

HENNING ASSOCIATES

*Henning Associates, Inc.
1688 East Gude Drive, Suite 302
Rockville, Maryland 20850*

CONSULTANTS
IN
ACOUSTICS
NOISE CONTROL
VIBRATION
AUDIOVISUAL DESIGN

**WISCONSIN AVENUE GIANT
WASHINGTON, DC**

**Environmental Noise Study
With Noise Control Measures**

**Gerald H. Henning
President**

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A new Giant Food Store is proposed at 3336 Wisconsin Avenue in Washington, DC. The main loading dock is located near existing residences, and outdoor mechanical equipment is planned for the rooftop of the building. Provided herein is a study of the noise expected from these sources and measures to control the noise to acceptable levels.

CRITERIA

District of Columbia Noise Code

Under the District of Columbia Municipal Regulations, the maximum permissible noise level from loading dock activities at the Wisconsin Avenue Giant property line and residential zone is 60 dBA during the daytime and 55 dBA during the nighttime. Daytime is defined as the hours from 7:00 a.m. to 9:00 p.m., and nighttime is defined as the hours from 9:00 p.m. to 7:00 a.m. Motor vehicle noise and safety alarm noise are exempt from the maximum permissible noise levels of the code. The maximum permissible noise level from mechanical equipment is 60 dBA at the property line anytime.

The A-weighted decibel (dBA) is a logarithmic unit of sound which simulates human hearing by rolling off the low and very high frequencies of sound. To help relate the A-weighted decibel system to subjective perceptions, a noise level decreased by 10 dBA is perceived to be roughly one-half as loud. Conversely, a noise level increased by 10 dBA is perceived to be roughly twice as loud. A difference of 3 dBA is generally the minimum perceivable difference between noise levels. For reference, the level of normal speech is approximately 60 dBA 3 ft from the person speaking, and the average noise level in a busy office is also approximately 60 dBA.

Ambient Noise Level

The noise levels from a source may be compared to the ambient noise levels to assist in assessing the impact of the noise source on the surrounding community. The difference between the level of the source and the level of the background ambient noise indicates the degree that the noise source is discernable. Where the level of the noise source is no greater than the level of the background ambient noise, any potential for disturbance is generally considered insignificant. Where the level of the source is 5 dBA

above the background ambient noise level, it is noticeable, and where the level of the source is 10 dBA above the background ambient noise level, it is roughly twice as loud as the background ambient noise level.

EXISTING AMBIENT NOISE LEVELS

On November 11, 2008, between 6:30 a.m. and 7:15 p.m., ambient noise levels were measured at the five locations shown in Figure 1. Location 1 was near the property line between the Wisconsin Avenue Giant property and the residential property at 3321 Idaho Avenue NW. Location 2 was at the low wall at the west end of the existing parking lot of the Wisconsin Avenue Giant. Location 3 was at the property line between the Wisconsin Avenue Giant property and the adjacent apartment building at 3725 Macomb Street NW. Location 4 was at the corner of the apartment building adjacent to the office building at 3400 Idaho Avenue NW. Location 5 was in front of the building at 3333 Wisconsin Avenue NW.

At Location 1 and Location 2, Rion NL-31 Sound Level Meters were set up to continuously monitor the noise levels in consecutive 15-minute periods. Ambient noise levels were measured in 15-minute periods at Locations 3-5 at various times throughout the survey using a handheld Rion NA-27 Realtime Analyzer. Additionally, ambient noise levels were measured in 15-minute periods on December 3, 2008 at Locations 1-4 between 7:00 a.m. and 1:30 p.m. using the NA-27 Realtime Analyzer. The microphones of the instruments were fitted with windscreens and positioned or held 4-5 ft above the ground. At Location 2 the elevation of the microphone was roughly the same as the elevations of the bottoms of the windows on the second floor of the upper floor level of the existing residence closest to the proposed turnaround. The instruments were set to fast response, and the calibrations of the instruments were verified before and after the noise measurements.

