# Appendix G

# **Exterior Noise Analysis Report**

**EXTERIOR NOISE ANALYSIS REPORT** 

# **1122 FOURTH AVENUE**

# San Diego, CA

April 4, 2015

Prepared for: Martinez + Cutri Corporation 402 West Broadway, Suite 2600 San Diego, CA 92101

Prepared by:



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# **1.0 INTRODUCTION**

This report estimates the exterior noise environment at outdoor usable areas of the proposed "1122 Fourth Avenue" mixed-use commercial / multi-family residential condominium project in the Core-Columbia neighborhood of downtown San Diego, California (Figure 1). The project site is situated between Third Avenue and Fourth Avenue, north of C Street and the Metropolitan Transit System (MTS) San Diego Trolley Blue Line / Orange Line light rail route, and is currently developed with the California Theatre. The project would consist of a single 40-story building with retail spaces on the ground floor, three levels of below-grade parking, four levels of above-grade parking, and multi-family residential units on the levels above.

Surrounding land uses include a parking lot and the Fourth and B single-story building to the north, the Wells Fargo office tower building to the northeast, retail and restaurant buildings to the east and southeast, the U.S. Grant Hotel building to the south, the Westgate Hotel building to the southwest, and the Civic Theater to the west. The primary noise sources affecting the project site are vehicular traffic on the adjacent streets and light rail traffic on the adjacent route.

Future exterior composite transportation traffic noise levels on the project site would range from below 45 dBA CNEL on the rooftop deck to approximately 71 dBA CNEL at the southeast project building corner as designed. Future exterior roadway traffic noise levels at project outdoor usable areas would range from below 45 dBA CNEL on the rooftop deck to approximately 57 dBA on the podium level terraces as designed. Traffic noise levels at project outdoor usable space would comply with the City of San Diego traffic noise significance threshold of 65 dBA CNEL.

Because future exterior transportation noise levels would exceed 60 dBA CNEL at the project building façades, interior noise levels in habitable rooms could exceed the California Code of Regulations, Title 24: Noise Insulation Standard and City of San Diego General Plan Noise Compatibility Guidelines requirement of 45 dBA CNEL. To avoid a potential land use impact, as a condition of project approval, an interior noise analysis would be required to be approved by the City's Building Inspection Department upon application for a building permit.

This interior noise analysis must identify the sound transmission loss requirements for building façade elements (windows, walls, doors, and exterior wall assemblies) necessary to limit interior noise in habitable rooms to 45 dBA CNEL or below. Upgraded windows and/or doors with Sound Transmission Class (STC) ratings of 30 or higher may be necessary. If the interior noise limit can be achieved only with the windows closed, the building design must include mechanical ventilation that meets California Building Code (CBC) requirements. Worst-case noise levels, either existing or future, must be used.

With the implementation of the findings of the interior noise analysis, interior noise levels in habitable rooms would be 45 dBA CNEL or below and comply with the California Code of Regulations, Title 24: Noise Insulation Standard City of San Diego General Plan Noise Compatibility Guidelines requirement. The project would result in a less than significant interior noise impact with project features incorporated in accordance with the interior noise analysis.









FIGURE 1 Vicinity Map

### 1.1 NOISE BACKGROUND

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound, typically associated with human activity and that interferes with or disrupts normal activities. The human environment is characterized by a certain consistent noise level which varies with each area. This is called ambient noise. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, perceived importance of the noise and its appropriateness in the setting, time of day and type of activity during which the noise occurs, and sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the sound's pitch and is measured in cycles per second, or hertz (Hz), whereas intensity describes the sound's loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually as pain at still higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. The average person perceives a change in sound level of about 10 dB as a doubling (or halving) of the sound's loudness; this relation holds true for sounds of any loudness. Sound levels of typical noise sources and environments are provided in Table 1.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. A simple rule is useful, however, in dealing with sound levels. If a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example, 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB.



Noise Source (at Given Distance)	Noise Environment	A-Weighted Sound Level	Human Judgment of Noise Loudness (Relative to Reference Loudness of 70 Decibels*)
Military Jet Takeoff with Afterburner (50 ft)	Carrier Flight Deck	140 Decibels	128 times as loud
Civil Defense Siren (100 ft)		130	64 times as loud
Commercial Jet Take-off (200 ft)		120	32 times as loud Threshold of Pain
Pile Driver (50 ft)	Rock Music Concert Inside Subway Station (New York)	110	16 times as loud
Ambulance Siren (100 ft) Newspaper Press (5 ft) Gas Lawn Mower (3 ft)		100	8 times as loud Very Loud
Food Blender (3 ft) Propeller Plane Flyover (1,000 ft) Diesel Truck (150 ft)	Boiler Room Printing Press Plant	90	4 times as loud
Garbage Disposal (3 ft)	Noisy Urban Daytime	80	2 times as loud
Passenger Car, 65 mph (25 ft) Living Room Stereo (15 ft) Vacuum Cleaner (10 ft)	Commercial Areas	70	Reference Loudness Moderately Loud
Normal Speech (5 ft) Air Conditioning Unit (100 ft)	Data Processing Center Department Store	60	1/2 as loud
Light Traffic (100 ft)	Large Business Office Quiet Urban Daytime	50	1/4 as loud
Bird Calls (distant)	Quiet Urban Nighttime	40	1/8 as loud <b>Quiet</b>
Soft Whisper (5 ft)	Library and Bedroom at Night Quiet Rural Nighttime	30	1/16 as loud
	Broadcast and Recording Studio	20	1/32 as loud Just Audible
		0	1/64 as loud Threshold of Hearing

#### Table 1. Sound Levels of Typical Noise Sources and Noise Environments

Source: Compiled by dBF Associates, Inc.



