I-265

Louisville, Kentucky

NOISE IMPACT STUDY

Prepared in accordance with Louisville Development Code Chapter 5 Section1.7.E

Prepared for:

Mindel Scott and Associates

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Prepared by:

Teak-Keun Kim, PhD, PE
Raleigh, NC 27614

INTRODUCTION

A study was made of the effects that the operation of I-265 would have on the noise environment at the proposed Cedar Heights Subdivision Property located in the southwest quadrant of I-265 and Bardstown Road in Louisville, Jefferson County, Kentucky. The study was prepared consistent with the Louisville Development Code Chapter 5 Section1.7.E, which constitutes the noise compatibility requirements for residential development in Metro Louisville. This section of the code requires that new residential development approximately 250 feet of an existing I-265 must not exceed a sound level of 65 dBA Leq. If sound levels at any residential structure exceed 65 dBA Leq, appropriate abatement strategies must be recommended.

METHODOLOGY

Leq is the equivalent energy level, and is similar to an average value of the sound levels occurring over a period of time. The unit for Leq is the A-weighted decibel, abbreviated

"dBA". The dBA unit takes into account the characteristics of the human hearing mechanism as well the acoustic energy generated by the source.

The code requires that the study be based upon projected future traffic data provided by the Planning Commission. The year 2029 was selected as the study year, in accordance with industry practice. The year 2029 projected traffic and truck number were determined based on the KYTC information website:

http://datamart.business.transportation.ky.gov/EDSB_SOLUTIONS/CTS/StationDetail.aspx?STATION=056P98&TF_NE_ID=41582542

The traffic counts were adjusted to 2029 values using approximately 3 percent growth factor Based upon conversations with Ms. Dante St. Germain, AICP, Planner II of Planning & Design Services of the Department of Develop Louisville. Total two-way 2029 Annual Average Daily Traffic (AADT) for I-265 was determined to be 101,073, with the 3.7% for medium truck and 6.4% for heavy truck for I-265. This value was converted to an afternoon peak hour using the conversion factor of approximately 9.6 percent extracted from the websites shown above. The worst traffic noise conditions shall be evaluated as the lesser of the design hour factor percentage of the AADT or the roadway vehicle Level of Service "C" (LOS C) operating at the free flow speed condition. Numerous empirical evaluations and theoretical assessments have confirmed a widely accepted relationship between the loudest traffic hour and the "Level of Service" (LOS) C traffic volumes. When traffic volumes exceed LOS C, vehicles must slow down, and noise emissions are reduced (source: https://www.fhwa.dot.gov/Environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/polguide02.cfm).

The LOS C volumes is used for this study because the LOS C volumes is lesser than

the design hour factor percentage of the 2029 AADT volumes. The number of automobiles, medium trucks, and heavy trucks for a given roadway segment were calculated based on the LOS C volumes.

In order to calculate 2029 Leq values, the currently accepted state-of-the-art noise prediction program was used. That program is the USDOT Federal Highway Administration's (FHWA) Traffic Noise Model, TNM, version 2.5, commonly referred to as TNM 2.5. Information on TNM 2.5 may be found at:

http://www.fhwa.dot.gov/environment/noise/traffic_noise_model/tnm_v25

2019 NOISE MEASUREMENTS

Ambient noise measurements on Thursday, October 10, 2019 was conducted. The measurements were made with a Larson-Davis SoundTrack LxT Type 1, which was calibrated before and after the measurements. Weather conditions were clear and calm. Measurements were conducted based on the acceptable collection of existing noise level readings according to the FHWA Report, FHWA-PD-96-046, and "Measurement of Highway Related Noise." I-265 traffic noise was dominant at measurement locations. Ambient noise measurements obtained in the field ranged from 61 to 64 dBA Leq on Thursday, October 10, 2019.

ANALYSIS

Figure 1 shows a proposed plan view of the project site, as provided by Mindel Scott & Associates that is located in Louisville, Kentucky. The figure includes the location of modeled receiver, measurement location, and proposed noise barrier. Figure 2 shows the TNM 2.5-generated plan view of the project site. Table 1 below shows a summary

of the results. In determining traffic noise impacts, a highway agency shall give primary consideration to exterior areas where frequent human use occurs based on CFR 772.11 Analysis of traffic noise impacts.

Six (6) receivers, which are facing to I-265, are predicted to be impacted (refer to Table 1 and Figure 1). Therefore, appropriate abatement strategies must be recommended. Note that the Leq values have been rounded to the nearest whole number, in accordance with industry practice. Note that there is one receiver assigned for each residential building. Table 2 shows the results of the TNM 2.5 analysis for 2029.

