+50	300	420	35	28	35	8	35	4	35	0	0
	12+00	301	420	35	28	35	8	35	4	35	0	0
	point379	379	420	35	28	35	8	35	4	35	0	0
	12+50	302	420	35	28	35	8	35	4	35	0	0
	13+00	303	420	35	28	35	8	35	4	35	0	0
	13+50	304	420	35	28	35	8	35	4	35	0	0
	14+00	305	420	35	28	35	8	35	4	35	0	0
	14+50	306	420	35	28	35	8	35	4	35	0	0
	15+00	307	420	35	28	35	8	35	4	35	0	0
	15+50	308	420	35	28	35	8	35	4	35	0	0
	16+00	309	420	35	28	35	8	35	4	35	0	0
	16+50	310	420	35	28	35	8	35	4	35	0	0
	17+00	311	420	35	28	35	8	35	4	35	0	0
	17+50	312	420	35	28	35	8	35	4	35	0	0
	18+00	313	420	35	28	35	8	35	4	35	0	0
	18+50	314	420	35	28	35	8	35	4	35	0	0
	19+00	315	420	35	28	35	8	35	4	35	0	0
	19+50	316	420	35	28	35	8	35	4	35	0	0
	20+00	317	420	35	28	35	8	35	4	35	0	0
	20+50	318	420	35	28	35	8	35	4	35	0	0

	21+00	319	420	35	28	35	8	35	4	35	0	0
	21+50	320	420	35	28	35	8	35	4	35	0	0
	22+00	321	420	35	28	35	8	35	4	35	0	0
	22+50	376	420	35	28	35	8	35	4	35	0	0
	23+00	322										
EB Outside Left Turn Lane	17+50	323	0	0	0	0	0	0	0	0	0	0
	18+00	324	0	0	0	0	0	0	0	0	0	0
	18+50	325	0	0	0	0	0	0	0	0	0	0
	19+00	326	0	0	0	0	0	0	0	0	0	0
	19+50	327	0	0	0	0	0	0	0	0	0	0
	20+00	328	0	0	0	0	0	0	0	0	0	0
	20+50	329	0	0	0	0	0	0	0	0	0	0
	21+00	330	0	0	0	0	0	0	0	0	0	0
	21+50	331	0	0	0	0	0	0	0	0	0	0
	22+00	332	0	0	0	0	0	0	0	0	0	0
	22+50	333	0	0	0	0	0	0	0	0	0	0
	23+00	334										
EB - Inside Left Turn Lane	19+50	335	0	0	0	0	0	0	0	0	0	0
	20+00	336	0	0	0	0	0	0	0	0	0	0
	20+50	337	0	0	0	0	0	0	0	0	0	0
	21+00	338	0	0	0	0	0	0	0	0	0	0
	21+50	339	0	0	0	0	0	0	0	0	0	0
	22+00	340	0	0	0	0	0	0	0	0	0	0
	22+50	341	0	0	0	0	0	0	0	0	0	0
	23+00	342										
WB Thru Lane	23+00	343	364	35	64	35	40	35	4	35	0	0
	22+50	344	364	35	64	35	40	35	4	35	0	0
	22+00	345	364	35	64	35	40	35	4	35	0	0
	21+50	346	364	35	64	35	40	35	4	35	0	0
	21+00	347	364	35	64	35	40	35	4	35	0	0
	20+50	348	364	35	64	35	40	35	4	35	0	0
	20+00	349	364	35	64	35	40	35	4	35	0	0
	19+50	350	364	35	64	35	40	35	4	35	0	0
	19+00	351	364	35	64	35	40	35	4	35	0	0
	18+50	352	364	35	64	35	40	35	4	35	0	0
	18+00	353	364	35	64	35	40	35	4	35	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes **SR 202 Bridge**

	17+50	354	364	35	64	35	40	35	4	35	0	0
	17+00	355	364	35	64	35	40	35	4	35	0	0
	16+50	356	364	35	64	35	40	35	4	35	0	0
	16+00	357	364	35	64	35	40	35	4	35	0	0
	15+50	358	364	35	64	35	40	35	4	35	0	0
	15+00	359	364	35	64	35	40	35	4	35	0	0
	14+50	360	364	35	64	35	40	35	4	35	0	0
	14+00	361	364	35	64	35	40	35	4	35	0	0
	13+50	362	364	35	64	35	40	35	4	35	0	0
	13+00	363	364	35	64	35	40	35	4	35	0	0
	12+50	364	364	35	64	35	40	35	4	35	0	0
	12+00	365	364	35	64	35	40	35	4	35	0	0
	11+50	366	364	35	64	35	40	35	4	35	0	0
	11+00	367	364	35	64	35	40	35	4	35	0	0
	10+50	377										
WB - Right Turn Lane	13+00	369	0	0	0	0	0	0	0	0	0	0
	12+50	370	0	0	0	0	0	0	0	0	0	0
	12+00	371	0	0	0	0	0	0	0	0	0	0
	11+50	372	0	0	0	0	0	0	0	0	0	0
	11+00	373	0	0	0	0	0	0	0	0	0	0
	10+50	378										

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Linda Howard TNM 2.5

INPUT: GROUND ZONES
PROJECT/CONTRACT: SR 202 Bridge
RUN: Existing 2011, Val-Site1-1

Ground Zone			Points		
Name	Type	Flow Resistivity	No.	Coordinates X	Y
		cgs rayls		ft	ft
Ground Zone1	Field	150	9	1,311,881.5	277,733.0
			10	1,311,848.8	277,704.2
			11	1,311,861.0	277,702.1
			12	1,311,881.9	277,712.1
			13	1,311,895.9	277,719.9
Ground Zone2	Pavement	20000	14	1,311,747.6	277,575.8
			15	1,311,808.9	277,515.4
			16	1,311,881.6	277,595.8
			17	1,311,931.6	277,548.9
			18	1,311,914.4	277,529.6
			19	1,311,919.8	277,520.8
			20	1,311,900.9	277,501.9
			21	1,311,887.4	277,501.5
			22	1,311,882.8	277,496.9
			23	1,311,931.6	277,450.7
			24	1,312,043.4	277,636.7
			25	1,312,021.8	277,654.3
			26	1,312,009.9	277,639.7
			27	1,311,996.4	277,665.5
			28	1,311,917.9	277,660.5
Ground Zone3	Hard Soil	5000	29	1,311,746.8	277,572.8
			30	1,311,720.2	277,559.2
			31	1,311,846.2	277,454.5

			32	1,311,952.2	277,332.4
			33	1,311,981.2	277,436.4
			34	1,312,033.0	277,581.8
			35	1,312,102.1	277,707.2
			44	1,312,076.4	277,723.8
			43	1,312,046.9	277,697.8
			46	1,312,020.8	277,725.5
			45	1,312,030.9	277,742.8
			36	1,312,014.9	277,763.3
			37	1,311,905.0	277,669.7
			38	1,311,996.8	277,674.2
			39	1,312,050.4	277,639.9
			40	1,311,932.1	277,440.3
			41	1,311,833.4	277,530.8
			42	1,311,813.2	277,507.5
Ground Zone10	Pavement	20000	47	1,312,545.9	278,019.2
			48	1,312,544.6	278,002.1
			49	1,312,529.4	277,995.1
			50	1,312,527.6	277,912.5
			51	1,312,618.1	277,910.7
			52	1,312,632.5	277,892.8
			53	1,312,636.4	277,865.2
			54	1,312,634.8	277,841.2
			55	1,312,600.6	277,841.2
			56	1,312,600.1	277,822.4
			57	1,312,535.5	277,823.7
			58	1,312,525.0	277,804.0
			59	1,312,525.8	277,725.4
			60	1,312,542.8	277,715.1
			61	1,312,599.2	277,715.7
			62	1,312,603.0	277,765.6
			63	1,312,632.1	277,766.2
			64	1,312,667.4	277,766.2
			65	1,312,699.6	277,765.6
			66	1,312,700.2	277,708.3
			67	1,312,714.2	277,724.0

			68	1,312,717.8	277,781.8
			69	1,312,726.1	277,801.4
			70	1,312,734.4	277,801.0
			71	1,312,737.0	277,839.5
			72	1,312,720.4	277,842.1
			73	1,312,723.2	277,932.7
			74	1,312,699.6	277,933.9
			75	1,312,661.9	277,900.5
			76	1,312,623.0	277,946.1
			77	1,312,665.0	277,984.4
			78	1,312,703.9	277,941.2
			79	1,312,722.2	277,940.0
			80	1,312,723.0	277,984.2
			81	1,312,710.8	277,998.6
			82	1,312,695.0	278,005.2
			83	1,312,584.4	278,004.7
			84	1,312,584.4	278,021.3
Ground Zone11	Pavement	20000	85	1,312,735.9	278,161.5
			86	1,312,679.0	278,161.9
			87	1,312,676.5	278,125.1
			88	1,312,641.0	278,126.0
			89	1,312,645.0	278,225.8
			90	1,312,553.0	278,174.2
			91	1,312,500.2	278,134.1
			92	1,312,471.6	278,113.7
			93	1,312,478.6	278,103.1
			94	1,312,543.2	278,113.3
			95	1,312,591.9	278,114.1
			96	1,312,594.8	278,103.5
			97	1,312,619.8	278,103.5
			98	1,312,693.8	278,099.8
			99	1,312,689.6	278,106.3
			100	1,312,718.6	278,123.5
			101	1,312,733.9	278,124.3
Ground Zone12	Water	20000	102	1,312,183.9	277,798.4
			103	1,312,153.6	277,746.2

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			104	1,312,195.4	277,710.3
			105	1,312,233.0	277,642.0
			106	1,312,277.4	277,563.4
			107	1,312,335.5	277,588.2
			108	1,312,278.8	277,674.2
			109	1,312,226.4	277,760.8
Ground Zone13	Water	20000	110	1,312,156.1	277,812.8
			111	1,312,116.9	277,839.2
			112	1,312,073.4	277,802.5
			113	1,312,126.2	277,765.0
Ground Zone14	Water	20000	114	1,311,967.4	278,019.4
			115	1,311,960.6	277,957.1
			116	1,311,968.2	277,904.2
			117	1,311,997.4	277,858.9
			118	1,312,028.9	277,831.6
			119	1,312,070.8	277,866.6
			120	1,312,034.0	277,917.0
			121	1,312,022.9	277,981.0
			122	1,312,034.0	278,047.6
Ground Zone15	Pavement	20000	123	1,312,306.4	278,029.9
			124	1,312,294.0	278,036.1
			125	1,312,277.2	278,054.4
			126	1,312,256.4	278,062.3
			127	1,312,224.0	278,062.9
			128	1,312,193.9	278,062.9
			129	1,312,167.8	278,055.1
			130	1,312,119.6	278,037.1
			131	1,312,114.6	278,031.2
			132	1,312,146.1	277,997.5
			133	1,312,176.2	278,029.9
			134	1,312,172.6	278,036.1
			135	1,312,174.9	278,042.7
			136	1,312,184.0	278,045.9
			137	1,312,212.9	278,046.9
			138	1,312,246.9	278,045.9
			139	1,312,265.5	278,041.7