The normal human ear can detect sounds that range in frequency from about 20 Hz to 20,000 Hz. However, all sounds in this wide range of frequencies are not heard equally well by the human ear, which is most sensitive to frequencies in the range of 1,000 Hz to 4,000 Hz. This frequency dependence can be taken into account by applying a correction to each frequency range to approximate the human ear's sensitivity within each range. This is called A-weighting and is commonly used in measurements of community environmental noise. The A-weighted sound pressure level (abbreviated as dBA) is the sound level with the "A-weighting" frequency correction. In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

Because community noise fluctuates over time, a single measure called the Equivalent Sound Level (Leq) is often used to describe the time-varying character of community noise. The Leq is the energy-averaged A-weighted sound level during a measured time interval, and is equal to the level of a continuous steady sound containing the same total acoustical energy over the averaging time period as the actual time-varying sound. The averaging time period used in this report is one hour unless otherwise specified.

Additionally, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the Lmax and Lmin indicators, which represent the root-mean-square maximum and minimum noise levels obtained during the measurement interval. The Lmin value obtained for a particular monitoring location is often called the "acoustic floor" for that location.

To describe the time-varying character of environmental noise, the statistical noise descriptors L10, L50, and L90 are commonly used. They are the noise levels equaled or exceeded during 10, 50, and 90 percent of a stated time, respectively. Sound levels associated with L10 typically describe transient or short-term events, whereas levels associated with L90 describe the steady-state (or most prevalent) noise conditions.

Another sound measure known as the Community Noise Equivalent Level (CNEL) is an adjusted average A-weighted sound level for a 24-hour day. It is calculated by adding a 5-dB adjustment to sound levels during evening hours (7:00 p.m. to 10:00 p.m.) and a 10-dB adjustment to sound levels during nighttime hours (10:00 p.m. to 7:00 a.m.). These adjustments compensate for the increased sensitivity to noise during the typically quieter evening and nighttime hours. The CNEL is used by the State of California and the City to evaluate land-use compatibility with regard to noise.



# 2.0 APPLICABLE NOISE STANDARDS

# 2.1 CITY OF SAN DIEGO

#### 2.1.1 General Plan

The City of San Diego requires new projects to meet exterior noise level standards as established in the Noise Element of the General Plan [City of San Diego 2008: Policy NE-A.2]. The Noise Compatibility Guidelines are presented in Table 2.

Sound levels up to 60 dBA CNEL are considered Compatible with outdoor areas of frequent use (patios, balconies, parks, swimming pools, etc.) in the Multiple Units land use category; sound levels up to 70 dBA CNEL are considered Conditionally Compatible.



Open Space and Parks and Recruitional	Land Use	Category	Exterior Noise Exposur (dBA CNEL)							
Open Space and Parks and Recreational       Image: Community & Neighborhood Parks, Passive Recreation       Image: Community & Neighborhood Parks, Passive Recreation         Regional Parks, Outdoor Spectator Sports, Colf Courses, Athletic Fields, Outdoor Spectator Sports, Water Recreational Facilities, Horris Stables, Park Maint Facilities       Image: Community & Neighborhood Parks, Park Maint Facilities         Agricultural       Corp Raising & Farming, Aquaculture, Daries, Horticulture Nurseries & Greenhouses, Animal Raising, Maimtain & Keeping, Commercial Stables       Image: Commercial Residential, Live Work, Group Living         Single Units, Mobile Homes, Senior Housing       Image: Commondations View work, Group Living       Image: Commondation View Work, Group Living         Accommodations View work, Intermediate Care Facilities, Kindergarten through Grade 12       Image: Commondation View Work, Group Living       Image: Commercial Residential, Live Work, Group Living         Accommodation View work, Intermediate Care Facilities, Kindergarten through Grade 12       Image: Commondation View Work, Group Living       Image: Commercial Care Facilities, Kindergarten through Grade 12       Image: Commercial Care Facilities, Market Use         Volational To Professional Elactive, Player Education Institution Facilities       Image: Commercial Care Facilities, Kindergarten through Grade 12       Image: Commercial Care Facilities, Market Use         Sala       Emetant Commercial Care Facilities, Nueseums, Player & Accessories       Image: Commercial Care Facilities, Warning Kinacial Institutions, Assembly & Enternatiment, Radio & Television Studios, Golf Course		0,			6	0 6	5 70	) 7	5	
Community & Neighborhood Parks, Passive Recreation       Image: Community & Neighborhood Parks, Control Courses, Athletic Fields, Ourdoor Sports, Water Recreational Facilities, Hork Stables, Park Maint, Facilities         Agricultural       Crop Raising & Farming, Aquaculture, Dairies, Horticulture Nurseries & Greenhouses, Animal Raising, Maintain & Keeping, Commercial Stables       Image: Commercial Residential         Single Units, Mobile Homes, Senior Housing       45       45         Multiple Units, Moked-Use Commercial Residential, Live Work, Group Living Accommodations For eas alfeed by ancipt website. Higher Facilities, Hortegraten through Grade 12       45       45         Feature Topoles and Educational Facilities, Higher Facilities (Comments), Places of Workhip, Child Care Facilities       43       45         Vaccinional Professional Facilities, Higher Facilities (Comments), Places of Workhip, Child Care Facilities       43       45         Sale       Sale       Sale       50       50         Building Supplex/Equipment, Food, Beverages & Groceries, Pets & Pet Supplies, Sundries, Pharmacutical, & Convenience Sales, Wearing Apparel & Accessories       50       50         Gematerial Strice       50       50       50       50         Visitor Accommodations       45       45       45       45         Office       Sale       Sale       Sale       Sale       50       50       50         Sale       Sale <td>Open Space and</td> <td>Parks and Recreational</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Open Space and	Parks and Recreational	1							
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Agricalized         Crop Raising & Farming, Aquaculture, Dairies, Horticulture Nurseries & Greenhouses, Animal Raising, Maintain & Keeping, Commercial Stables         Single Units, Mobile Homes, Senior Housing       45         Multiple Units, Mixed-Use Commercial/Residential, Live Work, Group Living Accommodations 'For an afficial by atrody ware, rife to Policen NE-D.2 & NE-D.3.       45         Institutional       45       45         Hospital's, Nursing Facilities, Intermediate Care Facilities, Kindergarten through Grade 12       45       45         Yocational or Professional Educational Facilities, Higher Education Institution Facilities       45       45         Commetries       9       9       50         Sale       50       50       50         Building SupplexEquipment, Food, Beverages & Groceries, Pets & Pet Supplies, Sundries, Parmaceutical, & Convenience Sales, Wearing Apparel & Accessories       50       50         Cammercial Struces       9       50       50       50         Building Services, Business Support, Eating & Drinking, Financial Institutions, Assembly & Entertainment, Radio & Television Studios, Colf Course Support       50       50         Visior Accommodations       45       45       50       50         Offics       50       50       50       50         Outscruces and Service Use       50       50       50	Regional Park Spectator Spe	cs; Outdoor Spectate orts, Water Recreatio	or Sports, Golf C onal Facilities; H	Courses; Athletic Fields; Outdoor lorse Stables; Park Maint. Facilities						
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#### Table 2. Noise Compatibility Guidelines