Table 1: Leq values in dB(A)

Receiver	Leq in dB(A) w/o barrier	Leq in dB(A) with barrier	Receiver	Leq in dB(A) w/o barrier	Leq in dB(A) with barrier
R-01	64	64	R-10	62	62
R-02	63	62	R-11	63	62
R-03	62	61	R-12	65	62
R-04	66	63	R-13	65	62
R-05	65	63	R-14	66	63
R-06	63	62	R-15	63	62
R-07	63	62	R-16	63	62
R-08	61	61	R-17	65	61
R-09	62	61			

XX exceed 65 dBA Leq

Note 1: W/O barrier noise levels are based on the existing topography.

Note 2: Assumed similar ground elevations between the proposed noise barriers and the impacted receivers

CONCLUSION AND RECOMMENDATION

Because 2029 Leq values exceed the 65 dBA criteria, a noise barrier will be required. The values shown as "Leq with barrier" include the effects of a five-foot high barrier located (refer to Figure 3) as close to the property line as feasible, and on the assumed similar ground elevations between the proposed noise barriers and the impacted receivers.

Figure 1: Rec ver, Measurement, and Nois Barrier location

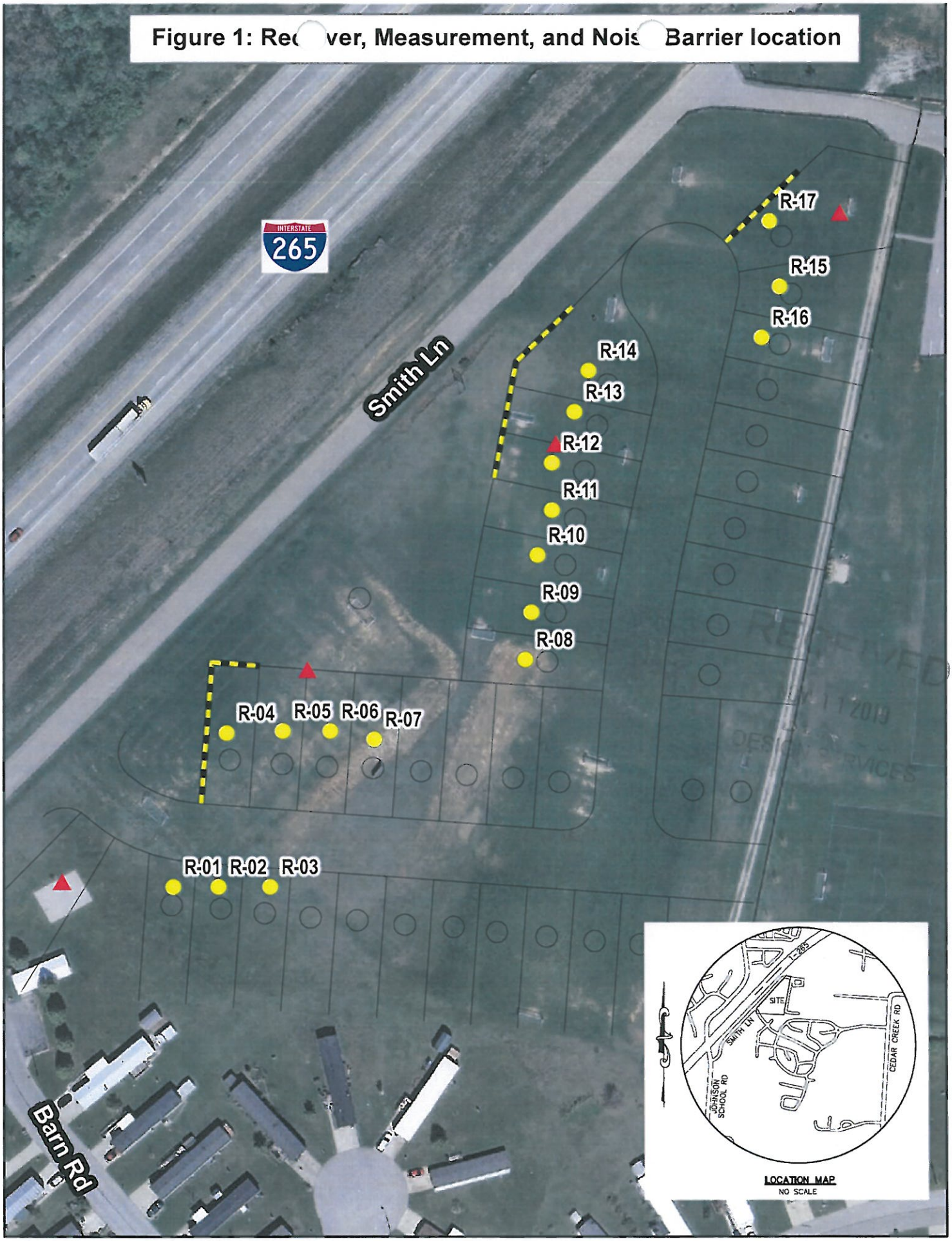

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Figure 2: TNM 2.5-generated plan view of the project site