			140	1,312,280.6	278,029.6
			141	1,312,281.5	278,016.1
Ground Zone16	Hard Soil	5000	142	1,312,277.8	278,017.0
			143	1,312,270.5	278,033.1
			144	1,312,257.4	278,039.8
			145	1,312,220.1	278,000.2
			146	1,312,181.8	277,971.0
			147	1,312,177.8	277,949.8
			148	1,312,231.4	277,988.6
Ground Zone17	Pavement	20000	149	1,312,191.4	277,602.7
			150	1,312,159.6	277,680.9
			151	1,312,130.6	277,666.9
			152	1,312,111.6	277,634.6
			153	1,312,066.1	277,509.8
			154	1,312,051.2	277,392.3
			155	1,312,054.6	277,348.5
			156	1,312,087.6	277,358.4
			157	1,312,068.6	277,413.0
			158	1,312,084.4	277,455.2
			159	1,312,106.6	277,471.7
			160	1,312,134.0	277,549.4
			161	1,312,124.0	277,577.6
Ground Zone18	Hard Soil	5000	162	1,311,785.4	277,674.4
			163	1,311,467.2	277,913.8
			164	1,311,403.0	277,831.9
			165	1,311,696.8	277,611.7
			166	1,311,761.8	277,643.8
Ground Zone19	Field	150	167	1,311,942.0	277,973.7
			168	1,311,772.0	277,927.8
			169	1,311,620.6	277,913.1
			170	1,311,618.6	277,884.8
			171	1,311,725.1	277,805.7
			172	1,311,832.6	277,735.3
			173	1,311,914.6	277,805.7
			174	1,311,868.8	277,850.6
			175	1,311,928.2	277,889.7

			176	1,311,965.4	277,860.3
			177	1,311,979.1	277,871.1
			178	1,311,949.8	277,937.5
Ground Zone21	Hard Soil	5000	180	1,312,299.9	277,967.6
			181	1,312,253.2	277,947.0
			187	1,312,209.8	277,921.7
			182	1,312,186.0	277,877.6
			183	1,312,178.5	277,862.9
			184	1,312,170.0	277,845.9
			185	1,312,201.8	277,828.1
			186	1,312,213.9	277,844.6

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AECOM

Linda Howard

16 June 2011

TNM 2.5

INPUT: TERRAIN LINES

PROJECT/CONTRACT: SR 202 Bridge

RUN: Existing 2011, Val-Site1-1

Terrain Line	Points			
Name	No.	Coordinates (ground)		
		X	Y	Z
		ft	ft	ft
Terrain Line3	17	1,311,977.2	277,783.1	40.00
	18	1,311,944.9	277,761.9	40.00
	19	1,311,920.5	277,741.1	40.00
	20	1,311,899.6	277,719.4	40.00
	21	1,311,884.2	277,711.0	40.00
	22	1,311,864.6	277,702.0	40.00
	23	1,311,854.1	277,691.0	40.00
	24	1,311,839.4	277,681.4	40.00
	25	1,311,811.6	277,669.5	40.00
	26	1,311,794.2	277,667.2	40.00
	27	1,311,784.1	277,672.4	40.00
	28	1,311,772.1	277,690.4	40.00
	29	1,311,749.9	277,709.2	40.00
	30	1,311,734.0	277,719.9	40.00
Terrain Line5	41	1,312,012.8	277,770.8	40.00
	42	1,312,115.8	277,702.3	40.00
	43	1,312,122.9	277,677.5	40.00
	44	1,312,066.9	277,568.7	40.00
	45	1,312,049.2	277,461.1	40.00
	46	1,312,034.9	277,391.3	40.00
Terrain Line6	47	1,311,976.4	277,801.0	35.00
	51	1,311,938.1	277,771.8	35.00
	48	1,311,909.8	277,752.5	35.00
	49	1,311,871.2	277,731.7	35.00

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		50	1,311,832.9	277,717.3	35.00
Terrain Line7		52	1,311,992.5	277,820.3	30.00
		53	1,311,953.1	277,858.1	30.00
		54	1,311,942.6	277,896.9	30.00
Terrain Line11		69	1,312,404.1	277,995.4	45.00
		70	1,312,419.2	277,982.0	45.00
		71	1,312,414.6	277,942.0	45.00
		72	1,312,408.8	277,915.9	45.00
		73	1,312,426.8	277,910.7	45.00
		74	1,312,457.5	277,932.7	45.00
		75	1,312,478.4	277,986.1	45.00
		76	1,312,454.6	278,020.3	45.00
Terrain Line12		77	1,312,327.5	277,931.3	45.00
		80	1,312,340.4	277,941.1	45.00
		81	1,312,354.5	277,953.5	45.00
		83	1,312,371.1	277,967.3	45.00
		82	1,312,404.1	277,995.5	45.00
Terrain Line13		84	1,312,515.1	277,940.8	40.00
		85	1,312,513.9	277,936.0	40.00
		86	1,312,512.8	277,931.1	40.00
		87	1,312,511.4	277,926.2	40.00
		88	1,312,509.8	277,921.6	40.00
		89	1,312,507.4	277,917.2	40.00
		90	1,312,504.1	277,913.2	40.00
		91	1,312,500.4	277,909.9	40.00
		92	1,312,496.0	277,907.4	40.00
		93	1,312,491.2	277,905.8	40.00
		94	1,312,486.2	277,905.2	40.00
		95	1,312,480.8	277,905.9	40.00
		96	1,312,475.5	277,906.5	40.00
		97	1,312,471.1	277,905.5	40.00
		98	1,312,467.9	277,902.4	40.00
		99	1,312,465.2	277,898.3	40.00
		100	1,312,462.9	277,893.6	40.00
		101	1,312,460.5	277,888.8	40.00
		102	1,312,457.9	277,884.4	40.00

	103	1,312,454.8	277,880.6	40.00
	104	1,312,451.1	277,876.9	40.00
	105	1,312,447.4	277,873.5	40.00
	106	1,312,443.4	277,870.4	40.00
	107	1,312,439.0	277,867.8	40.00
	108	1,312,434.6	277,865.8	40.00
	109	1,312,430.0	277,864.1	40.00
	110	1,312,425.1	277,862.7	40.00
	111	1,312,420.4	277,861.4	40.00
	112	1,312,415.4	277,860.3	40.00
	113	1,312,410.5	277,859.3	40.00
	114	1,312,405.5	277,858.3	40.00
	115	1,312,400.6	277,857.2	40.00
	116	1,312,395.8	277,856.0	40.00
	117	1,312,390.9	277,854.6	40.00
	118	1,312,386.2	277,852.9	40.00
	119	1,312,381.8	277,850.7	40.00
	120	1,312,377.5	277,848.1	40.00
	121	1,312,369.0	277,842.7	40.00
	122	1,312,363.8	277,840.8	40.00
	123	1,312,358.8	277,839.6	40.00
	124	1,312,354.5	277,841.0	40.00
	125	1,312,350.2	277,844.2	40.00
	126	1,312,347.0	277,848.3	40.00
	127	1,312,344.9	277,852.7	40.00
	128	1,312,343.2	277,857.4	40.00
	129	1,312,341.8	277,862.2	40.00
	130	1,312,340.8	277,867.2	40.00
	131	1,312,339.9	277,872.3	40.00
	132	1,312,339.5	277,877.3	40.00
	133	1,312,339.4	277,882.2	40.00
	134	1,312,340.0	277,887.2	40.00
	135	1,312,341.0	277,892.2	40.00
	136	1,312,342.1	277,897.2	40.00
	137	1,312,343.1	277,902.1	40.00
	138	1,312,343.8	277,907.0	40.00

		139	1,312,343.1	277,911.8	40.00
		140	1,312,340.1	277,916.0	40.00
		141	1,312,335.4	277,917.7	40.00
Terrain Line15		146	1,312,196.5	277,834.3	44.90
		152	1,312,211.1	277,856.5	45.30
		151	1,312,238.4	277,894.9	46.40
		150	1,312,264.0	277,935.6	46.90
		149	1,312,279.2	277,957.8	46.90

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INPUT: TREE ZONES
PROJECT/CONTRACT: SR 202 Bridge
RUN: Existing 2011, Val-Site1-1

Tree Zone		Points			
Name	Average Height	No.	Coordinates (ground)		
			X	Y	Z
	ft		ft	ft	ft
Tree Zone1	25.00	1	1,312,006.1	277,835.0	25.00
		6	1,311,977.9	277,799.4	32.50
		2	1,311,949.0	277,777.9	40.00
		7	1,311,917.5	277,755.4	40.00
		8	1,311,908.2	277,746.8	40.00
		3	1,311,883.6	277,734.8	40.00
		4	1,311,898.9	277,723.4	40.00
		9	1,311,934.0	277,756.3	40.00
		5	1,312,023.1	277,822.4	25.00
Tree Zone2	25.00	10	1,312,056.2	277,801.5	25.00
		11	1,312,118.2	277,756.2	25.00
		12	1,312,102.1	277,720.1	30.00
		13	1,312,025.2	277,771.1	30.00
Tree Zone4	25.00	14	1,312,216.0	277,825.0	32.00
		27	1,312,229.2	277,853.0	38.00
		15	1,312,248.0	277,890.3	40.00
		16	1,312,288.9	277,946.9	46.00
		25	1,312,330.1	277,969.1	46.00
		26	1,312,362.1	277,982.0	46.00
		24	1,312,365.1	277,979.4	46.00
		23	1,312,292.5	277,938.6	42.00
		17	1,312,309.5	277,925.7	42.00
		18	1,312,318.8	277,932.3	42.00
		19	1,312,329.9	277,926.5	40.00

