



July 6, 2006

Ref. No. 119503

Mr. John Hession, P.E.  
Senior Project Manager  
Vanasse Hangen Brustlin, Inc.  
101 Walnut Street  
Watertown, MA 02471

**Re: Morrill's Crossing, Portland, ME – Sound Level Impact Assessment Report  
Peer Review by Resource Systems Engineering – June 19, 2006**

**PRINCIPALS**

Theodore A Barten, PE

Margaret B Briggs

Michael E Guski, CCM

Samuel G Mygatt, LLB

Dale T Raczynski, PE

Cindy Schlessinger

Lester B Smith, Jr

Victoria H Fletcher, RLA

Robert D O'Neal, CCM

Dear John:

Epsilon Associates, Inc. (Epsilon) is in receipt of the letter from Resource Systems Engineering (RSE) dated June 19, 2006. Their review covered the Epsilon Sound Level Impact Assessment Report – City of Portland for Morrill's Crossing dated May 16, 2006 (the "report"). In addition, Epsilon met with you, Natalie Burns, Scott Bodwell of RSE, and several City of Portland staff members (Marge, Sarah, Alex, Penny) on June 30, 2006 to discuss noise issues. This letter responds to their questions or concerns, and provides additional backup information where warranted.

**Receptor Points**

RSE agrees with the selection of the receptors points for determining compliance with the City of Portland noise limits.

**Exemptions**

RSE agrees with the discussion of exempt noise sources as they apply to the City of Portland noise limits.

**Noise Levels and Analysis (pages 2 and 3)**

*Noise Source Categories*

In reviewing the original noise source data, it was not clear if engine noise may have contributed to the Lmax of 80 dBA at some time during the unloading process at the receiving dock. Since engine noise from trucks maneuvering into the docks is not subject to the City noise regulations, additional detail was required from the various activities that constitute the receiving process once the truck is parked at the dock. Therefore, a noise measurement program was conducted at an existing Stop & Shop Supermarket in Westborough, MA.

Based on observations in Westborough, various activities were monitored including opening/closing the truck door, raising/lowering the dock leveling plate, etc. The

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maximum sound levels from these sources were evaluated in the May 16, 2006 report. This list of sources was similar to one collected for a nearby Shaw's Supermarket in Portland during 2000 and submitted to the Portland Planning Board.<sup>1</sup> The data collected at the Stop & Shop in Westborough are more source-specific to the receiving dock and were used to refine the expected sound levels from these activities. Thus the 80 dBA source from the original noise report was eliminated.

#### *Scope of Report*

The May 16, 2006 report assesses compliance with the City of Portland B-2 noise regulations as per the Planning Board's request.

#### *Other Intermittent Sources*

It is Stop & Shop Supermarket's policy not to allow idling trucks at the receiving docks. The store will install a sign at both docks stating this policy. There may be noise from occasional activities within the site such as:

- Picking up the compactor bins for off-site disposal, and
- Routine parking lot sweeping or vacuuming.

Since these activities are associated with moving vehicles within the site, they are not subject to the City noise regulations. Nonetheless, Stop & Shop Supermarket will minimize any potential noise impacts from these occasional activities through mutually agreeable hours. Compactor bin pick-up and parking lot cleaning will be a daytime only activity limited to the hours of 7 a.m. to 9 p.m. In addition, truck delivery hours will be from 7 a.m. to 10 p.m.

Snowplowing, a normal winter activity in Maine, was also discussed at the meeting on June 30 and determined to be exempt by the City Zoning Administrator. Since snowstorms can not be "scheduled," snowplowing will be done as needed to clear the parking lot during either daytime or nighttime hours.

#### *Combined Sound Levels*

It is important to understand that the rooftop equipment is ALREADY COMBINED in the modeling – all 36 rooftop condenser fans, the Seasons4 HVAC unit, and the mechanical penthouse with compressors. Conservatism is already built in as we have assumed all units are running simultaneously at 100% capacity for comparison to the nighttime noise limit. This will not occur at night due to cooler ambient temperatures

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<sup>1</sup> Letter report prepared by Cavanaugh Tocci Associates, Inc., for Shaw's Supermarket, Northgate Shopping Center, Portland, ME, dated August 31, 2000.

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and some redundancy in the equipment.

Although still conservative, one possible scenario is that the continuous rooftop sources and one or two truck refrigeration units operate briefly together. It is important to understand that even the truck refrigeration units do not operate very frequently once they are parked at the docks. Due to improvements in trailer construction and insulation materials, the trailer holds the proper temperature for an extended period of time. The refrigeration unit typically runs on the order of 5 minutes to return the trailer to temperature.

