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Wal-Mart Noise Impact Assessment

by

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July 25, 2005

I. INTRODUCTION

Noise Solutions by Greg Zak, Inc. was retained by the firm of Rabin, Myers, Hanken & Durr, P.C., 1300 South Eighth Street, Springfield, Illinois 62703. Mr. John Myers, Attorney-at-Law and President of the firm, was our contact person. We were contracted to evaluate sound pressure (noise) levels expected to be emitted from a proposed Wal-Mart Super Center currently being considered for development on the west end of Springfield. The proposed property boundaries would be Westgate Drive on the north, South Meadowbrook Road on the east, Archer Elevator Road on the west and West Wabash on the south.

The particular concern is the possibility that the noise emissions from the proposed Wal-Mart Super Center will impact the surrounding residential area and also exceed the noise limits prescribed by the Illinois Noise Regulations. We accessed the website for the Southwest Springfield Neighborhood Association at www.ssna.org to supplement the verbal information provided by Mr. Roger Kanerva, a member of the Southwest Springfield Neighborhood Association (SSNA).

We met with Mr. Kanerva at his residence on 1-7-05 and toured the residential area surrounding the proposed new Wal-Mart development with him. In addition, information was gathered from our field trips to the Wal-Mart stores at Parkway Pointe and North Dirksen Parkway, as well as the Sam's Club at West White Oaks Drive, in Springfield, IL. This data was compiled from January 18 through June 9 of 2005.

Noise measurements were taken at the Wal-Mart Super Center on Dirksen on three occasions. This location was selected as it is the closest in representation to the noise levels that will be emitted from the proposed Wabash store location.

This report concludes that the noise emissions generated from the proposed Wal-Mart Super Center on Wabash will exceed the allowable limits for Sections 900.102 and 901.102(b) of Title 35, Sub-Title H, Chapter I of the Illinois Administrative Code.

II. ILLINOIS STATUTES AND REGULATIONS

The applicable portion of the statutes cited is Section 24 and the applicable portion of the Illinois Pollution Control Board (IPCB) regulations cited are Sections 900.102 and 901.102(b).

Section 24 of the Act provides that:

No person shall emit beyond the boundaries of his property any noise that unreasonably interferes with the enjoyment of life or with any lawful business or activity, so as to violate any regulation or standard adopted by the Board under this Act. 415 ILCS 5/24 (2000).

Section 900.102 of the Board's regulations specifies, in relevant part, that no person shall cause or allow the emission of sound beyond the boundaries of his property "so as to cause noise pollution in Illinois...." 35 Ill. Adm. Code 900.102. Noise pollution is defined as "the emission of sound that unreasonably interferes with the enjoyment of life or with any lawful business or activity." 35 Ill. Adm. Code 900.101.

Section 900.102 addresses noise that creates an unreasonable interference (nuisance), and does not specify numerical limits.

Section 901.102(b) regulates nine octave bands covering most of the audible spectrum, from 31.5 Hertz (a deep bass rumbling noise that can often be felt as well as heard) to 8000 Hertz (a very high treble hissing type noise). This section also specifies the allowable decibel levels for nighttime (10 PM to 7 AM) from various land use classifications and are given in Table 1. These limits are for a 1-hour equivalent level (L_{eq}) that is ambient corrected, as specified in Section 900.103(b). The equivalent level forms an energy-average of the sound over the hour. In this case, the Class B land use designation (35 IAC 901 Land Class B 2124, Super store), sometimes referred to as commercial use, is the most appropriate descriptor for the manner in which Wal-Mart will use their land. The complainants' land use, in this case, designation (35 IAC 901 Land Class A 1100, Private household), usually referred to as residential use, is the most accurate descriptor. The appropriate noise limits would be for those noise emissions from Class B land impacting Class A land.

OCTAVE BAND LIMITS

Octave-band Center Frequency (Hz)	31.5	63	125	250	500	1000	2000	4000	8000
901.102(b) (Nighttime) B to A Land Use	63	61	55	47	40	35	30	25	25

Table 1. Illinois Pollution Control Board nighttime limits (in dB) for sound emitted from Class B (commercial) to Class A (residential) land uses. The octave band limits are for continuous, quasi-continuous or intermittent sound.