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		20	1,312,265.9	277,878.4	40.00
		21	1,312,243.1	277,863.7	40.00
		28	1,312,236.9	277,847.7	35.00
		22	1,312,225.2	277,815.2	32.00

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TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: SR 202 Bridge
RUN: Existing 2011, Val-Site1-1

Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above Ground	Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
V-1	1	1	1,312,445.8	277,955.5	45.00	4.92	0.00	66	10.0	8.0	Y
V-2	6	1	1,311,868.2	277,739.1	32.00	4.92	0.00	66	10.0	8.0	
R-1	22	1	1,311,857.6	277,584.7	42.00	4.92	0.00	71	10.0	8.0	
R-2	25	1	1,311,869.1	277,524.8	42.00	4.92	0.00	71	10.0	8.0	
R-3	26	1	1,311,923.4	277,626.2	40.00	4.92	0.00	71	10.0	8.0	
R-4	27	1	1,312,112.5	277,529.3	30.00	4.92	0.00	71	10.0	8.0	
R-5	29	1	1,312,427.5	277,780.8	30.00	4.92	0.00	66	10.0	8.0	
R-6	30	1	1,312,542.9	277,627.4	30.00	4.92	0.00	66	10.0	8.0	
R-7	31	1	1,312,635.1	277,903.1	38.00	4.92	0.00	71	10.0	8.0	
R-8	32	1	1,312,654.8	277,775.1	38.00	4.92	0.00	71	10.0	8.0	
R-9	33	1	1,312,696.2	278,147.7	34.00	4.92	0.00	71	10.0	8.0	
R-10	34	1	1,312,129.9	278,012.7	34.00	4.92	0.00	71	10.0	8.0	

V-1 Validation Site 1 in Wilmot Gateway Park
V-2 Validation Site 2 on Woodinville Water District Access
R-1 McRory's Restaurant entrance
R-2 McRory's Restaurant outdoor seating area
R-3 Mercury's Coffee Stand
R-4 Woodinville Landing Industrial Park Entrance
R-5 Wilmot Gateway Park Tot Lot
R-6 Wilmot Gateway Park Outdoor Ampitheatre Seating Area
R-7 Convenience Store - Gas Station
R-8 Jack-in-the-Box Entrance

EXHIBIT 13
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R-9 Elliot Tire Store											
R-10 King County Public Utility - Pump Station											

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Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SR 202 Bridge
RUN: Existing 2011, Val-Site1-1
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
V-1	1	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0
V-2	6	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R-1	22	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-2	25	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-3	26	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-4	27	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-5	29	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R-6	30	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R-7	31	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-8	32	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-9	33	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-10	34	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	12	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

AECOM 16 June 2011
Linda Howard TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: SR 202 Bridge
RUN: Existing 2011, Val-Site1-2

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles		
			V	S	V	S	V	S	V	S	V	S	
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	
EB Thru Lane	10+50	375	516	35	16	35	16	35	1	35	0	0	
	point298	298	516	35	16	35	16	35	1	35	0	0	
	11+00	299	516	35	16	35	16	35	1	35	0	0	
	11+50	300	516	35	16	35	16	35	1	35	0	0	
	12+00	301	516	35	16	35	16	35	1	35	0	0	
	point379	379	516	35	16	35	16	35	1	35	0	0	
	12+50	302	516	35	16	35	16	35	1	35	0	0	
	13+00	303	516	35	16	35	16	35	1	35	0	0	
	13+50	304	516	35	16	35	16	35	1	35	0	0	
	14+00	305	516	35	16	35	16	35	1	35	0	0	
	14+50	306	516	35	16	35	16	35	1	35	0	0	
	15+00	307	516	35	16	35	16	35	1	35	0	0	
	15+50	308	516	35	16	35	16	35	1	35	0	0	
	16+00	309	516	35	16	35	16	35	1	35	0	0	
	16+50	310	516	35	16	35	16	35	1	35	0	0	
	17+00	311	516	35	16	35	16	35	1	35	0	0	
	17+50	312	516	35	16	35	16	35	1	35	0	0	
	18+00	313	516	35	16	35	16	35	1	35	0	0	
	18+50	314	516	35	16	35	16	35	1	35	0	0	
	19+00	315	516	35	16	35	16	35	1	35	0	0	
	19+50	316	516	35	16	35	16	35	1	35	0	0	
	20+00	317	516	35	16	35	16	35	1	35	0	0	
	20+50	318	516	35	16	35	16	35	1	35	0	0	

	21+00	319	516	35	16	35	16	35	1	35	0	0
	21+50	320	516	35	16	35	16	35	1	35	0	0
	22+00	321	516	35	16	35	16	35	1	35	0	0
	22+50	376	516	35	16	35	16	35	1	35	0	0
	23+00	322										
EB Outside Left Turn Lane	17+50	323	0	0	0	0	0	0	0	0	0	0
	18+00	324	0	0	0	0	0	0	0	0	0	0
	18+50	325	0	0	0	0	0	0	0	0	0	0
	19+00	326	0	0	0	0	0	0	0	0	0	0
	19+50	327	0	0	0	0	0	0	0	0	0	0
	20+00	328	0	0	0	0	0	0	0	0	0	0
	20+50	329	0	0	0	0	0	0	0	0	0	0
	21+00	330	0	0	0	0	0	0	0	0	0	0
	21+50	331	0	0	0	0	0	0	0	0	0	0
	22+00	332	0	0	0	0	0	0	0	0	0	0
	22+50	333	0	0	0	0	0	0	0	0	0	0
	23+00	334										
EB - Inside Left Turn Lane	19+50	335	0	0	0	0	0	0	0	0	0	0
	20+00	336	0	0	0	0	0	0	0	0	0	0
	20+50	337	0	0	0	0	0	0	0	0	0	0
	21+00	338	0	0	0	0	0	0	0	0	0	0
	21+50	339	0	0	0	0	0	0	0	0	0	0
	22+00	340	0	0	0	0	0	0	0	0	0	0
	22+50	341	0	0	0	0	0	0	0	0	0	0
	23+00	342										
WB Thru Lane	23+00	343	436	35	16	35	20	35	4	35	0	0
	22+50	344	436	35	16	35	20	35	4	35	0	0
	22+00	345	436	35	16	35	20	35	4	35	0	0
	21+50	346	436	35	16	35	20	35	4	35	0	0
	21+00	347	436	35	16	35	20	35	4	35	0	0
	20+50	348	436	35	16	35	20	35	4	35	0	0
	20+00	349	436	35	16	35	20	35	4	35	0	0
	19+50	350	436	35	16	35	20	35	4	35	0	0
	19+00	351	436	35	16	35	20	35	4	35	0	0
	18+50	352	436	35	16	35	20	35	4	35	0	0
	18+00	353	436	35	16	35	20	35	4	35	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes **SR 202 Bridge**

	17+50	354	436	35	16	35	20	35	4	35	0	0
	17+00	355	436	35	16	35	20	35	4	35	0	0
	16+50	356	436	35	16	35	20	35	4	35	0	0
	16+00	357	436	35	16	35	20	35	4	35	0	0
	15+50	358	436	35	16	35	20	35	4	35	0	0
	15+00	359	436	35	16	35	20	35	4	35	0	0
	14+50	360	436	35	16	35	20	35	4	35	0	0
	14+00	361	436	35	16	35	20	35	4	35	0	0
	13+50	362	436	35	16	35	20	35	4	35	0	0
	13+00	363	436	35	16	35	20	35	4	35	0	0
	12+50	364	436	35	16	35	20	35	4	35	0	0
	12+00	365	436	35	16	35	20	35	4	35	0	0
	11+50	366	436	35	16	35	20	35	4	35	0	0
	11+00	367	436	35	16	35	20	35	4	35	0	0
	10+50	377										
WB - Right Turn Lane	13+00	369	0	0	0	0	0	0	0	0	0	0
	12+50	370	0	0	0	0	0	0	0	0	0	0
	12+00	371	0	0	0	0	0	0	0	0	0	0
	11+50	372	0	0	0	0	0	0	0	0	0	0
	11+00	373	0	0	0	0	0	0	0	0	0	0
	10+50	378										

AECOM
Linda Howard

16 June 2011
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SR 202 Bridge
RUN: Existing 2011, Val-Site1-2
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	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
V-1	1	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
V-2	6	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R-1	22	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-2	25	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-3	26	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-4	27	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-5	29	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R-6	30	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R-7	31	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-8	32	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-9	33	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-10	34	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	12	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

AECOM 16 June 2011
Linda Howard TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: SR 202 Bridge
RUN: Existing 2011, Val-Site1-3

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
EB Thru Lane	10+50	375	564	35	48	35	20	35	4	35	0	0
	point298	298	564	35	48	35	20	35	4	35	0	0
	11+00	299	564	35	48	35	20	35	4	35	0	0
	11+50	300	564	35	48	35	20	35	4	35	0	0
	12+00	301	564	35	48	35	20	35	4	35	0	0
	point379	379	564	35	48	35	20	35	4	35	0	0
	12+50	302	564	35	48	35	20	35	4	35	0	0
	13+00	303	564	35	48	35	20	35	4	35	0	0
	13+50	304	564	35	48	35	20	35	4	35	0	0
	14+00	305	564	35	48	35	20	35	4	35	0	0
	14+50	306	564	35	48	35	20	35	4	35	0	0
	15+00	307	564	35	48	35	20	35	4	35	0	0
	15+50	308	564	35	48	35	20	35	4	35	0	0
	16+00	309	564	35	48	35	20	35	4	35	0	0
	16+50	310	564	35	48	35	20	35	4	35	0	0
	17+00	311	564	35	48	35	20	35	4	35	0	0
	17+50	312	564	35	48	35	20	35	4	35	0	0
	18+00	313	564	35	48	35	20	35	4	35	0	0
	18+50	314	564	35	48	35	20	35	4	35	0	0
	19+00	315	564	35	48	35	20	35	4	35	0	0
	19+50	316	564	35	48	35	20	35	4	35	0	0
	20+00	317	564	35	48	35	20	35	4	35	0	0
	20+50	318	564	35	48	35	20	35	4	35	0	0