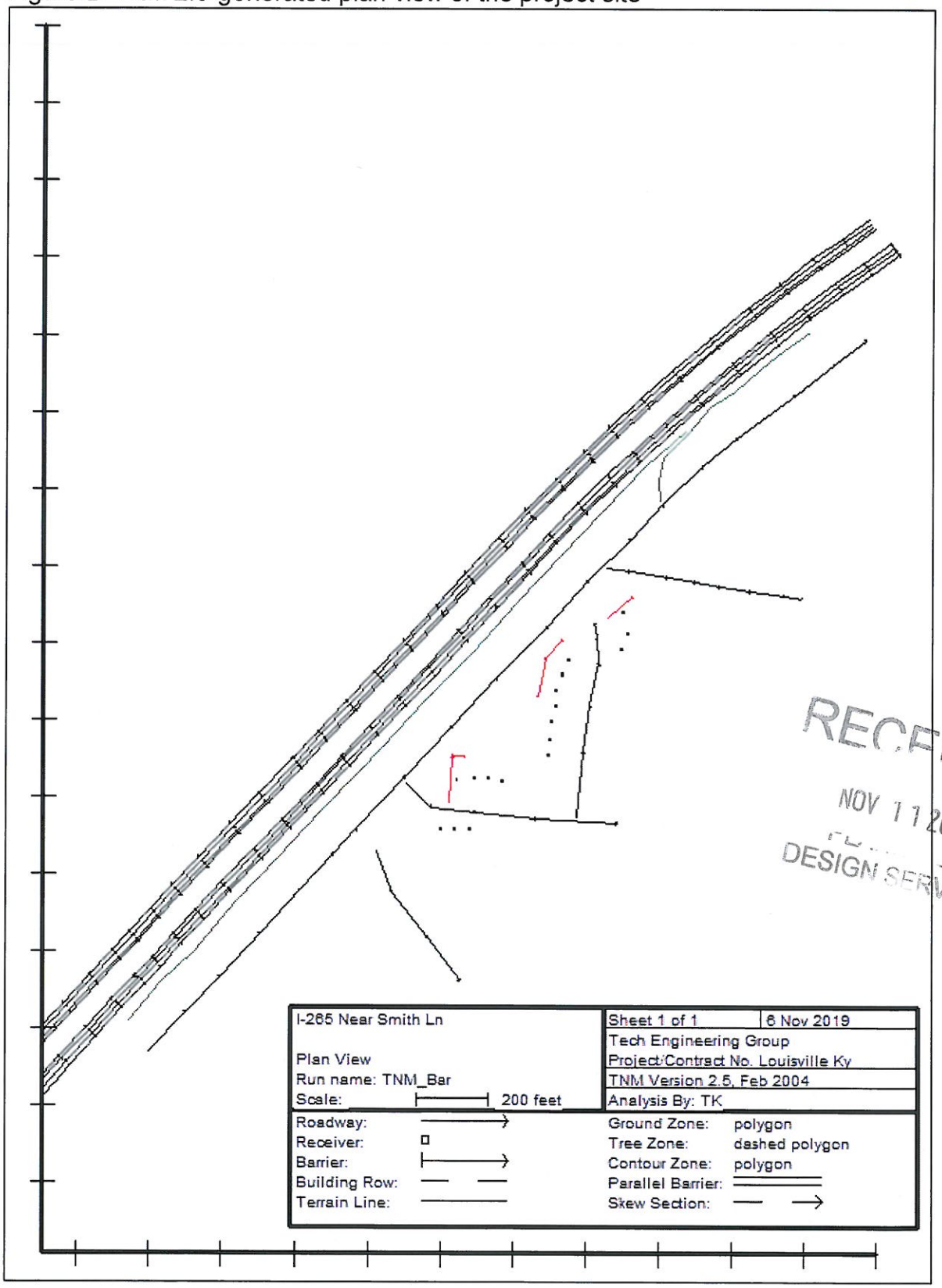


Figure 3: TNM 2.5-generated plan view of the barrier design