#### **CEQA Significance Thresholds** 2.1.2

The Development Services Department's California Environmental Quality Act (CEQA) Significance Determination Thresholds [City of San Diego 2011] addresses traffic noise, as specified in Table K-2: Traffic Noise Significance Thresholds (dB(A) CNEL). Relevant portions are reproduced in Table 3.

Table 3. City of San Diego Traffic Noise Significance Thresholds (dBA CNEL)	

Structure or Proposed Use that would be impacted by Traffic Noise	Interior Space	Exterior Useable Space†
Single-family detached	45 dB	65 dB
Multi-family, schools, libraries, hospitals, day care, hotels, motels, parks, convalescent homes	Development Services Department (DSD) ensures 45 dB pursuant to Title 24	65 dB
Offices, Churches, Business, Professional Uses	n/a	70 dB
Commercial, Retail, Industrial, Outdoor Spectator Sports Uses	n/a	75 dB

<sup>†</sup> If a project is currently at or exceeds the significance thresholds for traffic noise described above and noise levels would result in less than a 3 dB increase, then the impact is not considered significant.



# 3.0 EXTERIOR NOISE ENVIRONMENT

The project site is situated between Third Avenue and Fourth Avenue, north of C Street and the MTS San Diego Trolley Blue Line / Orange Line light rail route. The primary noise sources affecting the project site area are vehicular traffic on the adjacent streets, and light rail traffic on the adjacent route. C Street does not carry vehicular traffic between Second Avenue and Sixth Avenue. The project site and adjacent roadways are generally topographically flat.

The project site is exposed to aircraft noise levels less than 60 dBA CNEL from operations associated with the San Diego International Airport (SDIA) [SDCRAA 2009].

# 3.1 ROADWAY TRAFFIC

Third Avenue carries an existing (year 2010) Average Daily Traffic (ADT) volume of 4,200 vehicles between B Street and C Street [SANDAG 2014]. The posted speed limit on Third Avenue is 25 miles per hour (mph). Near the project site, Third Avenue is generally a two-lane two-way Local Collector roadway with parallel parking along both sides.

Fourth Avenue carries an existing (year 2010) ADT volume of 9,000 vehicles between A Street and Broadway [SANDAG 2014]. The posted speed limit on Fourth Avenue is 35 mph. Near the project site, Fourth Avenue is a three-lane one-way southbound Major Arterial roadway with parallel parking along both sides.

Based on vehicle classification counts conducted during the site visit, the estimated average existing vehicle mix on roadways in the project area is approximately 92/4.5/1/1/1.5 (% cars / medium trucks / heavy trucks / buses / motorcycles).



#### 3.1.1 Sound Level Measurements

Short-term (20-minute) sound level measurements were conducted during the afternoon peak traffic period of Wednesday, March 25, 2015 to quantify the existing on-site acoustical environment. Agencies such as the City of San Diego and the U.S. Department of Housing and Urban Development (HUD) consider the peak-hour Leq to be reasonably equivalent to the CNEL for vehicular traffic.

The noise environment on the project site was contaminated with a heavy pedestrian concentration, nearby construction activity, regular trolley passbys, and idling vehicles; therefore, measurements were conducted at acoustically-equivalent offsite locations.

A Larson Davis Model 820 American National Standards Institute (ANSI) Type 1 integrating sound level meter (SLM) was used as the data-collection device. The meter was mounted on a tripod approximately five feet above ground level to simulate the average height of the human ear. The sound level meter was calibrated before and after the measurement period.

The measurement results are summarized in Table 4 and correspond to the locations depicted on Figure 2. A review of the table shows that the measured sound level ranged from approximately 66 dBA Leq at Measurement Location 2 (ML2) to approximately 67 dBA Leq at ML1.

The primary noise sources observed during the site visit were vehicular traffic on Third Avenue and Fourth Avenue, and trolley traffic on the MTS San Diego Trolley Blue Line / Orange Line light rail route. Simultaneous vehicular traffic counts were conducted during the measurement periods as applicable. Other observed noise sources included pedestrians and occasional distant aircraft overflights.

Measurement	Location	Time	Leq	Lmin	Lmax	L10	L50	L90	Traffic
ML1	Fourth Avenue	15:20 – 15:40	67.1	51.0	78.2	69.1	61.5	59.2	146 / 8 / 1 / 2 / 3
ML2	Third Avenue	15:50 – 16:10	66.1	52.2	81.9	69.1	59.9	58.7	129 / 5 / 2 / 1 / 1

Table 4. Sound Level Measurements (dBA)

Notes:

Measurements conducted on Wednesday, March 25, 2015.

Traffic reported in terms of cars / medium trucks / heavy trucks / buses / motorcycles.