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	21+00	319	564	35	48	35	20	35	4	35	0	0
	21+50	320	564	35	48	35	20	35	4	35	0	0
	22+00	321	564	35	48	35	20	35	4	35	0	0
	22+50	376	564	35	48	35	20	35	4	35	0	0
	23+00	322										
EB Outside Left Turn Lane	17+50	323	0	0	0	0	0	0	0	0	0	0
	18+00	324	0	0	0	0	0	0	0	0	0	0
	18+50	325	0	0	0	0	0	0	0	0	0	0
	19+00	326	0	0	0	0	0	0	0	0	0	0
	19+50	327	0	0	0	0	0	0	0	0	0	0
	20+00	328	0	0	0	0	0	0	0	0	0	0
	20+50	329	0	0	0	0	0	0	0	0	0	0
	21+00	330	0	0	0	0	0	0	0	0	0	0
	21+50	331	0	0	0	0	0	0	0	0	0	0
	22+00	332	0	0	0	0	0	0	0	0	0	0
	22+50	333	0	0	0	0	0	0	0	0	0	0
	23+00	334										
EB - Inside Left Turn Lane	19+50	335	0	0	0	0	0	0	0	0	0	0
	20+00	336	0	0	0	0	0	0	0	0	0	0
	20+50	337	0	0	0	0	0	0	0	0	0	0
	21+00	338	0	0	0	0	0	0	0	0	0	0
	21+50	339	0	0	0	0	0	0	0	0	0	0
	22+00	340	0	0	0	0	0	0	0	0	0	0
	22+50	341	0	0	0	0	0	0	0	0	0	0
	23+00	342										
WB Thru Lane	23+00	343	500	35	28	35	12	35	4	35	0	0
	22+50	344	500	35	28	35	12	35	4	35	0	0
	22+00	345	500	35	28	35	12	35	4	35	0	0
	21+50	346	500	35	28	35	12	35	4	35	0	0
	21+00	347	500	35	28	35	12	35	4	35	0	0
	20+50	348	500	35	28	35	12	35	4	35	0	0
	20+00	349	500	35	28	35	12	35	4	35	0	0
	19+50	350	500	35	28	35	12	35	4	35	0	0
	19+00	351	500	35	28	35	12	35	4	35	0	0
	18+50	352	500	35	28	35	12	35	4	35	0	0
	18+00	353	500	35	28	35	12	35	4	35	0	0

	17+50	354	500	35	28	35	12	35	4	35	0	0
	17+00	355	500	35	28	35	12	35	4	35	0	0
	16+50	356	500	35	28	35	12	35	4	35	0	0
	16+00	357	500	35	28	35	12	35	4	35	0	0
	15+50	358	500	35	28	35	12	35	4	35	0	0
	15+00	359	500	35	28	35	12	35	4	35	0	0
	14+50	360	500	35	28	35	12	35	4	35	0	0
	14+00	361	500	35	28	35	12	35	4	35	0	0
	13+50	362	500	35	28	35	12	35	4	35	0	0
	13+00	363	500	35	28	35	12	35	4	35	0	0
	12+50	364	500	35	28	35	12	35	4	35	0	0
	12+00	365	500	35	28	35	12	35	4	35	0	0
	11+50	366	500	35	28	35	12	35	4	35	0	0
	11+00	367	500	35	28	35	12	35	4	35	0	0
	10+50	377										
WB - Right Turn Lane	13+00	369	0	0	0	0	0	0	0	0	0	0
	12+50	370	0	0	0	0	0	0	0	0	0	0
	12+00	371	0	0	0	0	0	0	0	0	0	0
	11+50	372	0	0	0	0	0	0	0	0	0	0
	11+00	373	0	0	0	0	0	0	0	0	0	0
	10+50	378										

EXHIBIT 13
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AECOM
Linda Howard

16 June 2011
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SR 202 Bridge
RUN: Existing 2011, Val-Site1-3
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 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
V-1	1	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
V-2	6	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R-1	22	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-2	25	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-3	26	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-4	27	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-5	29	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R-6	30	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R-7	31	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-8	32	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-9	33	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0
R-10	34	1	0.0	0.0	71	0.0	10	inactive	0.0	0.0	8	0.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	12	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

AECOM 16 June 2011
Linda Howard TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: SR 202 Bridge
RUN: Existing 2011

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
EB Thru Lane	10+50	375	903	35	78	35	0	0	0	0	0	0
	point298	298	903	35	78	35	0	0	0	0	0	0
	11+00	299	903	35	78	35	0	0	0	0	0	0
	11+50	300	903	35	78	35	0	0	0	0	0	0
	12+00	301	903	35	78	35	0	0	0	0	0	0
	point379	379	903	35	78	35	0	0	0	0	0	0
	12+50	302	903	35	78	35	0	0	0	0	0	0
	13+00	303	903	35	78	35	0	0	0	0	0	0
	13+50	304	903	35	78	35	0	0	0	0	0	0
	14+00	305	903	35	78	35	0	0	0	0	0	0
	14+50	306	903	35	78	35	0	0	0	0	0	0
	15+00	307	903	35	78	35	0	0	0	0	0	0
	15+50	308	903	35	78	35	0	0	0	0	0	0
	16+00	309	903	35	78	35	0	0	0	0	0	0
	16+50	310	903	35	78	35	0	0	0	0	0	0
	17+00	311	903	35	78	35	0	0	0	0	0	0
	17+50	312	903	35	78	35	0	0	0	0	0	0
	18+00	313	903	35	78	35	0	0	0	0	0	0
	18+50	314	903	35	78	35	0	0	0	0	0	0
	19+00	315	903	35	78	35	0	0	0	0	0	0
	19+50	316	903	35	78	35	0	0	0	0	0	0
	20+00	317	903	35	78	35	0	0	0	0	0	0
	20+50	318	903	35	78	35	0	0	0	0	0	0

	21+00	319	903	35	78	35	0	0	0	0	0	0
	21+50	320	903	35	78	35	0	0	0	0	0	0
	22+00	321	903	35	78	35	0	0	0	0	0	0
	22+50	376	903	35	78	35	0	0	0	0	0	0
	23+00	322										
EB Outside Left Turn Lane	17+50	323	0	0	0	0	0	0	0	0	0	0
	18+00	324	0	0	0	0	0	0	0	0	0	0
	18+50	325	0	0	0	0	0	0	0	0	0	0
	19+00	326	0	0	0	0	0	0	0	0	0	0
	19+50	327	0	0	0	0	0	0	0	0	0	0
	20+00	328	0	0	0	0	0	0	0	0	0	0
	20+50	329	0	0	0	0	0	0	0	0	0	0
	21+00	330	0	0	0	0	0	0	0	0	0	0
	21+50	331	0	0	0	0	0	0	0	0	0	0
	22+00	332	0	0	0	0	0	0	0	0	0	0
	22+50	333	0	0	0	0	0	0	0	0	0	0
	23+00	334										
EB - Inside Left Turn Lane	19+50	335	0	0	0	0	0	0	0	0	0	0
	20+00	336	0	0	0	0	0	0	0	0	0	0
	20+50	337	0	0	0	0	0	0	0	0	0	0
	21+00	338	0	0	0	0	0	0	0	0	0	0
	21+50	339	0	0	0	0	0	0	0	0	0	0
	22+00	340	0	0	0	0	0	0	0	0	0	0
	22+50	341	0	0	0	0	0	0	0	0	0	0
	23+00	342										
WB Thru Lane	23+00	343	493	35	33	35	16	35	5	35	0	0
	22+50	344	493	35	33	35	16	35	5	35	0	0
	22+00	345	493	35	33	35	16	35	5	35	0	0
	21+50	346	493	35	33	35	16	35	5	35	0	0
	21+00	347	493	35	33	35	16	35	5	35	0	0
	20+50	348	493	35	33	35	16	35	5	35	0	0
	20+00	349	493	35	33	35	16	35	5	35	0	0
	19+50	350	493	35	33	35	16	35	5	35	0	0
	19+00	351	493	35	33	35	16	35	5	35	0	0
	18+50	352	493	35	33	35	16	35	5	35	0	0
	18+00	353	493	35	33	35	16	35	5	35	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes **SR 202 Bridge**

	17+50	354	493	35	33	35	16	35	5	35	0	0
	17+00	355	493	35	33	35	16	35	5	35	0	0
	16+50	356	493	35	33	35	16	35	5	35	0	0
	16+00	357	493	35	33	35	16	35	5	35	0	0
	15+50	358	493	35	33	35	16	35	5	35	0	0
	15+00	359	493	35	33	35	16	35	5	35	0	0
	14+50	360	493	35	33	35	16	35	5	35	0	0
	14+00	361	493	35	33	35	16	35	5	35	0	0
	13+50	362	493	35	33	35	16	35	5	35	0	0
	13+00	363	493	35	33	35	16	35	5	35	0	0
	12+50	364	493	35	33	35	16	35	5	35	0	0
	12+00	365	493	35	33	35	16	35	5	35	0	0
	11+50	366	493	35	33	35	16	35	5	35	0	0
	11+00	367	493	35	33	35	16	35	5	35	0	0
	10+50	377										
WB - Right Turn Lane	13+00	369	0	0	0	0	0	0	0	0	0	0
	12+50	370	0	0	0	0	0	0	0	0	0	0
	12+00	371	0	0	0	0	0	0	0	0	0	0
	11+50	372	0	0	0	0	0	0	0	0	0	0
	11+00	373	0	0	0	0	0	0	0	0	0	0
	10+50	378										

EXHIBIT 13
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AECOM
Linda Howard

16 June 2011
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SR 202 Bridge
RUN: Existing 2011
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	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
V-1	1	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
V-2	6	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R-1	22	1	0.0	67.2	71	67.2	10	----	67.2	0.0	8	-8.0
R-2	25	1	0.0	62.2	71	62.2	10	----	62.2	0.0	8	-8.0
R-3	26	1	0.0	67.0	71	67.0	10	----	67.0	0.0	8	-8.0
R-4	27	1	0.0	53.7	71	53.7	10	----	53.7	0.0	8	-8.0
R-5	29	1	0.0	55.5	66	55.5	10	----	55.5	0.0	8	-8.0
R-6	30	1	0.0	53.3	66	53.3	10	----	53.3	0.0	8	-8.0
R-7	31	1	0.0	61.3	71	61.3	10	----	61.3	0.0	8	-8.0
R-8	32	1	0.0	57.3	71	57.3	10	----	57.3	0.0	8	-8.0
R-9	33	1	0.0	66.5	71	66.5	10	----	66.5	0.0	8	-8.0
R-10	34	1	0.0	61.5	71	61.5	10	----	61.5	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	12	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