The results of the continuous noise monitoring at Locations 1 and 2 are shown in Figures 2 and 3. The A-weighted average and maximum noise levels measured in the 15-minute periods are shown for each location. During the survey some atypical sources of noise occurred on the Wisconsin Avenue Giant property which at times contributed to

the ambient noise levels measured at Locations 1 and 2. Leaf blowers were operated for about an hour to clean up the leaves in the parking lot. Also, drilling equipment, trucks, and a forklift generated noise associated with obtaining soil samples in the parking lot. Time intervals when these atypical sources of noise were occurring are shown in the figures. Most of the time the soil sample drilling noise did not seem high enough to contribute significantly to the ambient noise levels measured.

The results of the ambient noise measurements are summarized in Table 1 and repeated in Tables 2-4 for comparison with the delivery truck and unloading noise levels. The ambient noise levels measured were primarily generated by roadway traffic.

DELIVERY TRUCK AND LOADING DOCK NOISE LEVELS

On November 11, 2008 noise levels from delivery trucks and unloading operations were also measured using a Rion NA-27 Realtime Analyzer. Noise levels were typically measured approximately 50 ft from the trucks with the microphone with a windscreen approximately 4-5 ft above the ground. Delivery truck noise levels measured included those generated by arrivals, departures, and maneuvering including backing up with backup alarms. Noise levels generated by unloading supplies were also measured.

November 11, 2008 was a Tuesday which we understand is one of the busiest days of the week for deliveries. Tractor trailer, box trucks, and vans delivered supplies to the Wisconsin Avenue Giant on this day. Most all of the deliveries occurred in the morning.

Delivery truck and unloading noise levels for existing and proposed conditions with various noise control options are shown in Tables 1-4. The noise levels were determined from the on-site noise measurements conducted on November 11, 2008, submission drawings, and delivery truck data from the Wells + Associates October 22, 2008 Memorandum, "Friendship Shopping Center PUD Traffic Impact Study Addendum, Zoning Commission Case No. 08-15." According to this study 5 tractor trailer trucks, 18 box trucks, and 7 vans delivered supplies to the Wisconsin Avenue Giant on Tuesday, September 16, 2008.

Both average and maximum delivery truck and unloading noise levels are shown in the tables. The average noise levels were calculated from the noise energy emitted for each event multiplied by the number of events and averaged over the daytime hours between 7:00 a.m. and 9:00 p.m. A delivery truck event included a truck arrival, maneuvering, and departure. An unloading event included the unloading of supplies from a truck. The maximum noise levels were based on those measured during each event and may have only occurred once briefly during the event.

The delivery truck and unloading noise levels shown in the tables do not include contributions from the ambient noise levels. When the delivery truck and unloading noise levels are lower than the ambient noise levels at the same location, the ambient noise levels will dominate the noise perceived at this location.

TRUCK AND UNLOADING NOISE CONTROL MEASURES

The following summarizes the noise control measures for the main loading dock of the Wisconsin Avenue Giant. It is noted that the DC noise code states that motor vehicle noise and safety alarm noise are exempt from having to comply with the maximum permissible noise levels of the code.

Proposed Noise Control Measures

The proposed noise control measures consist of sound absorptive interior finishes in the loading dock area, a solid door system at the loading dock entrance, and a nominal 15 ft high noise barrier between the turnaround area and the nearest existing residence. The truck and unloading noise levels expected with these measures are shown in Tables 1-4 for ground level and upper floor levels of surrounding properties.

These measures will provide control of the loading dock noise to meet the DC noise code at the ground level and upper levels of the surrounding residential properties including the existing residence closest to the truck turnaround (except for perhaps brief periods when the door would be opened to allow a truck to enter or exit while another was unloading). These measures will also substantially reduce the noise from trucks

maneuvering in the turnaround area (including the backup alarm noise) at the ground level of the residence closest to the turnaround area.