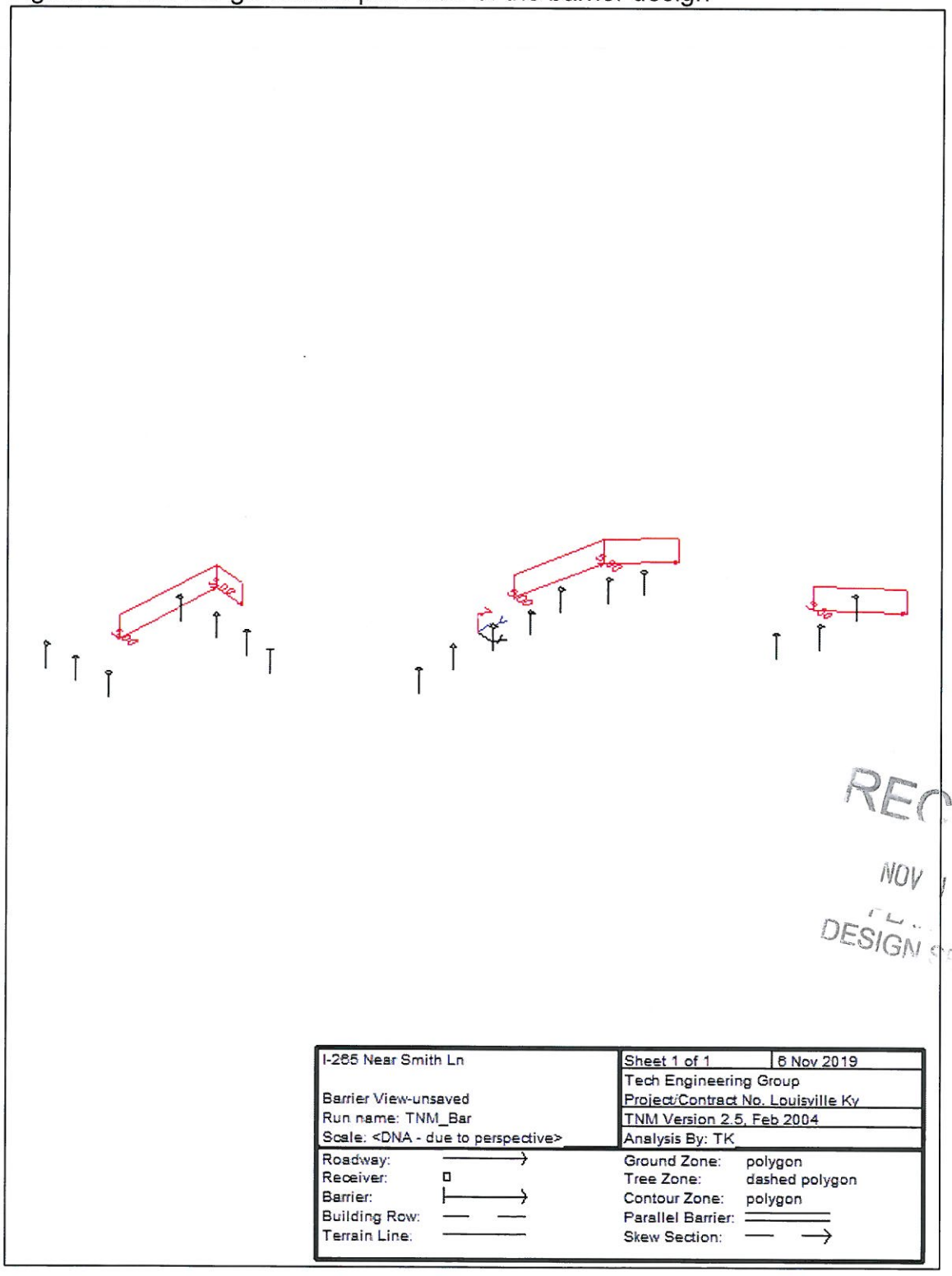
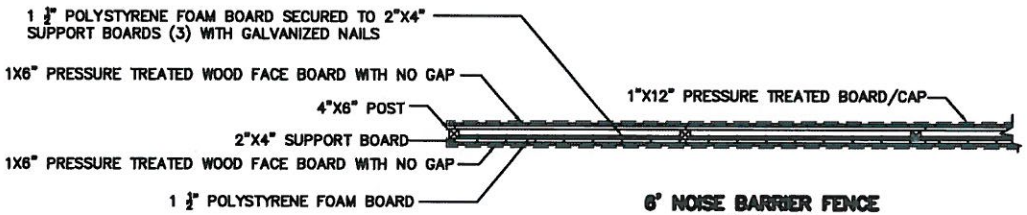
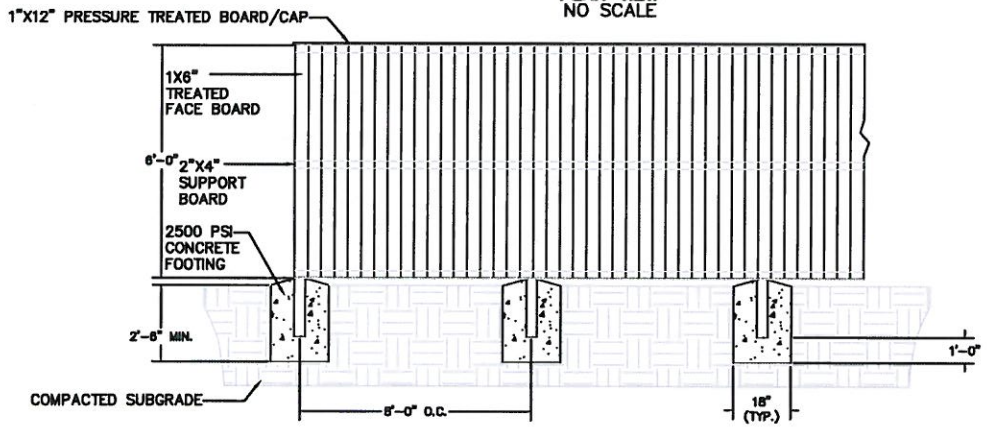