EXHIBIT 13
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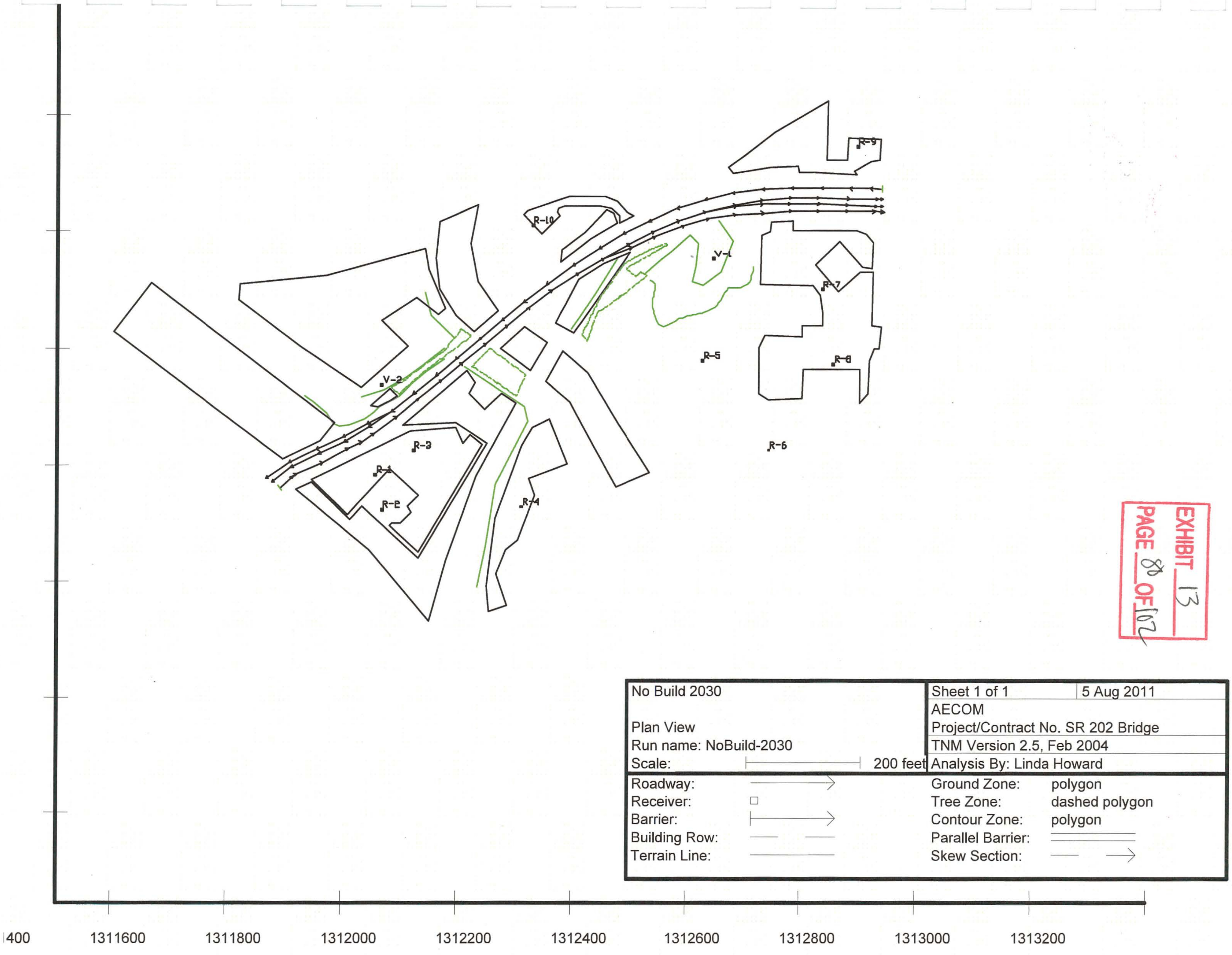

No Build 2030	Sheet 1 of 1 — 5 Aug 2011
	AECOM
Plan View	Project/Contract No. SR 202 Bridge
Run name: NoBuild-2030	TNM Version 2.5, Feb 2004
Scale: 200 feet	Analysis By: Linda Howard

Roadway:	→	Ground Zone:	polygon
Receiver:	□	Tree Zone:	dashed polygon
Barrier:	⊢→	Contour Zone:	polygon
Building Row:	— —	Parallel Barrier:	═
Terrain Line:	—	Skew Section:	— →

AECOM
Linda Howard

16 June 2011
TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: SR 202 Bridge
RUN: No Build 2030

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
EB Thru Lane	10+50	375	1211	35	105	35	0	0	0	0	0	0
	point298	298	1211	35	105	35	0	0	0	0	0	0
	11+00	299	1211	35	105	35	0	0	0	0	0	0
	11+50	300	1211	35	105	35	0	0	0	0	0	0
	12+00	301	1211	35	105	35	0	0	0	0	0	0
	point379	379	1211	35	105	35	0	0	0	0	0	0
	12+50	302	1211	35	105	35	0	0	0	0	0	0
	13+00	303	1211	35	105	35	0	0	0	0	0	0
	13+50	304	1211	35	105	35	0	0	0	0	0	0
	14+00	305	1211	35	105	35	0	0	0	0	0	0
	14+50	306	1211	35	105	35	0	0	0	0	0	0
	15+00	307	1211	35	105	35	0	0	0	0	0	0
	15+50	308	1211	35	105	35	0	0	0	0	0	0
	16+00	309	1211	35	105	35	0	0	0	0	0	0
	16+50	310	1211	35	105	35	0	0	0	0	0	0
	17+00	311	1211	35	105	35	0	0	0	0	0	0
	17+50	312	1211	35	105	35	0	0	0	0	0	0
	18+00	313	1211	35	105	35	0	0	0	0	0	0
	18+50	314	1211	35	105	35	0	0	0	0	0	0
	19+00	315	1211	35	105	35	0	0	0	0	0	0
	19+50	316	1211	35	105	35	0	0	0	0	0	0
	20+00	317	1211	35	105	35	0	0	0	0	0	0
	20+50	318	1211	35	105	35	0	0	0	0	0	0

EXHIBIT 13
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INPUT: TRAFFIC FOR LAeq1h Volumes **SR 202 Bridge**

	21+00	319	1211	35	105	35	0	0	0	0	0	0
	21+50	320	1211	35	105	35	0	0	0	0	0	0
	22+00	321	1211	35	105	35	0	0	0	0	0	0
	22+50	376	1211	35	105	35	0	0	0	0	0	0
	23+00	322										
EB Outside Left Turn Lane	17+50	323	0	0	0	0	0	0	0	0	0	0
	18+00	324	0	0	0	0	0	0	0	0	0	0
	18+50	325	0	0	0	0	0	0	0	0	0	0
	19+00	326	0	0	0	0	0	0	0	0	0	0
	19+50	327	0	0	0	0	0	0	0	0	0	0
	20+00	328	0	0	0	0	0	0	0	0	0	0
	20+50	329	0	0	0	0	0	0	0	0	0	0
	21+00	330	0	0	0	0	0	0	0	0	0	0
	21+50	331	0	0	0	0	0	0	0	0	0	0
	22+00	332	0	0	0	0	0	0	0	0	0	0
	22+50	333	0	0	0	0	0	0	0	0	0	0
	23+00	334										
EB - Inside Left Turn Lane	19+50	335	0	0	0	0	0	0	0	0	0	0
	20+00	336	0	0	0	0	0	0	0	0	0	0
	20+50	337	0	0	0	0	0	0	0	0	0	0
	21+00	338	0	0	0	0	0	0	0	0	0	0
	21+50	339	0	0	0	0	0	0	0	0	0	0
	22+00	340	0	0	0	0	0	0	0	0	0	0
	22+50	341	0	0	0	0	0	0	0	0	0	0
	23+00	342										
WB Thru Lane	23+00	343	613	35	41	35	20	35	7	35	0	0
	22+50	344	613	35	41	35	20	35	7	35	0	0
	22+00	345	613	35	41	35	20	35	7	35	0	0
	21+50	346	613	35	41	35	20	35	7	35	0	0
	21+00	347	613	35	41	35	20	35	7	35	0	0
	20+50	348	613	35	41	35	20	35	7	35	0	0
	20+00	349	613	35	41	35	20	35	7	35	0	0
	19+50	350	613	35	41	35	20	35	7	35	0	0
	19+00	351	613	35	41	35	20	35	7	35	0	0
	18+50	352	613	35	41	35	20	35	7	35	0	0
	18+00	353	613	35	41	35	20	35	7	35	0	0

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	17+50	354	613	35	41	35	20	35	7	35	0	0
	17+00	355	613	35	41	35	20	35	7	35	0	0
	16+50	356	613	35	41	35	20	35	7	35	0	0
	16+00	357	613	35	41	35	20	35	7	35	0	0
	15+50	358	613	35	41	35	20	35	7	35	0	0
	15+00	359	613	35	41	35	20	35	7	35	0	0
	14+50	360	613	35	41	35	20	35	7	35	0	0
	14+00	361	613	35	41	35	20	35	7	35	0	0
	13+50	362	613	35	41	35	20	35	7	35	0	0
	13+00	363	613	35	41	35	20	35	7	35	0	0
	12+50	364	613	35	41	35	20	35	7	35	0	0
	12+00	365	613	35	41	35	20	35	7	35	0	0
	11+50	366	613	35	41	35	20	35	7	35	0	0
	11+00	367	613	35	41	35	20	35	7	35	0	0
	10+50	377										
WB - Right Turn Lane	13+00	369	0	0	0	0	0	0	0	0	0	0
	12+50	370	0	0	0	0	0	0	0	0	0	0
	12+00	371	0	0	0	0	0	0	0	0	0	0
	11+50	372	0	0	0	0	0	0	0	0	0	0
	11+00	373	0	0	0	0	0	0	0	0	0	0
	10+50	378										