Subjectively, at ground level the nominal 15 ft high noise barrier is expected to reduce the truck noise and loading dock noise at the residence closest to the turnaround area to a level about one-third as loud as it would otherwise be without the noise barrier. At ground level at this residence with this noise barrier, unloading noise is expected to be well below the existing unloading noise levels and even further below the ambient noise levels. At ground level with this noise barrier, the truck noise levels would be about the same as the ambient noise levels at this residence.

Optional Noise Control Measures

Since the proposed nominal 15 ft high noise barrier would provide little reduction of the truck noise at the upper floor level of the existing residence closest to the truck turnaround area, increasing the height of the noise barrier to 20 ft is an optional measure that could be implemented to achieve more reduction at this location. The truck and unloading noise levels expected with the 20 ft high noise barrier (instead of the 15 ft high noise barrier) are shown in Tables 1-4 for ground level and upper floor levels of surrounding properties. The nominal 20 ft high noise barrier is expected to reduce the truck noise at the upper floor of the residence closest to the turnaround area to a level about one-half as loud as it would otherwise be without the noise barrier. The brief maximum truck noise levels would be comparable to the maximum levels of the ambient noise, and the average truck noise levels would be substantially below the average ambient noise levels at this location.

Construction Details

The loading dock entrance door should be a solid thermal insulated door with a minimum face weight of 1.5 lbs/sq ft (such as 20 gage sheet metal). The noise barrier should be solid with no gaps and have a minimum face weight of 2 lbs/sq ft (such as 3/4 in. plywood).

Nominal 2 in. thick sound absorptive treatments should cover the ceiling and interior wall surfaces of the loading dock area and the inside surface of the noise barrier.

Acceptable nominal 2 in. sound absorptive treatments for the interior surfaces of the loading dock include hardware cloth or perforated sheet metal (with a minimum 20% open area) covered 2 in. thick fiberglass duct liner, 1 in. Tectum covered 1 1/2 in. thick fiberglass duct liner, 2 in. thick spray-ons such as manufactured by International Cellulose Corporation, and suspended 1 1/2 in. fiberglass acoustical tile ceilings such as CertainTeed Capaul Symphony f.

The hardware cloth or perforated sheet metal covered 2 in. thick fiberglass duct liner treatment may also be used for the interior surface (facing toward the noise source) of the noise barrier provided the following details are followed for compatibility with the outdoor environment. The side of the duct liner with the acrylic coating should be the side that is exposed, a waterproof cap should be installed on top of the sound absorptive treatment to prevent water from seeping in behind the duct liner, and the duct liner should be kept 6 in. above the ground to ensure that it does not sit in water for prolonged periods of time.

MECHANICAL EQUIPMENT NOISE

Mechanical equipment is proposed on the rooftop of the Wisconsin Avenue Giant surrounded by a 14 ft high wall. The Wisconsin Avenue Giant has not yet been fully designed, and the mechanical equipment for the building has not yet been selected. However, based on the noise levels measured from the existing rooftop mechanical equipment and based on conditions of maximum noise generation from the equipment, the noise levels from the new rooftop equipment as presently located would comply with the DC noise code at all surrounding residential properties with a properly constructed wall. The 14 ft high wall should be solid with no gaps (except for a nominal 1 in. gap at the bottom if necessary for water drainage), and it should have a minimum face weight of 1.5 lbs/sq ft.

CONCLUSIONS

The proposed noise control measures for the truck and loading dock noise consist of sound absorptive interior finishes in the main loading dock area, a solid door system at the main loading dock entrance, and a nominal 15 ft high noise barrier between the truck turnaround area and the nearest existing residence. With the door system closed, these measures will provide control of the main loading dock noise to meet the DC noise code at the ground level and upper levels of the surrounding residential properties including the existing residence closest to the truck turnaround.

While noise from operation of the delivery trucks is exempt from the DC noise code, the proposed nominal 15 ft high noise barrier would substantially control the truck noise at the ground level of the existing residence closest to the truck turnaround. Optionally, a nominal 20 ft high noise barrier would also substantially control the truck noise at the upper floor level of this residence. With noise levels substantially controlled, the brief maximum truck noise levels would be comparable to the maximum levels of the ambient noise, and the average truck noise levels would be substantially below the average ambient noise levels at this location.