### 3.2 LIGHT RAIL

The project site is between the Civic Center Station and the Fifth Avenue Station along the San Diego Trolley Blue Line and Orange Line routes. The centerlines of the westbound and eastbound tracks are approximately 35 and 42 feet, respectively, from the south project property line. The existing total bidirectional weekday San Diego Trolley volume near the project site is 221 daytime trolleys (average 14.73 per hour) and 68 nighttime trolleys (average 7.56 per hour) [MTDB 2014]. The average trolley was assumed to consist of three cars, operating at 15 mph. Refer to Appendix B for details.



# 1122 Fourth Ave - Exterior Noise Analysis Report





FIGURE 2 Noise Measurement Locations

# 4.0 FUTURE NOISE ENVIRONMENT

The primary noise source affecting the project site area in the future would continue to be vehicular traffic on Third Avenue and Fourth Avenue, and light rail traffic on the MTS San Diego Trolley Blue Line / Orange Line light rail route.

No future noise level projections are available for SDIA; therefore, it was assumed that the project site would remain outside of the 60-dBA CNEL noise contour. However, noise associated with SDIA operations may be periodically audible on the project site or within the project building. Aircraft noise was not included in this analysis, and will not be further discussed in this document.

### 4.1 ROADWAY TRAFFIC

Third Avenue is projected to carry a future buildout ADT volume of 8,000 vehicles between B Street and C Street [CCDC 2006]. Fourth Avenue is projected to carry a future buildout ADT volume of 19,000 vehicles between B Street and C Street [CCDC 2006]. The existing speeds and traffic mixes were assumed to remain constant in the future. The peak-hour traffic volume was assumed to be 10% of the ADT volume.

The Federal Highway Administration (FHWA) Traffic Noise Model (TNM) version 2.5 was used to calculate traffic noise levels. TNM is required by the FHWA and the California Department of Transportation (Caltrans) for roadway noise modeling. The modeling effort considered roadway alignments, project buildings, intervening topography, peak-hour traffic volume, estimated average vehicle speed, and estimated vehicle mix (i.e., percentage of cars, medium trucks, heavy trucks, buses, and motorcycles). The default ground type used in the model was "hard soil."

The model was calibrated using actual traffic counts and sound level measurements. The measured sound levels were approximately 4-5 dBA higher than the modeled sound levels due to general urban ambient noise sources such as pedestrians, occasional distant aircraft, rooftop HVAC units, distant construction, etc. The model was considered to be accurately representative of the traffic noise conditions; no calibration correction was made.

Future exterior roadway traffic noise levels on the project site would range from below 45 dBA CNEL on the rooftop deck to approximately 70 dBA CNEL at the southeast project building corner as designed. Future exterior roadway traffic noise levels at project outdoor usable areas would range from below 45 dBA CNEL on the rooftop deck to approximately 57 dBA on the podium level terraces as designed. The vehicular traffic calculations are summarized in Appendix A.



### 4.2 LIGHT RAIL

The Federal Transit Administration (FTA) General Transit Noise Assessment methodology [FTA 2006] was used to estimate rail Day-Night Level (Ldn) noise levels. For purposes of this analysis, Ldn was considered interchangeable with CNEL. The rail calculations are summarized in Appendix B.

No projections are available for San Diego Trolley operations; therefore, in the future, existing operational parameters were expected to continue. A light rail volume of 289 trolleys per day (221 during daytime hours and 68 during nighttime hours) at 15 mph is projected to generate a noise level of approximately 61 dBA Ldn / CNEL at 38.5 feet, the average distance from the eastbound/westbound tracks to the south ground-level project building façade.

### 4.3 COMPOSITE TRANSPORTATION

The predicted future exterior roadway traffic noise levels were added to the projected future exterior light rail noise levels. The resultant future exterior composite transportation noise levels would range from below 45 dBA CNEL on the rooftop deck to approximately 71dBA CNEL at the southeast project building corner, as shown on Figure 3.





# 1122 Fourth Avenue - Exterior Noise Analysis Report

dBF

Associates, Inc.

FIGURE 3

Future Exterior Composite Transportation Noise Levels (CNEL)

# 5.0 FINDINGS AND MITIGATION

This section discusses the possible mitigation measures that can be implemented to either reduce or mitigate impacts to the proposed project or impacts generated by the proposed project.

### 5.1 EXTERIOR TRAFFIC NOISE

As designed, traffic noise levels at project outdoor areas of frequent use would not exceed the City of San Diego traffic noise significance threshold of 65 dBA CNEL.

### 5.2 INTERIOR TRANSPORTATION NOISE

Because future exterior composite transportation noise levels would exceed 60 dBA CNEL at the project building façades, interior noise levels in habitable rooms could exceed the California Code of Regulations, Title 24: Noise Insulation Standard and City of San Diego General Plan Noise Compatibility Guidelines requirement of 45 dBA CNEL. To avoid a potential land use impact, as a condition of project approval, an interior noise analysis would be required to be approved by the City's Building Inspection Department upon application for a building permit.

This interior noise analysis must identify the sound transmission loss requirements for building façade elements (windows, walls, doors, and exterior wall assemblies) necessary to limit interior noise in habitable rooms to 45 dBA CNEL or below. Upgraded windows and/or doors with Sound Transmission Class (STC) ratings of 30 or higher may be necessary. If the interior noise limit can be achieved only with the windows closed, the building design must include mechanical ventilation that meets California Building Code (CBC) requirements. Worst-case noise levels, either existing or future, must be used.

With the implementation of the findings of the interior noise analysis, interior noise levels in habitable rooms would be 45 dBA CNEL or below and comply with the California Code of Regulations, Title 24: Noise Insulation Standard City of San Diego General Plan Noise Compatibility Guidelines requirement. The project would result in a less than significant interior noise impact with project features incorporated in accordance with the interior noise analysis.