Table 2: TNM 2.5-generated noise levels results file.

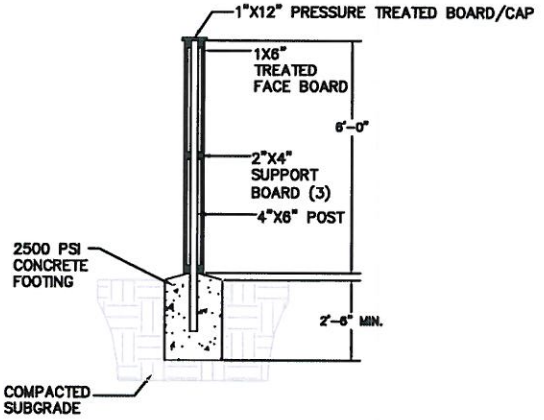
	No Barrier				With Barrier			
	LAeq1h		Increase over existing		Calculated	Noise Reduction		
	Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	LAeq1h	Calculated	Goal	Calculated minus Goal
	dBA	dBA	dB	dB	dBA	dB	dB	dB
R-01	63.6	66	63.6	10	63.5	0.2	8	-7.8
R-02	62.7	66	62.7	10	62.4	0.3	8	-7.7
R-03	61.9	66	61.9	10	61.2	0.7	8	-7.3
R-04	66.4	66	66.4	10	62.6	3.8	8	-4.2
R-05	64.5	66	64.5	10	62.7	1.7	8	-6.3
R-06	63.3	66	63.3	10	62.3	1.1	8	-6.9
R-07	62.5	66	62.5	10	61.7	0.9	8	-7.1
R-08	61.3	66	61.3	10	60.7	0.5	8	-7.5
R-09	61.6	66	61.6	10	61.2	0.4	8	-7.6
R-10	62.4	66	62.4	10	61.7	0.8	8	-7.2
R-11	63.2	66	63.2	10	61.5	1.6	8	-6.4
R-12	64.6	66	64.6	10	61.8	2.8	8	-5.2
R-13	65.3	66	65.3	10	62.3	2.7	8	-5.3
R-14	65.9	66	65.9	10	63.1	2.6	8	-5.4
R-15	63.2	66	63.2	10	61.7	1.4	8	-6.6
R-16	62.6	66	62.6	10	62.0	0.5	8	-7.5
R-17	64.8	66	64.8	10	61.3	3.5	8	-4.5



6' NOISE BARRIER FENCE
PLAN VIEW
NO SCALE



6' NOISE BARRIER FENCE
ELEVATION
NO SCALE



6' NOISE BARRIER FENCE
SECTION
NO SCALE