III. FIELDWORK

Greg Zak and Pat Zak of Noise Solutions by Greg Zak, Inc. met with Roger Kanerva, at his residence 2827 Cronin Drive at 10 AM on January 7, 2005. Upon arrival, Mr. Kanerva gave us additional information so that we could better determine where the proposed Center would be located based on the preliminary plans for the development, including a map labeled "Concept Plan "L" Springfield, IL Access Scenario 4" dated 10/20/04. This map indicates that Wal-Mart's main building is located at the north end of the development area and faces south toward what will be their parking lot. On the west side of the drawing of their building, there appears to be a bank of chillers.

Mr. Kanerva then accompanied us on a tour of the residential area that would be affected by the proposed Wal-Mart operation, along with pointing out the area of the proposed development south of Westgate Drive (see Map 1, page 8). The expected noise generated from their operations would be in close proximity to the Kanerva residence, as well as that of the adjoining neighborhood.

In order to project the possible noise impact of this new Wal-Mart development on the surrounding residential area, we decided that observing operations and taking measurements of existing Wal-Mart stores in Springfield would provide us with a baseline from which to work.

1. Parkway Pointe

We visited the Parkway Pointe Wal-Mart on 2-1, 3-8 and 3-14-05. Photographs were taken and the following observations were made. From the standpoint of potential noise impact, the store appears to be well located. Deliveries are made by semi-truck passing by the west side of the store and unloading at a dock at the southwest corner of their building. The area is heavily commercial with other nearby facilities being supplied by semi-truck deliveries. On the north side of the store, is an automotive service area consisting of 6 bays facing Lindbergh Boulevard. Sparkling Clean Car Wash, Prairie House Furnishings and the Parkway Pointe 8 Theatres are situated on the other side of Lindbergh. Noise should not be an issue in this area. During our visits, no semi-trucks were unloading and due to the cold temperatures, all the doors for the auto service area were closed. No noise was audible coming from Wal-Mart. Due to the heavy traffic volume on Lindbergh and the presence of many potentially noisy activities and facilities in the area, we felt that attempts to take noise measurements would produce marginal results.

2. Sam's Club

The client suggested visits to this location. We visited this facility twice. This store, while having an automobile service area and semi-truck unloading area, appeared to be well situated in a commercial setting where noise would not normally be an issue. During our visits, no significant amounts of noise were being generated. Since this facility appears to be structurally dissimilar to the proposed development, we decided to concentrate our efforts on the super center on Dirksen.

3. Dirksen Parkway Super Center

The first two visits to the Wal-Mart on the northeast end of Springfield were January 18 at approximately 2:30 PM and February 1 at 11:50 AM. Photographs were taken and the following observations were made. The building faces toward the west where the major parking area is situated. In the process of driving around the entire facility, we observed 7 truck unloading bays (4 on the east side of the store, in the northeast corner and 3 on the south side of the store in the southeast corner). There were 8 auto service bays, 4 were facing west and 4 were facing east. The west-facing bays were situated in a "U" shape, which is a good configuration to focus noise. The building has refrigeration units for dairy, meat, produce and freezers. It also has air conditioning to cool the building during hot weather. The building has a Big R to the north, a Lowe's to the south, Ryans Steakhouse and Dirksen Parkway to the west. This store is situated in a very commercial location, with a large amount of open area on its north and east sides.

During our 2-1-05 visit, we noted a semi being unloaded at one of the unloading bays in the northeast corner. The truck pulled out a few minutes after our arrival preventing us from taking any noise measurements of it. However, we did note a considerable amount of clanging and banging from the doors and tailgates on the truck and the doors on the facility. In addition, the idling and gunning of the diesel truck's engine was plainly audible. During that same visit, we noted a considerable amount of noise being generated by refrigeration chillers located at ground level on the north side of the building.

It is quite likely the chillers for the building's air conditioning are located in the same area as those for refrigeration, but we were not able to verify this supposition. Due to the cold weather, only a minimal amount of this equipment was running (yet it was very noisy and would generate even more noise in warm weather).

On June 9, 2005, we again visited this facility and obtained noise level measurements representing the chiller noise during warm weather. (See Table 2, Row 3).

4. Proposed Wal-Mart Super Center – Wabash

Our fieldwork began with our tour of the proposed site for the Wal-Mart Super Center with Roger Kanerva on 1-7-05. This proposed development is to be located on Westgate Drive on the north, South Meadowbrook Road on the east, Archer Elevator Road on the west and West Wabash on the south (see Map 1, page 8). We took photographs of the area. Using a laser range finder, we determined the distance from the proposed Wal-Mart to the nearest residences to the northwest (594 feet) and northeast (597 feet) to be approximately 600 feet (see Maps 1 and 2, pages 8 and 9).