### 6.0 REFERENCES

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# 7.0 LIST OF PREPARERS

Steve Fiedler, INCE Principal



INPUT: ROADWAYS

dBF Associates, Inc.		,			4 April 2015								
SPF					TNM 2.5								
INPUT: ROADWAYS							Average	pavement typ	e shall be u	used unles	s		
PROJECT/CONTRACT:	1122 Fou	rth Avenue	e			a State highway agency substantiates the use							
RUN:	Calibratio					of a differ	ent type with	the approv	al of FHW	4			
Roadway		Points											
Name	Width	Name	No.	Coordinates	(pavement)		Flow Con	trol		Segment			
				X	Y	Z	Control	Speed	Percent	Pvmt	On		
							Device	Constraint	Vehicles	Туре	Struct?		
									Affected				
	ft			ft	ft	ft		mph	%				
Third Avenue	35.0	point1	1	6,668.0	-2,241.3	0.00				Average			
		point2	2	6,668.0	-1,935.3	0.00				Average			
		point26	26	6,668.0	-1,898.3	0.00				Average			
		point3	3	6,668.0	-1,861.3	0.00				Average			
		point4	4	6,668.0	-1,175.3	0.00							
Fourth Avenue	40.0	point10	10	6,948.0	-1,175.3	0.00				Average			
		point9	9	6,948.0	-1,481.3	0.00				Average			
		point21	21	6,948.0	-1,518.3	0.00				Average			
		point8	8	6,948.0	-1,555.3	0.00				Average			
		point7	7	6,948.0	-1,861.3	0.00				Average			
		point27	27	6,948.0	-1,898.3	0.00				Average			
		point6	6	6,948.0	-1,935.3	0.00				Average			
		point5	5	6,948.0	-2,241.3	0.00							
C Street	12.0	point15	15	7,208.7	-1,898.3	0.00				Average			
		point16	16	6,985.0	-1,898.3	0.00				Average			
		point25	25	6,948.0	-1,898.3	0.00				Average			
		point17	17	6,911.0	-1,898.3	0.00				Average			
		point18	18	6,705.0	-1,898.3	0.00				Average			
		point24	24	6,668.0	-1,898.3	0.00				Average			
		point19	19	6,631.0	-1,898.3	0.00		-		Average			
		point20	20	6,407.4	-1,898.3	0.00							
B Street	35.0	point11	11	7,208.7	-1,518.3	0.00				Average			
		point22	22	6,985.0	-1,518.3	0.00				Average			
		point23	23	6,948.0	-1,518.3	0.00				Average			
		point13	13	6,911.0	-1,518.3	0.00				Average			

INPUT: ROADWAYS				1122 Fourth Avenue								
	po	bint14 14	6,705.0	-1,518.3	0.00							

INPUT: TRAFFIC FOR LAeq1h Volumes

dBF Associates, Inc.				4 April	2015							
SPF				TNM 2	.5							
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	1122 Fourth A	venue										
RUN:	Calibration											
Roadway	Points											
Name	Name	No.	Segmen	t								
			Autos		MTruck	S	HTrucks	5	Buses		Motorcy	cles
			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
Third Avenue	point1	1	387	25	15	25	6	25	3	25	3	25
	point2	2	387	25	15	5 25	6	25	3	25	3	25
	point26	26	387	25	15	5 25	6	25	3	25	3	25
	point3	3	387	25	15	5 25	6	25	3	25	3	25
	point4	4										
Fourth Avenue	point10	10	438	35	24	35	3	35	6	35	9	35
	point9	9	438	35	24	35	3	35	6	35	9	35
	point21	21	438	35	24	35	3	35	6	35	9	35
	point8	8	438	35	24	35	3	35	6	35	9	35
	point7	7	438	35	24	35	3	35	6	35	9	35
	point27	27	438	35	24	35	3	35	6	35	9	35
	point6	6	438	35	24	35	3	35	6	35	9	35
	point5	5										
C Street	point15	15	0	0	1	15	0	0	0	0	0	0
	point16	16	0	0	1	15	0	0	0	0	0	0
	point25	25	0	0	1	15	0	0	0	0	0	0
	point17	17	0	0	1	15	0	0	0	0	0	0
	point18	18	0	0	1	15	0	0	0	0	0	0
	point24	24	0	0	1	15	0	0	0	0	0	0
	point19	19	0	0	1	15	0	0	0	0	0	0
	point20	20										
B Street	point11	11	1	25	0	0 0	0	0	0	0	0	0
	point22	22	1	25	0	0 0	0	0	0	0	0	0

#### INPUT: TRAFFIC FOR LAeq1h Volumes

	point23	23	1	25	0	0	0	0	0	0	0	0	
	point13	13	1	25	0	0	0	0	0	0	0	0	
	point14	14											

INPUT: RECEIVERS			1	1	1		1	122 Fourth	n Avenue	1	
dBF Associates, Inc.						4 April 20	15				
SPF						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	1122 F	ourth	Avenue								
RUN:	Calibr	ation									
Receiver											
Name	No.	#DUs	Coordinates	(ground)		Height	Input Sou	nd Levels a	and Criteria	a	Active
			X	Y	Z	above	Existing	Impact Cri	iteria	NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ML1	23	1	6,908.0	-1,300.0	0.00	4.92	67.10	66	10.0	8.0	Y
ML2	24	1	6,703.0	-1,675.0	0.00	4.92	66.10	66	10.0	8.0	Y