AECOM
Linda Howard

16 June 2011
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SR 202 Bridge
RUN: No Build 2030
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
V-1	1	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
V-2	6	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R-1	22	1	67.2	68.4	71	1.2	10	----	68.4	0.0	8	-8.0
R-2	25	1	62.2	63.4	71	1.2	10	----	63.4	0.0	8	-8.0
R-3	26	1	67.0	68.2	71	1.2	10	----	68.2	0.0	8	-8.0
R-4	27	1	53.7	54.8	71	1.1	10	----	54.8	0.0	8	-8.0
R-5	29	1	55.5	56.6	66	1.1	10	----	56.6	0.0	8	-8.0
R-6	30	1	53.3	54.4	66	1.1	10	----	54.4	0.0	8	-8.0
R-7	31	1	61.3	62.3	71	1.0	10	----	62.3	0.0	8	-8.0
R-8	32	1	57.3	58.3	71	1.0	10	----	58.3	0.0	8	-8.0
R-9	33	1	66.5	67.5	71	1.0	10	----	67.5	0.0	8	-8.0
R-10	34	1	61.5	62.6	71	1.1	10	----	62.6	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	12	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

EXHIBIT 13
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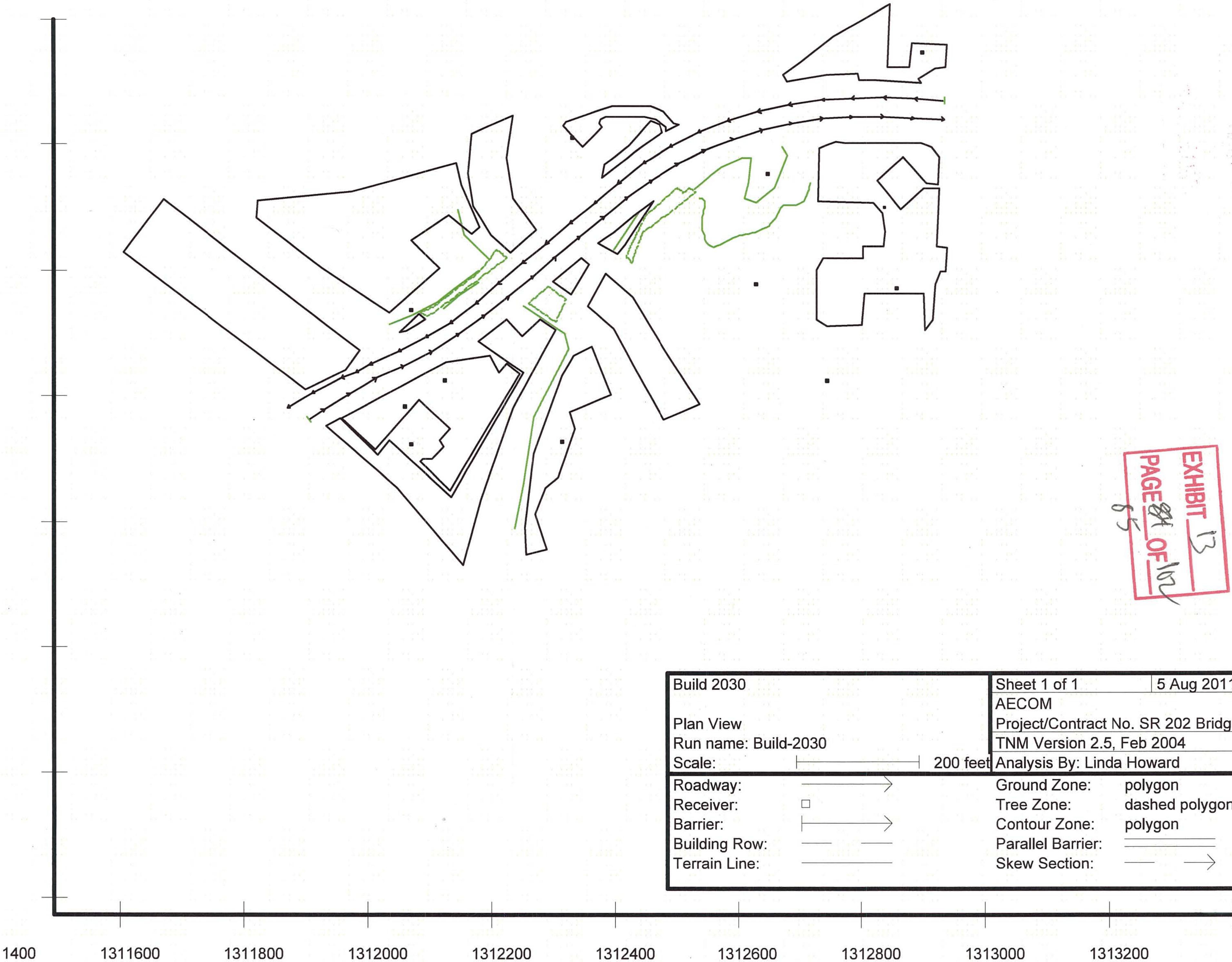

EXHIBIT 13
PAGE 85 OF 102

Build 2030 Plan View Run name: Build-2030 Scale: 200 feet	Sheet 1 of 1 · 5 Aug 2011 AECOM Project/Contract No. SR 202 Bridge TNM Version 2.5, Feb 2004 Analysis By: Linda Howard
Roadway: Receiver: Barrier: Building Row: Terrain Line:	Ground Zone: polygon Tree Zone: dashed polygon Contour Zone: polygon Parallel Barrier: Skew Section:

AECOM
Linda Howard

16 June 2011
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: SR 202 Bridge
RUN: Build 2030

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

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
EB Lane	30.0	10+50	380	1,311,702.6	277,564.6	45.80	Signal	0.00	100	Average	
		11+00	381	1,311,727.9	277,580.0	42.90				Average	
		11+50	382	1,311,769.5	277,605.2	41.50				Average	
		12+00	383	1,311,811.5	277,629.8	40.60				Average	
		12+50	384	1,311,856.6	277,650.5	40.60				Average	
		13+00	386	1,311,902.2	277,673.3	40.80				Average	
		13+50	387	1,311,946.2	277,701.7	41.20				Average	
		14+00	389	1,311,988.0	277,730.6	41.60				Average	
		14+50	437	1,312,026.8	277,761.3	42.70				Average	Y
		15+00	438	1,312,066.4	277,794.2	43.40				Average	Y
		15+50	435	1,312,103.0	277,824.2	44.20				Average	Y
		16+00	439	1,312,141.9	277,856.4	44.90				Average	Y
		16+50	391	1,312,180.8	277,888.5	45.30					
WB Lane	29.0	22+50	473	1,312,732.6	278,072.0	36.80	Signal	0.00	100	Average	
		22+00	449	1,312,683.8	278,074.5	37.20				Average	
		21+50	406	1,312,634.9	278,076.5	38.20				Average	
		21+00	451	1,312,582.1	278,076.2	39.70				Average	
		20+50	452	1,312,533.0	278,073.2	41.40				Average	
		20+00	454	1,312,480.6	278,065.3	43.50				Average	
		19+50	411	1,312,430.4	278,054.3	44.80				Average	
		19+00	455	1,312,381.4	278,039.4	45.80				Average	
		18+50	414	1,312,333.5	278,020.7	46.70				Average	
		18+00	415	1,312,287.5	277,999.0	47.00				Average	
		17+50	417	1,312,243.8	277,972.1	46.90				Average	
		17+00	459	1,312,203.0	277,940.5	46.40				Average	

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		16+50	420	1,312,164.2	277,908.5	45.30				Average	
		16+00	461	1,312,125.2	277,876.4	44.90				Average	Y
		15+50	460	1,312,086.4	277,844.5	44.20				Average	Y
		15+00	465	1,312,048.8	277,813.5	43.40				Average	Y
		14+50	466	1,312,009.0	277,780.5	42.70				Average	Y
		14+00	422	1,311,972.1	277,749.8	41.60				Average	
		13+50	424	1,311,930.6	277,718.5	41.20				Average	
		13+00	468	1,311,891.5	277,694.7	40.80				Average	
		12+50	469	1,311,847.2	277,672.3	40.60				Average	
		12+00	428	1,311,800.2	277,651.3	40.60				Average	
		point475	475	1,311,778.0	277,639.4	41.05					
EB Lane-2	42.0	16+50	474	1,312,180.8	277,888.5	45.30				Average	
		17+00	440	1,312,219.4	277,918.4	46.40				Average	
		17+50	442	1,312,258.8	277,946.6	46.90				Average	
		18+00	394	1,312,301.5	277,972.4	47.00				Average	
		18+50	443	1,312,345.9	277,993.6	46.70				Average	
		19+00	444	1,312,391.4	278,011.5	45.80				Average	
		19+50	398	1,312,438.4	278,025.6	44.80				Average	
		20+00	399	1,312,486.0	278,036.3	43.50				Average	
		20+50	445	1,312,536.1	278,043.3	41.40				Average	
		21+00	447	1,312,583.5	278,046.6	39.70				Average	
		21+50	403	1,312,633.6	278,046.7	38.20				Average	
		22+00	448	1,312,683.2	278,044.3	37.20				Average	
		22+50	472	1,312,732.6	278,042.3	36.80					
WB Lane-2	40.0	11+88	476	1,311,778.0	277,639.4	41.05				Average	
		11+50	432	1,311,755.6	277,630.2	41.50				Average	
		11+00	471	1,311,707.2	277,605.4	42.90				Average	
		10+50	429	1,311,667.1	277,583.1	45.80					

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AECOM 16 June 2011
Linda Howard TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: SR 202 Bridge
RUN: Build 2030

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
EB Lane	10+50	380	956	35	83	35	0	0	0	0	0	0
	11+00	381	956	35	83	35	0	0	0	0	0	0
	11+50	382	956	35	83	35	0	0	0	0	0	0
	12+00	383	956	35	83	35	0	0	0	0	0	0
	12+50	384	956	35	83	35	0	0	0	0	0	0
	13+00	386	956	35	83	35	0	0	0	0	0	0
	13+50	387	956	35	83	35	0	0	0	0	0	0
	14+00	389	956	35	83	35	0	0	0	0	0	0
	14+50	437	956	35	83	35	0	0	0	0	0	0
	15+00	438	956	35	83	35	0	0	0	0	0	0
	15+50	435	956	35	83	35	0	0	0	0	0	0
	16+00	439	956	35	83	35	0	0	0	0	0	0
	16+50	391										
WB Lane	22+50	473	1628	35	109	35	54	35	18	35	0	0
	22+00	449	1628	35	109	35	54	35	18	35	0	0
	21+50	406	1628	35	109	35	54	35	18	35	0	0
	21+00	451	1628	35	109	35	54	35	18	35	0	0
	20+50	452	1628	35	109	35	54	35	18	35	0	0
	20+00	454	1628	35	109	35	54	35	18	35	0	0
	19+50	411	1628	35	109	35	54	35	18	35	0	0
	19+00	455	1628	35	109	35	54	35	18	35	0	0
	18+50	414	1628	35	109	35	54	35	18	35	0	0
	18+00	415	1628	35	109	35	54	35	18	35	0	0