With a properly constructed 14 ft high wall around the Wisconsin Avenue Giant rooftop mechanical equipment area, the noise levels from the new rooftop mechanical equipment are expected to comply with the DC noise code at all surrounding residential properties.

LOCATION 1 AMBIENT NOISE LEVELS
November 11, 2008

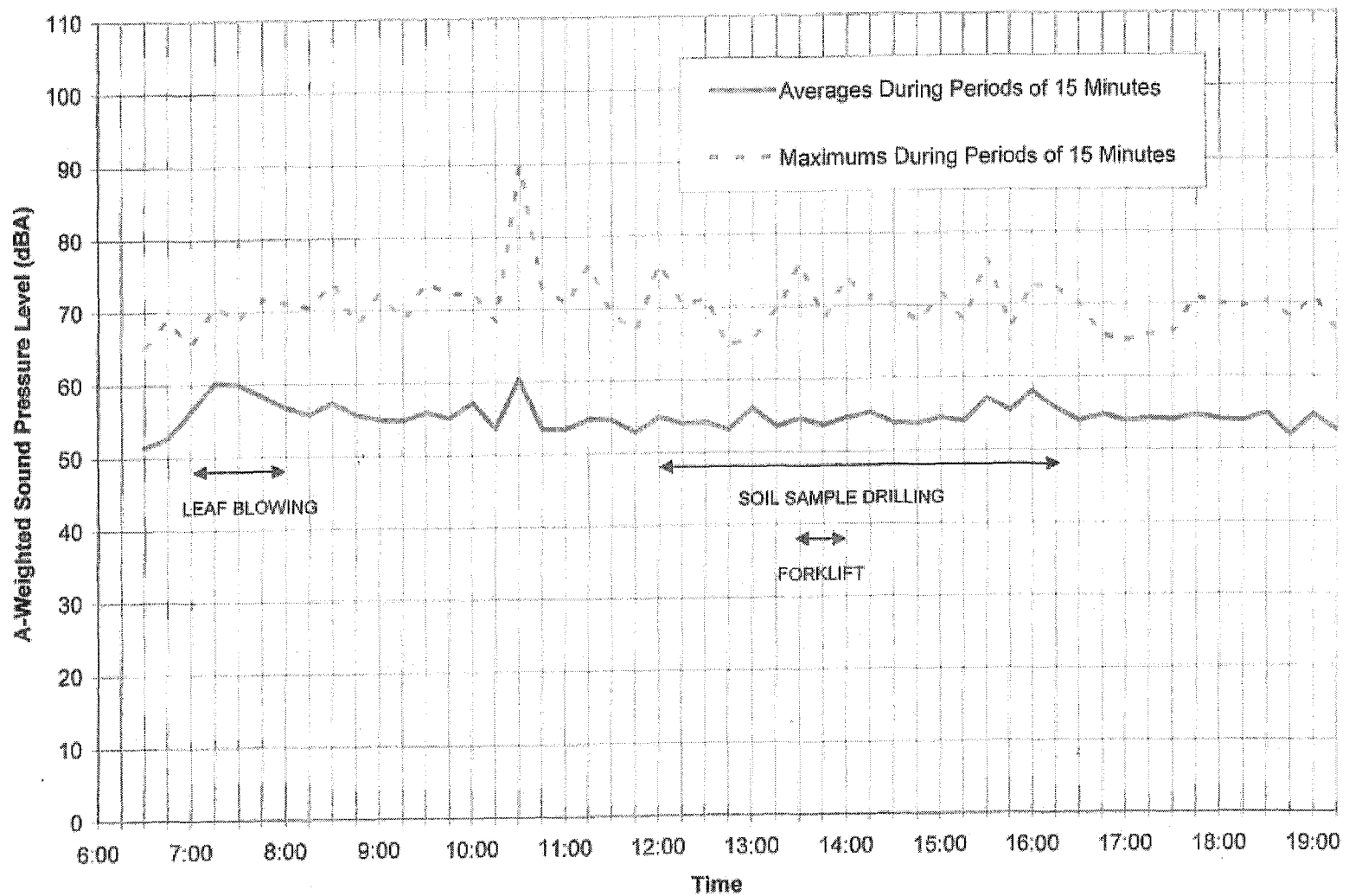


Figure 2

LOCATION 2 AMBIENT NOISE LEVELS
November 11, 2008

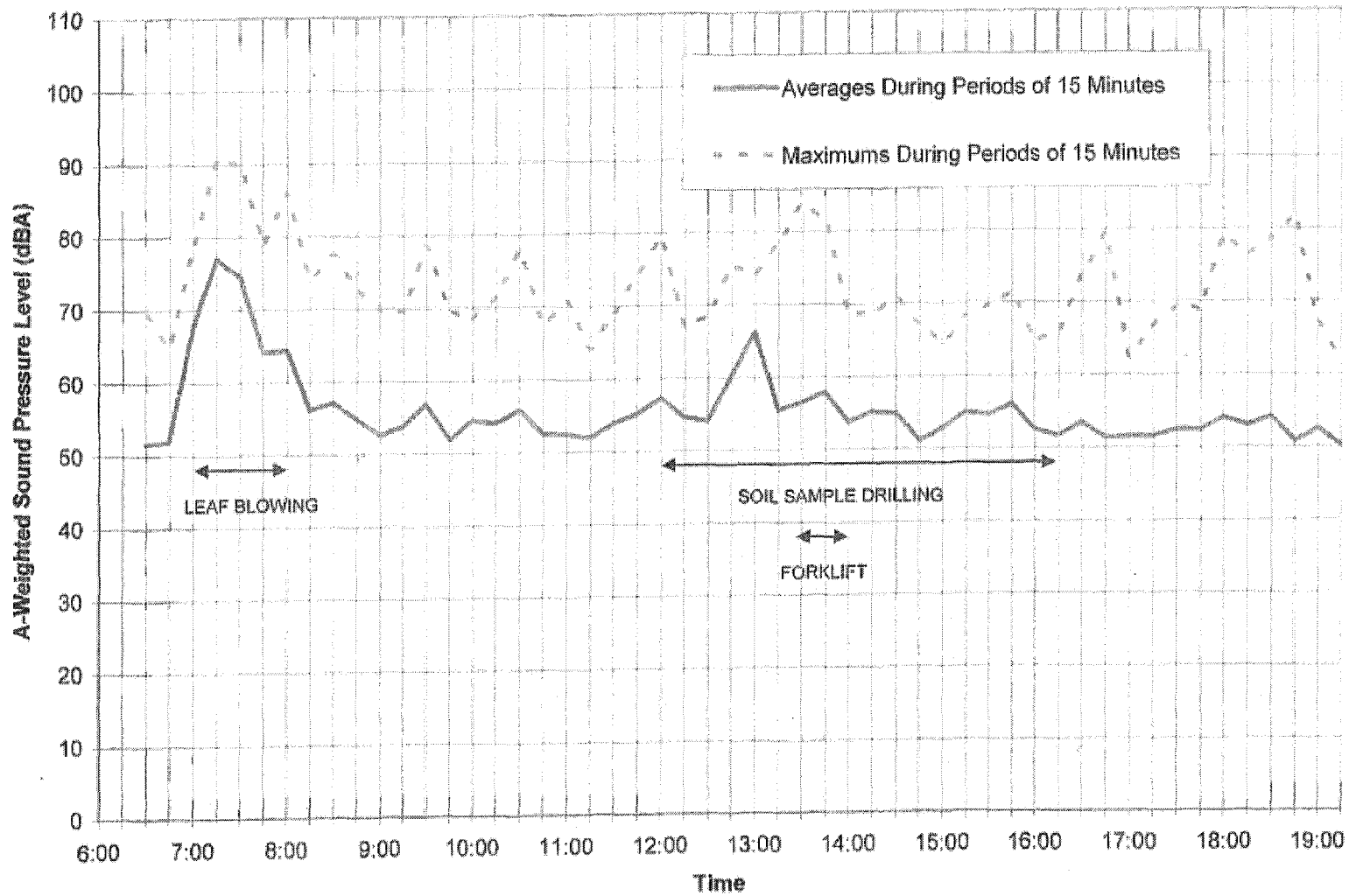


Figure 3

Table 1
WISCONSIN AVENUE GIANT
A-WEIGHTED (dBA) NOISE LEVELS
AT GROUND LEVEL
FROM UNLOADING

Loc.	Level Type	Typical Background Ambient Noise	Unloading Noise		
			Existing	Proposed w/ Noise Control Measures	Proposed w/ Noise Control Measures Optional
1	Avg. ⁽¹⁾	51-57	17-20	0	0
	Max.	65-75	50-61	26-37	24-35
2	Avg. ⁽¹⁾	50-57	30-33	Note 2	Note 2
	Max.	64-82	65-74	Note 2	Note 2
3	Avg. ⁽¹⁾	50-55	34-37	Note 3	Note 3
	Max.	62-80	69-78	Note 3	Note 3
4	Avg. ⁽¹⁾	55-59	27-30	Note 3	Note 3
	Max.	69-82	62-71	Note 3	Note 3
5	Avg. ⁽¹⁾	71-73	Note 3	Note 3	Note 3