#### INPUT: BARRIERS

dBF Associates, Inc.					4 April	2015													
SPF					TNM 2.	5													
INPUT: BARRIERS																			
PROJECT/CONTRACT:	1122 I	ourth A	venue																
RUN:	Calibr	ation																	
Barrier									Points										
Name	Туре	Height		If Wall	If Berm	i i		Add'tnl	Name	No.	Coordinates	(bottom)		Height	Segme	nt			
		Min	Max	\$ per	\$ per	Тор	Run:Rise	\$ per			x	Y	Z	at	Seg Ht	Pertu	ırbs	On	Important
				Unit	Unit	Width		Unit				ĺ	Ì	Point	Incre-	#Up	#Dn	Struct?	Reflec-
			İ	Area	Vol.			Length			Ì	ĺ	Ì		ment	İ			tions?
		ft	ft	\$/sq ft	\$/cu yd	ft	ft:ft	\$/ft			ft	ft	ft	ft	ft				
California Theatre	W	0.00	99.99	0.00				0.00	point61	61	6,708.5	-1,758.8	0.00	70.00	0.00	0	0		
									point62	62	6,708.5	-1,857.8	0.00	70.00	0.00	0	0		
									point63	63	6,907.5	-1,857.8	0.00	70.00	0.00	0	0		
									point64	64	6,907.5	-1,758.8	0.00	70.00	0.00	0	0		
									point65	65	6,708.5	-1,758.8	0.00	70.00					
4th & B	W	0.00	99.99	0.00				0.00	point54	54	6,838.0	-1,708.3	0.00	25.00	0.00	0	0		
									point55	55	6,838.0	-1,558.3	0.00	25.00	0.00	0	0		
									point56	56	6,908.0	-1,558.3	0.00	25.00	0.00	0	0		
									point66	66	6,907.5	-1,708.8	0.00	25.00	0.00	0	0		
									point67	67	6,838.0	-1,708.3	0.00	25.00					

	4 April 2015	
	TNM 2.5	
ue		
Points	5	
No.	Coordinates	
stivity	X	Y
ayls	ft	ft
20000 7	6,708.5	-1,758.8
8	6,708.5	-1,558.3
9	6,838.0	-1,558.3
10	6,838.0	-1,708.3
11	6,808.0	-1,708.3
12	6 808 5	_1 758 8
	ue ve ve ve ve ve ve ve ve ve v	Points           Points           No.         Coordinates           stivity         X           ayls         ft           20000         7         6,708.5           8         6,708.5         9         6,838.0           10         6,838.0         11         6,808.5

RESULTS: SOUND LEVELS				r		•	1122 Fourth	Avenue		1		
dBF Associates, Inc.							4 April 20	15				
SPF							TNM 2.5					
							Calculate	d with TNI	M 2.5			
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		1122 Fo	ourth Aven	ue	1							
RUN:		Calibra	tion									
BARRIER DESIGN:		INPUT	HEIGHTS					Average	pavement typ	e shall be use	ed unless	!
								a State h	ighway agenc	y substantiat	es the use	9
ATMOSPHERICS:		68 deg	F, 50% RH	1				of a diffe	rent type with	approval of I	FHWA.	
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over	r existing	Туре	Calculated	Noise Redu	ction	
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
								1				Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ML1	23	1	67.1	63.1	(	6 -4.0	0 10	)	63.1	0.0	)	8 -8.0
ML2	24	. 1	66.1	60.7	(	66 -5.4	4 10	)	60.7	7 0.0	)	8 -8.0
Dwelling Units		# DUs	Noise Re	duction	1							
			Min	Avg	Max							
			dB	dB	dB		_					
All Selected		2	2 0.0	0.0	0	.0						
All Impacted		C	0.0	0.0	0	.0		1				
All that meet NR Goal		C	0.0	0.0	0	.0		1				

INPUT: TRAFFIC FOR LAeq1h Volumes

dBF Associates, Inc.				4 April	2015							
SPF				TNM 2	.5							
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	1122 Fourth A	venue										
RUN:	Future											
Roadway	Points											
Name	Name	No.	Segmer	t								
			Autos		MTruck	S	HTrucks	5	Buses		Motorcy	cles
			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
Third Avenue	point1	1	1141	25	56	25	12	25	12	25	19	25
	point30	30	1141	25	56	25	12	25	12	25	19	25
	point2	2	1141	25	56	25	12	25	12	25	19	25
	point26	26	552	25	27	25	6	25	6	25	9	25
	point3	3	552	25	27	25	6	25	6	25	9	25
	point29	29	736	25	36	25	8	25	8	25	12	25
	point28	28	1104	25	54	25	12	25	12	25	18	25
	point4	4										
Fourth Avenue	point10	10	1656	35	81	35	18	35	18	35	27	35
	point9	9	1656	35	81	35	18	35	18	35	27	35
	point21	21	1747	35	86	35	19	35	19	35	29	35
	point8	8	1747	35	86	35	19	35	19	35	29	35
	point7	7	1747	35	86	35	19	35	19	35	29	35
	point27	27	1840	35	90	35	20	35	20	35	30	35
	point6	6	1840	35	90	35	20	35	20	35	30	35
	point5	5										
C Street	point15	15	0	0	1	15	0	0	0	0	0	0
	point16	16	0	0	1	15	0	0	0	0	0	0
	point25	25	0	0	1	15	0	0	0	0	0	0
	point17	17	0	0	1	15	0	0	0	0	0	0
	point18	18	0	0	1	15	0	0	0	0	0	0
	point24	24	0	0	1	15	0	0	0	0	0	0
	point19	19	0	0	1	15	0	0	0	0	0	0

#### INPUT: TRAFFIC FOR LAeq1h Volumes

	point20	20										
B Street	point11	11	1011	25	50	25	11	25	11	25	17	25
	point22	22	1011	25	50	25	11	25	11	25	17	25
	point23	23	1011	25	50	25	11	25	11	25	17	25
	point13	13	1011	25	50	25	11	25	11	25	17	25
	point31	31	827	25	41	25	9	25	9	25	14	25
	point14	14										