	17+50	417	1628	35	109	35	54	35	18	35	0	0
	17+00	459	1628	35	109	35	54	35	18	35	0	0
	16+50	420	1628	35	109	35	54	35	18	35	0	0
	16+00	461	1628	35	109	35	54	35	18	35	0	0
	15+50	460	1628	35	109	35	54	35	18	35	0	0
	15+00	465	1628	35	109	35	54	35	18	35	0	0
	14+50	466	1628	35	109	35	54	35	18	35	0	0
	14+00	422	1628	35	109	35	54	35	18	35	0	0
	13+50	424	1628	35	109	35	54	35	18	35	0	0
	13+00	468	1628	35	109	35	54	35	18	35	0	0
	12+50	469	1628	35	109	35	54	35	18	35	0	0
	12+00	428	1628	35	109	35	54	35	18	35	0	0
	point475	475										
EB Lane-2	16+50	474	935	35	67	35	30	35	7	35	0	0
	17+00	440	935	35	67	35	30	35	7	35	0	0
	17+50	442	935	35	67	35	30	35	7	35	0	0
	18+00	394	935	35	67	35	30	35	7	35	0	0
	18+50	443	935	35	67	35	30	35	7	35	0	0
	19+00	444	935	35	67	35	30	35	7	35	0	0
	19+50	398	935	35	67	35	30	35	7	35	0	0
	20+00	399	935	35	67	35	30	35	7	35	0	0
	20+50	445	935	35	67	35	30	35	7	35	0	0
	21+00	447	935	35	67	35	30	35	7	35	0	0
	21+50	403	935	35	67	35	30	35	7	35	0	0
	22+00	448	935	35	67	35	30	35	7	35	0	0
	22+50	472										
WB Lane-2	11+88	476	1675	35	40	35	80	35	13	35	0	0
	11+50	432	1675	35	40	35	80	35	13	35	0	0
	11+00	471	1675	35	40	35	80	35	13	35	0	0
	10+50	429										

AECOM 16 June 2011
Linda Howard TNM 2.5

INPUT: GROUND ZONES
PROJECT/CONTRACT: SR 202 Bridge
RUN: Build 2030

Ground Zone			Points		
Name	Type	Flow Resistivity	No.	Coordinates X	Coordinates Y
		cgs rayls		ft	ft
Ground Zone1	Field	150	9	1,311,881.5	277,733.0
			10	1,311,848.8	277,704.2
			11	1,311,861.0	277,706.6
			12	1,311,875.4	277,714.6
			13	1,311,891.4	277,724.9
Ground Zone2	Pavement	20000	14	1,311,755.2	277,566.9
			15	1,311,808.9	277,515.4
			16	1,311,881.6	277,595.8
			17	1,311,931.6	277,548.9
			18	1,311,914.4	277,529.6
			19	1,311,919.8	277,520.8
			20	1,311,900.9	277,501.9
			21	1,311,887.4	277,501.5
			22	1,311,882.8	277,496.9
			23	1,311,931.6	277,450.7
			24	1,312,043.4	277,636.7
			25	1,312,021.8	277,654.3
			26	1,312,009.9	277,639.7
			27	1,311,996.4	277,665.5
			28	1,311,924.0	277,654.8
Ground Zone3	Hard Soil	5000	29	1,311,752.9	277,565.9
			30	1,311,729.9	277,552.7
			31	1,311,846.2	277,454.5

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			32	1,311,952.2	277,332.4
			33	1,311,981.2	277,436.4
			34	1,312,033.0	277,581.8
			35	1,312,102.1	277,707.2
			44	1,312,076.4	277,723.8
			43	1,312,046.9	277,697.8
			46	1,312,023.6	277,724.2
			37	1,311,976.2	277,688.3
			38	1,311,996.8	277,674.2
			39	1,312,050.4	277,639.9
			40	1,311,932.1	277,440.3
			41	1,311,833.4	277,530.8
			42	1,311,813.2	277,507.5
Ground Zone10	Pavement	20000	47	1,312,557.9	278,005.6
			48	1,312,544.6	278,002.1
			49	1,312,529.4	277,995.1
			50	1,312,527.6	277,912.5
			51	1,312,618.1	277,910.7
			52	1,312,632.5	277,892.8
			53	1,312,636.4	277,865.2
			54	1,312,634.8	277,841.2
			55	1,312,600.6	277,841.2
			56	1,312,600.1	277,822.4
			57	1,312,535.5	277,823.7
			58	1,312,525.0	277,804.0
			59	1,312,525.8	277,725.4
			60	1,312,542.8	277,715.1
			61	1,312,599.2	277,715.7
			62	1,312,603.0	277,765.6
			63	1,312,632.1	277,766.2
			64	1,312,667.4	277,766.2
			65	1,312,699.6	277,765.6
			66	1,312,700.2	277,708.3
			67	1,312,714.2	277,724.0
			68	1,312,717.8	277,781.8
			69	1,312,726.1	277,801.4

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			70	1,312,734.4	277,801.0
			71	1,312,737.0	277,839.5
			72	1,312,720.4	277,842.1
			73	1,312,723.2	277,932.7
			74	1,312,699.6	277,933.9
			75	1,312,661.9	277,900.5
			76	1,312,623.0	277,946.1
			77	1,312,665.0	277,984.4
			78	1,312,703.9	277,941.2
			79	1,312,722.2	277,940.0
			80	1,312,723.0	277,984.2
			81	1,312,710.8	277,998.6
			82	1,312,695.0	278,005.2
			83	1,312,584.4	278,004.7
			84	1,312,571.8	278,004.8
Ground Zone11	Pavement	20000	85	1,312,735.9	278,161.5
			86	1,312,679.0	278,161.9
			87	1,312,676.5	278,125.1
			88	1,312,641.0	278,126.0
			89	1,312,645.0	278,225.8
			90	1,312,553.0	278,174.2
			91	1,312,500.2	278,134.1
			92	1,312,471.6	278,113.7
			93	1,312,478.6	278,103.1
			94	1,312,543.2	278,113.3
			95	1,312,591.9	278,114.1
			96	1,312,594.8	278,103.5
			97	1,312,619.8	278,103.5
			98	1,312,693.8	278,099.8
			99	1,312,689.6	278,106.3
			100	1,312,718.6	278,123.5
			101	1,312,733.9	278,124.3
Ground Zone12	Water	20000	102	1,312,183.9	277,798.4
			103	1,312,153.6	277,746.2
			104	1,312,195.4	277,710.3
			105	1,312,233.0	277,642.0

			106	1,312,277.4	277,563.4
			107	1,312,335.5	277,588.2
			108	1,312,278.8	277,674.2
			109	1,312,226.4	277,760.8
Ground Zone13	Water	20000	110	1,312,156.1	277,812.8
			111	1,312,143.2	277,822.2
			112	1,312,098.0	277,785.1
			113	1,312,126.2	277,765.0
Ground Zone14	Water	20000	114	1,311,967.4	278,019.4
			115	1,311,960.6	277,957.1
			116	1,311,968.2	277,904.2
			117	1,311,997.4	277,858.9
			118	1,312,028.9	277,831.6
			119	1,312,070.8	277,866.6
			120	1,312,034.0	277,917.0
			121	1,312,022.9	277,981.0
			122	1,312,034.0	278,047.6
Ground Zone15	Pavement	20000	123	1,312,302.4	278,032.9
			124	1,312,294.0	278,036.1
			125	1,312,277.2	278,054.4
			126	1,312,256.4	278,062.3
			127	1,312,224.0	278,062.9
			128	1,312,193.9	278,062.9
			129	1,312,167.8	278,055.1
			130	1,312,119.6	278,037.1
			131	1,312,114.6	278,031.2
			132	1,312,146.1	277,997.5
			133	1,312,176.2	278,029.9
			134	1,312,172.6	278,036.1
			135	1,312,174.9	278,042.7
			136	1,312,184.0	278,045.9
			137	1,312,212.9	278,046.9
			138	1,312,246.9	278,045.9
			139	1,312,265.5	278,041.7
			140	1,312,280.6	278,029.6
			141	1,312,281.5	278,022.1

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Ground Zone16	Hard Soil	5000	142	1,312,276.2	278,021.0
			143	1,312,270.5	278,033.1
			144	1,312,257.4	278,039.8
			145	1,312,220.1	278,000.2
			146	1,312,181.8	277,971.0
			147	1,312,177.8	277,949.8
			148	1,312,229.4	277,990.1
Ground Zone17	Pavement	20000	149	1,312,191.4	277,602.7
			150	1,312,159.6	277,680.9
			151	1,312,130.6	277,666.9
			152	1,312,111.6	277,634.6
			153	1,312,066.1	277,509.8
			154	1,312,051.2	277,392.3
			155	1,312,054.6	277,348.5
			156	1,312,087.6	277,358.4
			157	1,312,068.6	277,413.0
			158	1,312,084.4	277,455.2
			159	1,312,106.6	277,471.7
			160	1,312,134.0	277,549.4
			161	1,312,124.0	277,577.6
Ground Zone18	Hard Soil	5000	162	1,311,785.4	277,674.4
			163	1,311,467.2	277,913.8
			164	1,311,403.0	277,831.9
			165	1,311,696.8	277,611.7
			166	1,311,761.8	277,643.8
Ground Zone19	Field	150	167	1,311,942.0	277,973.7
			168	1,311,772.0	277,927.8
			169	1,311,620.6	277,913.1
			170	1,311,618.6	277,884.8
			171	1,311,725.1	277,805.7
			172	1,311,832.6	277,735.3
			173	1,311,914.6	277,805.7
			174	1,311,868.8	277,850.6
			175	1,311,928.2	277,889.7
			176	1,311,965.4	277,860.3
			177	1,311,979.1	277,871.1