	Max.	89-95	Note 3	Note 3	Note 3

Notes:

- (1) Delivery truck noise averaged over the daytime hours between 7:00 a.m. and 9:00 p.m.
- (2) Although the ambient noise levels were measured approximately 5 ft above the existing ground level, the proposed elevation of the ground at this Wisconsin Avenue Giant property location will be substantially lower. The elevation of the microphone of the instrumentation used to measure the background ambient noise levels at this location was roughly the same as the elevations of the bottoms of the windows of the upper floor level of the existing residence closest to the turnaround. Consequently, the noise levels at this location are directly applicable to the upper floor levels of the residence.
- (3) Not a concern because of distance, noise shielding from proposed on-site buildings, noise attenuation measures, and/or dominant background ambient noise.

Table 2
WISCONSIN AVENUE GIANT
A-WEIGHTED (dBA) NOISE LEVELS
AT UPPER BUILDING LEVELS
FROM UNLOADING

Loc. ⁽⁴⁾	Level Type	Typical Background Ambient Noise Measured at Ground Level	Unloading Noise		
			Existing	Proposed w/ Noise Control Measures	Proposed w/ Noise Control Measures Optional
2a	Avg. ⁽¹⁾	50-57 ⁽²⁾	29-32	8-11	1-6
	Max.	64-82 ⁽²⁾	64-73	40-49	33-44
3a	Avg. ⁽¹⁾	50-55	20-23	0	0
	Max.	62-80	53-64	28-37	28-37
4a	Avg. ⁽¹⁾	55-59	27-30	0-1	0-1
	Max.	69-82	62-71	30-39	30-39
5a	Avg. ⁽¹⁾	71-73	Note 3	Note 3	Note 3
	Max.	89-95	Note 3	Note 3	Note 3

Notes:

(1) Delivery truck noise averaged over the daytime hours between 7:00 a.m. and 9:00 p.m.

(2) The elevation of the microphone of the instrumentation used to measure the background ambient noise levels at this location was roughly the same as the elevations of the bottoms of the windows of the upper floor level of the existing residence closest to the turnaround. Consequently, these noise levels are directly applicable to the upper floor levels of the residence.

(3) Not a concern because of distance, noise shielding from proposed on-site buildings, noise attenuation measures, and/or dominant background ambient noise.