IV. MEASUREMENTS

1. Measurement Locations

The measurements using our laser range finder were taken from the proposed Wal-Mart site on north Westgate Drive to the two closest residences. The closest house to the northeast, 2923 Cronin Drive, is a distance of 597 feet from the center of the proposed site. The house that is nearest on the northwest is 14 Lear Street, at a distance of 594 feet from the center of the proposed Wal-Mart development.

Given this short distance of approximately 600 feet, it is very unlikely that Wal-Mart will be willing to (or even able to) incorporate in their design sufficient noise control to meet the Illinois nighttime noise limits. (See Table 2, Row 4).

We subsequently visited the Wal-Mart Super Center on Dirksen eight times following our visit on 2-1-05 (10 visits in total). As previously discussed, the predominant source of noise during our visits was the chiller units on the north side of the store, which we measured on three separate occasions. We have concentrated on this particular store because that is where we feel we can get the most representative noise measurements for predicting the noise impact for the proposed development. (See Table 2, Rows 1, 2 and 3).

2. Equipment

A Larson-Davis Laboratories Model 2900 Real Time Analyzer with associated microphone and pre-amplifier was used to perform the measurements. This combination of instrumentation meets the requirements for a Type 1 Sound Level Meter, as defined in American National Standards Institute (ANSI) S1.4-1983 and ANSI S1.4A-1985. This instrumentation also meets the requirements of International Electro-technical Commission (IEC) 651 for a Type 1 SLM and IEC 804 for a Type 1 Integrating SLM. (Note: An integrating SLM is preferred for this type of measurement). The octave band-filters in the Model 2900 Real Time Analyzer meet the requirements of IEC 225 and ANSI

S1.11-1985. The microphone and pre-amplifier were mounted on a tripod and separated from the analyzer by a 10-foot cable.

Calibration was performed using a Larson-Davis Laboratories Model 250 calibrator that meets the Type 1 requirements for acoustical calibrators. Calibration was performed before and after the measurements, and did not vary by more than 0.1 dB. The measurements were performed in accordance with applicable American National Standards.

A Laser Range Finder Model Yardage Pro 1000 manufactured by Bushnell, with an accuracy at a thousand yards of +/- 1 yard, was used to verify distance measurements.

3. Measurement Procedures

Measurements were made to be able to accurately predict compliance or lack thereof. The analyzer was calibrated before and after the various measurements were taken. Battery condition of all equipment was monitored continuously. Weather observations were made prior to and at the end of the measurement period. During each test, wind speeds, wind direction, temperature, humidity, and barometric pressure were well within the equipment manufacturer's and IPCB guidelines. Measurements were taken in octave band, 1/3 octave band and dB(A). We took sound level measurements at the Wal-Mart on Dirksen on three occasions, 2-1, 3-17 and 6-9-05. These results are illustrated in the first three rows in Table 2.

Since the IPCB requires all noise data to be ambient corrected, as specified in Section 900.103(b), the protocols below were followed. Background (ambient) sound levels were established using the tables for that purpose found in ANSI S12.-1993/Part 3 and Section 910.106(b)(6)(E)(iv), Appendix A, Table D. This data was derived from extensive measurements conducted in the Chicago area and are based on "predominant land use and time of day" (either daytime or nighttime). They are then divided into 5 categories, Category 1 being the noisiest urban industrial setting through Category 5, the quietest rural setting. Category 4 appears to be the most representative of this location site depicted as a "quiet residential area." Using Category 4, the appropriate ambient noise levels by octave band frequency are found in Section 910 Appendix A (Table D). We feel the general nature of the neighborhood around Cronin and Lear Drives would fall into Category 4. Those ambient levels used are shown in Table 2, Row 5.

When ambient levels fall ten or more decibels below the noise source, there is no correction needed. This is because the actual correction is less than 0.5 dB, which is lost in the rounding process. Ambient levels, within 3 dB or less of the levels measured for a noise source, call for assigning a zero to any octave band measurements meeting this criteria per the ANSI standards [ANSI S12.9-1993/Part 3, (8.8)(a)(i)].

V. RESULTS AND DISCUSSION

Based on our previous observations and noise measurements at the Wal-Mart Super Center on Dirksen, we anticipate that the most significant noise impact from the proposed Wal-Mart will be emanating from the chiller units that will be running continuously, creating a probable violation of 901.102(b) of the IPCB regulations. The table below indicates in Row 6 what the allowable nighttime decibel levels