#### INPUT: RECEIVERS

dBF Associates, Inc.						4 April 20	15				
SPF						TNM 2.5					
			_								
PROJECT/CONTRACT:	1122 F	ourth	Avenue								
RUN:	Future										
Receiver											
Name	No.	#DUs	Coordinates	(ground)		Height	Input Sou	nd Levels a	and Criteria	3	Active
			X	Y	Z	above	Existing	Impact Cri	iteria	NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
SW	1	1	6,706.5	-1,861.4	0.00	5.00	0.00	66	10.0	8.0	Y
S	2	1	6,781.1	-1,861.4	0.00	5.00	0.00	66	10.0	8.0	Y
SE	3	1	6,860.0	-1,861.4	0.00	5.00	0.00	66	10.0	8.0	Y
ES	4	1	6,862.1	-1,850.0	0.00	86.00	0.00	66	10.0	8.0	Y
E	5	1	6,862.7	-1,811.9	0.00	86.00	0.00	66	10.0	8.0	Y
NE	6	1	6,863.2	-1,768.9	0.00	86.00	0.00	66	10.0	8.0	Y
ENE	7	1	6,818.1	-1,765.6	0.00	86.00	0.00	66	10.0	8.0	Y
NNE	8	1	6,795.8	-1,767.8	0.00	75.00	0.00	66	10.0	8.0	Y
NNW	9	1	6,760.4	-1,767.3	0.00	75.00	0.00	66	10.0	8.0	Y
WNW	10	1	6,737.5	-1,766.7	0.00	86.00	0.00	66	10.0	8.0	Y
NW	11	1	6,715.2	-1,766.7	0.00	86.00	0.00	66	10.0	8.0	Y
WN	12	1	6,704.3	-1,774.3	0.00	5.00	0.00	66	10.0	8.0	Y
W	13	1	6,704.3	-1,813.5	0.00	5.00	0.00	66	10.0	8.0	Y
Eco Deck NW	15	1	6,816.9	-1,719.1	0.00	5.00	0.00	66	10.0	8.0	Y
Eco Deck SW	16	1	6,819.2	-1,747.4	0.00	5.00	0.00	66	10.0	8.0	Y
Eco Deck SE	17	1	6,896.3	-1,752.1	0.00	5.00	0.00	66	10.0	8.0	Y
Eco Deck NE	18	1	6,896.3	-1,719.6	0.00	5.00	0.00	66	10.0	8.0	Y
Roof Terrace SW	19	1	6,717.1	-1,850.8	0.00	5.00	0.00	66	10.0	8.0	Y
Roof Terrace S	20	1	6,801.6	-1,846.7	0.00	5.00	0.00	66	10.0	8.0	Y
SE @ 4th & C	23	1	6,909.6	-1,860.9	0.00	5.00	0.00	66	10.0	8.0	Y

#### INPUT: BARRIERS

dBF Associates, Inc.					4 April	2015													
SPF					TNM 2.	5													
INPUT: BARRIERS																			
PROJECT/CONTRACT:	1122 F	ourth A	venue																
RUN:	Future	•																	
Barrier									Points										
Name	Туре	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates	(bottom)		Height	Segme	ent			
		Min	Max	\$ per	\$ per	Тор	Run:Rise	\$ per			x	Y	z	at	Seg H	Pert	urbs	On	Important
				Unit	Unit	Width		Unit						Point	Incre-	#Up	#Dn	Struct?	Reflec-
				Area	Vol.			Length							ment				tions?
		ft	ft	\$/sq ft	\$/cu yd	ft	ft:ft	\$/ft			ft	ft	ft	ft	ft				
Project Building Tower	W	0.00	500.00	0.00				0.00	point5	5	6,708.5	-1,773.8	0.00	415.00	0.00	0	0		
									point6	6	6,708.5	-1,857.8	0.00	415.00	0.00	0	0		
									point7	7	6,858.0	-1,857.8	0.00	415.00	0.00	0	0		
									point8	8	6,858.0	-1,772.3	0.00	415.00	0.00	0	0		
									point9	9	6,824.2	-1,772.3	0.00	415.00	0.00	0	0		
									point12	12	6,808.5	-1,777.8	0.00	415.00	0.00	0	0		
									point13	13	6,766.2	-1,777.8	0.00	415.00	0.00	0	0		
									point18	18	6,746.2	-1,773.8	0.00	415.00	0.00	0	0		
									point23	23	6,708.5	-1,773.8	0.00	415.00					
Existing Building	W	0.00	99.99	0.00				0.00	point25	25	6,868.0	-1,857.8	0.00	80.00	0.00	0	0		
									point26	26	6,907.5	-1,857.8	0.00	80.00	0.00	0	0		
									point27	27	6,907.5	-1,758.8	0.00	80.00	0.00	0	0		
	14/	0.00	00.00	0.00				0.00	point28	28	6,868.0	-1,758.8	0.00	80.00	0.00				
	VV	0.00	99.99	0.00				0.00	point34	34	6,746.2	-1,773.8	0.00	81.00	0.00	0	0		
									point35	30	6,740.2	-1,750.0	0.00	81.00	0.00	0	0		
									point37	30	6,708.5	-1,730.0	0.00	81.00	0.00	0	0		
E / NE	W	0.00	00.00	0.00				0.00	point38	38	6 858 0	-1,773.0	0.00	81.00	0.00	0	0		
		0.00	33.33	0.00				0.00	point39	30	6 868 0	-1,057.0	0.00	81.00	0.00	0	0		
									point40	40	6 868 0	-1 758 8	0.00	81.00	0.00	0	0		
									point41	41	6.808.5	-1.758.8	0.00	81.00	0.00	0	0		
									point42	42	6.808.5	-1.777.8	0.00	81.00		-	-		
Green Roof	W	0.00	99.99	0.00				0.00	point50	50	6,808.5	-1,758.8	0.00	70.00	0.00	0	0		
									point51	51	6,808.0	-1,708.3	0.00	70.00	0.00	0	0		
									point60	60	6,838.0	-1,708.3	0.00	70.00	0.00	0	0		
									point52	52	6,907.5	-1,708.8	0.00	70.00	0.00	0	0		
									point53	53	6,907.5	-1,758.8	0.00	70.00					
4th & B	W	0.00	99.99	0.00				0.00	point54	54	6,838.0	-1,708.3	0.00	25.00	0.00	0	0		
									point55	55	6,838.0	-1,558.3	0.00	25.00	0.00	0	0		
									point56	56	6,908.0	-1,558.3	0.00	25.00	0.00	0	0		
									point57	57	6,907.5	-1,708.8	0.00	25.00					
Ν	W	0.00	99.99	0.00				0.00	point58	58	6,746.2	-1,758.8	0.00	70.00	0.00	0	0		
									point59	59	6,808.5	-1,758.8	0.00	70.00					