(4) Location 2a represents the upper floor level of the residence at 3321 Idaho Ave. NW which is the closest existing residence to the turnaround. Location 3a represents the upper floor levels of the west building face of the apartment building at 3725 Macomb St. NW. Location 4a represents the upper floor levels of the apartment building adjacent to 3400 Idaho Ave. NW. Location 5a represents the upper floor levels of the buildings across Wisconsin Ave. from the Wisconsin Ave. Giant.

Table 3
WISCONSIN AVENUE GIANT
A-WEIGHTED (dBA) NOISE LEVELS
AT GROUND LEVEL
FROM DELIVERY TRUCKS

Loc.	Level Type	Typical Background Ambient Noise	Delivery Truck Noise		
			Existing	Proposed w/ Noise Control Measures	Proposed w/ Noise Control Measures Optional
1	Avg. ⁽¹⁾	51-57	24-27	36-42	34-40
	Max.	65-75	48-59	65-76	63-74
2	Avg. ⁽¹⁾	50-57	40-43	Note 2	Note 2
	Max.	64-82	67-75	Note 2	Note 2
3	Avg. ⁽¹⁾	50-55	44-47	Note 3	Note 3
	Max.	62-80	71-79	Note 3	Note 3
4	Avg. ⁽¹⁾	55-59	37-40	Note 3	Note 3
	Max.	69-82	64-72	Note 3	Note 3
5	Avg. ⁽¹⁾	71-73	Note 3	Note 3	Note 3
	Max.	89-95	Note 3	Note 3	Note 3

Notes:

(1) Delivery truck noise averaged over the daytime hours between 7:00 a.m. and 9:00 p.m.

(2) Although the ambient noise levels were measured approximately 5 ft above the existing ground level, the proposed elevation of the ground at this Wisconsin Avenue Giant property location will be substantially lower. The elevation of the microphone of the instrumentation used to measure the background ambient noise levels at this location was roughly the same as the bottom of the windows of the upper floor level of the existing residence closest to the turnaround. Consequently, these noise levels are directly applicable to the upper floor levels of the residence.

(3) Not a concern because of distance, noise shielding from proposed on-site buildings, noise attenuation measures, and/or dominant background ambient noise.

Table 4
WISCONSIN AVENUE GIANT
A-WEIGHTED (dBA) NOISE LEVELS
AT UPPER BUILDING LEVELS
FROM DELIVERY TRUCKS

Loc. ⁽⁴⁾	Level Type	Typical Background Ambient Noise Measured at Ground Level	Delivery Truck Noise		
			Existing	Proposed w/ Noise Control Measures	Proposed w/ Noise Control Measures Optional
2a	Avg. ⁽¹⁾	50-57 ⁽²⁾	39-42	51-56	43-49
	Max.	64-82 ⁽²⁾	66-74	78-88	72-83
3a	Avg. ⁽¹⁾	50-55	27-30	45-48	45-48
	Max.	62-80	51-62	72-80	72-80
4a	Avg. ⁽¹⁾	55-59	37-40	36-39	36-39
	Max.	69-82	64-72	63-71	63-71
5a	Avg. ⁽¹⁾	71-73	Note 3	Note 3	Note 3
	Max.	89-95	Note 3	Note 3	Note 3

Notes:

(1) Delivery truck noise averaged over the daytime hours between 7:00 a.m. and 9:00 p.m.

(2) The elevation of the microphone of the instrumentation used to measure the background ambient noise levels at this location was roughly the same as the elevations of the bottoms of the windows of the upper floor level of the existing residence closest to the turnaround. Consequently, these noise levels are directly applicable to the upper floor levels of the residence.

(3) Not a concern because of distance, noise shielding from proposed on-site buildings, noise attenuation measures, and/or dominant background ambient noise.

(4) Location 2a represents the upper floor level of the residence at 3321 Idaho Ave. NW which is the closest existing residence to the turnaround. Location 3a represents the upper floor levels of the west building face of the apartment building at 3725 Macomb St. NW. Location 4a represents the upper floor levels of the apartment building adjacent to 3400 Idaho Ave. NW. Location 5a represents the upper floor levels of the buildings across Wisconsin Ave. from the Wisconsin Ave. Giant.