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			178	1,311,949.8	277,937.5
Ground Zone21	Hard Soil	5000	180	1,312,260.6	277,912.1
			181	1,312,237.0	277,896.0
			187	1,312,229.6	277,890.5
			182	1,312,195.0	277,863.4
			183	1,312,183.2	277,854.4
			184	1,312,171.2	277,845.1
			185	1,312,201.8	277,828.1
			186	1,312,213.9	277,844.6

AECOM 16 June 2011
Linda Howard TNM 2.5

INPUT: TERRAIN LINES
PROJECT/CONTRACT: SR 202 Bridge
RUN: Build 2030

Terrain Line Name	Points No.	Coordinates (ground) X ft	Y ft	Z ft
Terrain Line3	17	1,311,977.2	277,783.1	40.00
	18	1,311,944.9	277,761.9	40.00
	19	1,311,920.5	277,741.1	40.00
Terrain Line5	41	1,312,049.6	277,746.4	40.00
	42	1,312,115.8	277,702.3	40.00
	43	1,312,122.9	277,677.5	40.00
	44	1,312,066.9	277,568.7	40.00
	45	1,312,049.2	277,461.1	40.00
	46	1,312,034.9	277,391.3	40.00
Terrain Line6	47	1,311,976.4	277,801.0	35.00
	51	1,311,938.1	277,771.8	35.00
	48	1,311,909.8	277,752.5	35.00
	49	1,311,871.2	277,731.7	35.00
	50	1,311,832.9	277,717.3	35.00
Terrain Line7	52	1,311,992.5	277,820.3	30.00
	53	1,311,953.1	277,858.1	30.00
	54	1,311,942.6	277,896.9	30.00
Terrain Line11	69	1,312,405.5	277,981.0	45.00
	70	1,312,419.2	277,982.0	45.00
	71	1,312,414.6	277,942.0	45.00
	72	1,312,408.8	277,915.9	45.00
	73	1,312,426.8	277,910.7	45.00
	74	1,312,457.5	277,932.7	45.00
	75	1,312,478.4	277,986.1	45.00

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	76	1,312,468.8	277,998.8	45.00
Terrain Line12	77	1,312,327.5	277,931.3	45.00
	80	1,312,340.4	277,941.1	45.00
	81	1,312,354.5	277,953.5	45.00
	83	1,312,371.1	277,967.3	45.00
	82	1,312,405.5	277,981.0	45.00
Terrain Line13	84	1,312,515.1	277,940.8	40.00
	85	1,312,513.9	277,936.0	40.00
	86	1,312,512.8	277,931.1	40.00
	87	1,312,511.4	277,926.2	40.00
	88	1,312,509.8	277,921.6	40.00
	89	1,312,507.4	277,917.2	40.00
	90	1,312,504.1	277,913.2	40.00
	91	1,312,500.4	277,909.9	40.00
	92	1,312,496.0	277,907.4	40.00
	93	1,312,491.2	277,905.8	40.00
	94	1,312,486.2	277,905.2	40.00
	95	1,312,480.8	277,905.9	40.00
	96	1,312,475.5	277,906.5	40.00
	97	1,312,471.1	277,905.5	40.00
	98	1,312,467.9	277,902.4	40.00
	99	1,312,465.2	277,898.3	40.00
	100	1,312,462.9	277,893.6	40.00
	101	1,312,460.5	277,888.8	40.00
	102	1,312,457.9	277,884.4	40.00
	103	1,312,454.8	277,880.6	40.00
	104	1,312,451.1	277,876.9	40.00
	105	1,312,447.4	277,873.5	40.00
	106	1,312,443.4	277,870.4	40.00
	107	1,312,439.0	277,867.8	40.00
	108	1,312,434.6	277,865.8	40.00
	109	1,312,430.0	277,864.1	40.00
	110	1,312,425.1	277,862.7	40.00
	111	1,312,420.4	277,861.4	40.00
	112	1,312,415.4	277,860.3	40.00
	113	1,312,410.5	277,859.3	40.00

	114	1,312,405.5	277,858.3	40.00
	115	1,312,400.6	277,857.2	40.00
	116	1,312,395.8	277,856.0	40.00
	117	1,312,390.9	277,854.6	40.00
	118	1,312,386.2	277,852.9	40.00
	119	1,312,381.8	277,850.7	40.00
	120	1,312,377.5	277,848.1	40.00
	121	1,312,369.0	277,842.7	40.00
	122	1,312,363.8	277,840.8	40.00
	123	1,312,358.8	277,839.6	40.00
	124	1,312,354.5	277,841.0	40.00
	125	1,312,350.2	277,844.2	40.00
	126	1,312,347.0	277,848.3	40.00
	127	1,312,344.9	277,852.7	40.00
	128	1,312,343.2	277,857.4	40.00
	129	1,312,341.8	277,862.2	40.00
	130	1,312,340.8	277,867.2	40.00
	131	1,312,339.9	277,872.3	40.00
	132	1,312,339.5	277,877.3	40.00
	133	1,312,339.4	277,882.2	40.00
	134	1,312,340.0	277,887.2	40.00
	135	1,312,341.0	277,892.2	40.00
	136	1,312,342.1	277,897.2	40.00
	137	1,312,343.1	277,902.1	40.00
	138	1,312,343.8	277,907.0	40.00
	139	1,312,343.1	277,911.8	40.00
	140	1,312,340.1	277,916.0	40.00
	141	1,312,335.4	277,917.7	40.00
Terrain Line15	146	1,312,196.5	277,834.3	44.90
	152	1,312,211.1	277,856.5	45.30
	151	1,312,238.4	277,894.9	46.40

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TNM 2.5

INPUT: TREE ZONES
PROJECT/CONTRACT: SR 202 Bridge
RUN: Build 2030

Tree Zone		Points			
Name	Average Height	No.	Coordinates (ground)		
			X	Y	Z
	ft		ft	ft	ft
Tree Zone1	25.00	1	1,312,006.1	277,835.0	25.00
		6	1,311,977.9	277,799.4	32.50
		2	1,311,949.0	277,777.9	40.00
		7	1,311,917.5	277,755.4	40.00
		8	1,311,908.2	277,746.8	40.00
		3	1,311,883.6	277,734.8	40.00
		4	1,311,894.4	277,728.5	40.00
		9	1,311,934.0	277,756.3	40.00
		5	1,312,023.1	277,822.4	25.00
Tree Zone2	25.00	10	1,312,090.2	277,776.4	25.00
		11	1,312,118.2	277,756.2	25.00
		12	1,312,102.1	277,720.1	30.00
		13	1,312,057.6	277,750.0	30.00
Tree Zone4	25.00	14	1,312,216.0	277,825.0	32.00
		27	1,312,229.2	277,853.0	38.00
		15	1,312,248.0	277,890.3	40.00
		23	1,312,299.4	277,933.3	42.00
		17	1,312,309.5	277,925.7	42.00
		18	1,312,318.8	277,932.3	42.00
		19	1,312,329.9	277,926.5	40.00
		20	1,312,265.9	277,878.4	40.00
		21	1,312,243.1	277,863.7	40.00
		28	1,312,236.9	277,847.7	35.00
		22	1,312,225.2	277,815.2	32.00

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Linda Howard TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: SR 202 Bridge
RUN: Build 2030

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
V-1	1	1	1,312,445.8	277,955.5	45.00	4.92	0.00	66	10.0	8.0	
V-2	6	1	1,311,868.2	277,739.1	32.00	4.92	0.00	66	10.0	8.0	
R-1	22	1	1,311,857.6	277,584.7	42.00	4.92	67.20	71	10.0	8.0	Y
R-2	25	1	1,311,869.1	277,524.8	42.00	4.92	62.20	71	10.0	8.0	Y
R-3	26	1	1,311,923.4	277,626.2	40.00	4.92	67.00	71	10.0	8.0	Y
R-4	27	1	1,312,112.5	277,529.3	30.00	4.92	53.70	71	10.0	8.0	Y
R-5	29	1	1,312,427.5	277,780.8	30.00	4.92	55.50	66	10.0	8.0	Y
R-6	30	1	1,312,542.9	277,627.4	30.00	4.92	53.30	66	10.0	8.0	Y
R-7	31	1	1,312,635.1	277,903.1	38.00	4.92	61.30	71	10.0	8.0	Y
R-8	32	1	1,312,654.8	277,775.1	38.00	4.92	57.30	71	10.0	8.0	Y
R-9	33	1	1,312,696.2	278,147.7	34.00	4.92	66.50	71	10.0	8.0	Y
R-10	34	1	1,312,129.9	278,012.7	34.00	4.92	61.50	71	10.0	8.0	Y

V-1 Validation Site 1 in Wilmot Gateway Park
V-2 Validation Site 2 on Woodinville Water District Access
R-1 McRory's Restaurant entrance
R-2 McRory's Restaurant outdoor seating area
R-3 Mercury's Coffee Stand
R-4 Woodinville Landing Industrial Park Entrance
R-5 Wilmot Gateway Park Tot Lot
R-6 Wilmot Gateway Park Outdoor Ampitheatre Seating Area
R-7 Convenience Store - Gas Station
R-8 Jack-in-the-Box Entrance

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R-9 Elliot Tire Store											
R-10 King County Public Utility - Pump Station											

AECOM
Linda Howard

16 June 2011
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SR 202 Bridge
RUN: Build 2030
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
V-1	1	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
V-2	6	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
R-1	22	1	67.2	70.1	71	2.9	10	----	70.1	0.0	8	-8.0
R-2	25	1	62.2	66.4	71	4.2	10	----	66.4	0.0	8	-8.0
R-3	26	1	67.0	70.5	71	3.5	10	----	70.5	0.0	8	-8.0
R-4	27	1	53.7	57.4	71	3.7	10	----	57.4	0.0	8	-8.0
R-5	29	1	55.5	60.0	66	4.5	10	----	60.0	0.0	8	-8.0
R-6	30	1	53.3	57.2	66	3.9	10	----	57.2	0.0	8	-8.0
R-7	31	1	61.3	65.9	71	4.6	10	----	65.9	0.0	8	-8.0
R-8	32	1	57.3	60.9	71	3.6	10	----	60.9	0.0	8	-8.0
R-9	33	1	66.5	71.9	71	5.4	10	Snd Lvl	71.9	0.0	8	-8.0
R-10	34	1	61.5	64.5	71	3.0	10	----	64.5	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	12	0.0	0.0	0.0
All Impacted	1	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

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