RESULTS: SOUND LEVELS		1	1		1	1	122 Fourth	Avenue	1		1		
dBF Associates Inc							4 April 20	15					
CDE							4 April 20	13					
								d with TNM	125				
							Calculate		12.5				
RESULTS. SOUND LEVELS		1122 E	ourth Avon										
		Futuro		ue									
								Average	over ent two	a ahall ha uaa	d unloco		
BARRIER DESIGN:		INFUT	REIGHTS					Average p				_	
ATMOSPHERICS.		60 dog	E 600/ DU					a State m	griway agenc			5	
ATMOSPHERICS:		oo uey	г, э0% кп					or a differ	ent type with	approval of F	пwа.		
Receiver													
Name	No.	#DUs	Existing	No Barrier		1-			With Barrier	7			
		ļ	LAeq1h	LAeq1h		Increase over	existing	Туре	Calculated	Noise Reduc	tion		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculate	ed
							Sub'l Inc					minus	
												Goal	
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB	
SW	1	1	0.0	63.8	66	63.8	10	)	63.8	0.0		8	-8.0
S	2	1	0.0	61.2	66	61.2	10	)	61.2	0.0		8	-8.0
SE	3	1	0.0	63.5	66	63.5	10	)	63.5	0.0		8	-8.0
ES	4	1	0.0	57.2	66	57.2	10	)	57.2	.0.0		8	-8.0
E	5	1	0.0	47.9	66	47.9	10	)	47.9	0.0		8	-8.0
NE	6	1	0.0	54.4	66	54.4	· 10	)	54.4	0.0		8	-8.0
ENE	7	1	0.0	55.3	66	55.3	10	)	55.3	0.0		8	-8.0
NNE	8	1	0.0	53.3	66	53.3	s 10	)	53.3	0.0		8	-8.0
NNW	9	1	0.0	55.6	66	55.6	i 10	)	55.6	0.0		8	-8.0
WNW	10	1	0.0	56.0	66	56.0	10	)	56.0	0.0		8	-8.0
NW	11	1	0.0	56.5	66	56.5	i 10	)	56.5	0.0		8	-8.0
WN	12	1	0.0	62.6	66	62.6	i 10	)	62.6	0.0		8	-8.0
W	13	1	0.0	62.7	66	62.7	10	)	62.7	0.0		8	-8.0
Eco Deck NW	15	1	0.0	35.0	66	35.0	10	)	35.0	0.0		8	-8.0
Eco Deck SW	16	1	0.0	36.0	66	36.0	10	)	36.0	0.0		8	-8.0
Eco Deck SE	17	1	0.0	36.5	66	36.5	10	)	36.5	0.0		8	-8.0
Eco Deck NE	18	1	0.0	36.8	66	36.8	10	)	36.8	0.0		8	-8.0
Roof Terrace SW	19	1	0.0	18.0	66	18.0	10	)	18.0	0.0		8	-8.0
Roof Terrace S	20	1	0.0	18.0	66	18.0	10	)	18.0	0.0		8	-8.0
SE @ 4th & C	23	1	0.0	69.6	66	69.6	i 10	) Snd Lvl	69.6	0.0		8	-8.0
Dwelling Units		# DUs	Noise Red	duction									
		İ	Min	Avg	Max			1				_	
			dB	dB	dB								
			4			1		+	1				

#### **RESULTS: SOUND LEVELS**

All Selected	20	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			

# Noise Model Based on Federal Transit Adminstration General Transit Noise Assessment Developed for Chicago Create Project Copyright 2006, HMMH Inc. Case: 1122 Fourth Avenue

1122 Fourth Avenue

RESULTS			
Noise Source	Ldn (dB)	Leq - daytime (dB)	Leq - nighttime (dB)
All Sources	61	57	54
Freight Locomotives	61	57	54
Freight Cars	0	0	0
Amtrak + NCTD COASTER Locomotives	0	0	0
Amtrak + NCTD COASTER Cars	0	0	0
San Diego Trolley	0	0	0
Source 6	0	0	0
Source 7	0	0	0
Source 8	0	0	0

#### Enter noise receiver land use category below.

LAND USE CATEGORY	
Noise receiver land use category (1, 2 or 3)	2

Enter data for up to 8 noise sources below - see reference list for source numbers.

NOISE SOURCE PARAMETERS					
Parameter	Source 1		Source 2	Source 3	
Source Num.	RRT/LRT	4	0	0	
Distance (source to receiver)	distance (ft)	38.5	0	0	
Daytime Hours	speed (mph)	15	0	0	
(7 AM - 10 PM)	trains/hour	14.73333	0	0	
	cars/train	3	0	0	
Nighttime Hours	speed (mph)	15	0	0	
(10 PM - 7 AM)	trains/hour	7.555556	0	0	
	cars/train	3	0	0	
Wheel Flats?	% of cars w/ wheel flats	0.00%	0.00%	0.00%	
Jointed Track?	Y/N	N	N	N	
Embedded Track?	Y/N	N	N	N	
Aerial Structure?	Y/N	N	N	N	
Barrier Present?	Y/N	N	N	N	
Intervening Rows of of Buildings	number of rows	0	0	0	

SOURCE REFERENCE LIST				
Source	Number			
Commuter Electric Locomotive	1			
Commuter Diesel Locomotive	2			
Commuter Rail Cars	3			
RRT/LRT	4			
AGT, Steel Wheel	5			
AGT, Rubber Tire	6			
Monorail	7			
Maglev	8			
Freight Locomotive	9			
Freight Cars	10			
Hopper Cars (empty)	11			
Hopper Cars (full)	12			
Crossover	13			
Automobiles	14			
City Buses	15			
Commuter Buses	16			
Rail Yard or Shop	17			
Layover Tracks	18			
Bus Storage Yard	19			
Bus Op. Facility	20			
Bus Transit Center	21			
Parking Garage	22			
Park & Ride Lot	23			