Nonetheless, a combined scenario was modeled assuming all rooftop equipment plus two refrigeration trailers at the north receiving dock run simultaneously. Stop & Shop is willing to accept a nighttime restriction on the northern compactor to daytime hours only (7 a.m. to 9 p.m.) similar to the southern compactor. This eliminates the compactor from needing to comply with the nighttime noise limits.

This modeling was conducted using the Cadna/A noise calculation model (DataKustik Corporation, 2005). This model uses the ISO 9613-2 industrial standard for sound propagation (Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation).

The Cadna/A model allows for octave band calculation of noise from multiple noise sources, as well as computation of diffraction around building edges, and multiple reflections off parallel buildings and solid ground areas. In this manner, all significant noise sources and geometric propagation effects are accounted for in the noise modeling. For the short distances involved in this modeling, flat terrain was assumed. Shielding credit from onsite structures was taken in the modeling where appropriate. The model was run with standard meteorology conditions of 20 degrees C (68 degrees F), 50% relative humidity, and no wind. To be conservative, no ground attenuation credit was taken by the model.

Table 1A is produced directly from Cadna/A and summarizes the point source input data. This table shows only the A-weighted broadband data. However, the actual sound power level octave band data were input to Cadna/A and used in the modeling. Hardcopy printouts showing the octave band data for the four different sources are included as Tables 1B, 1C, 1D, and 1E.

As per discussions with RSE, the maximum order of reflections was set to 2 in Cadna/A. The rear of the store wall will be built from plain face construction masonry units (CMUs). With respect to the reflection type of the rear store wall, the smooth façade/reflective barrier option was selected using the default reflection loss of 1 dB. Gridded receptors with a spacing of 50 feet were analyzed as well as the three discrete points labeled "A", "B", and "C" to correspond to the points in Figure 5 of the

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May 16, 2006 report.

The results of the combined source modeling are shown in the attached Figure 1. The five sources are shown as red "plus" symbols (+). This plot shows the numerical values at each grid point as well as the sound level contours. Figure 1 shows the 60 dBA contour is right at the corner of the site property line. Maximum sound level impacts at the nearest property line from the combined sources are 60.0 dBA at Point "B", 54.6 dBA at Point "A", and 43.2 dBA at Point "C." The attached Table 2 is produced directly from Cadna/A with the results at the three discrete receptors.

#### Noise Barrier (page 3)

The site in this area is relatively flat and the horizontal distances were measured from the site plan included as Figure 6 in the May 16, 2006 Epsilon report. The heights above ground level (AGL) of various structures of interest are listed below:

- Main store roof = 28 ft, 2 in.
- Receiving dock roof = 20 ft, 9 in.
- Top of 18-wheeler trailer = 13 ft
- Refrigeration unit on trailer = 6 ft to 13 ft (12 ft used in model)
- Receiving dock barrier = 14 ft

With respect to the reflection type, the smooth façade/reflective barrier option was selected with both sides of the barrier using the default reflection loss of 1 dB (same as the rear store wall).

The results of the combined source modeling with a 14-foot high barrier wall are shown in the attached Figure 2. This plot shows the numerical values at each grid point as well as the sound level contours. Maximum sound level impacts at the nearest property line from the combined sources are 53.2 dBA at Point "B", 51.5 dBA at Point "A", and 43.2 dBA at Point "C." The attached Table 3 is produced directly from Cadna/A with the results at the three discrete receptors. The 55 dBA contour remains on the site property. The results of the Cadna/A modeling show that the barrier wall will reduce sound levels approximately 7 dBA over the case without the barrier wall.

This refined modeling using Cadna/A confirms the reasonableness of the predictions of the mitigated compactor sound levels (May 16, 2006 report) and the ability of the compactor to meet the City noise limits with a sound wall in place. That modeling showed the compactor is expected to meet the nighttime noise limit of 55 dBA (with mitigation) but Stop & Shop Supermarket has agreed to limit use of both compactors to daytime only (60 dBA limit).

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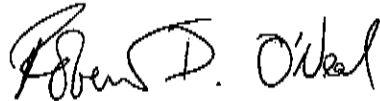
Information on the barrier transmission loss (TL) by octave band will come from the selected barrier manufacturer. At this time, several possible options are being considered. The manufacturer's cut sheets will provide an idea of the expected TL (or approved equal). These can be reviewed by the City and/or their consultant prior to construction.

The barrier can not be extended significantly to the south due to an emergency vehicle access near the truck turning area. This is required by the City and can not be blocked for safety reasons.

If you have any questions on these responses, please feel free to call at (978) 461-6236.

Very truly yours,

EPSILON ASSOCIATES, Inc.

A handwritten signature in black ink that reads "Robert D. O'Neal". The signature is written in a cursive style with a large, prominent "R" and "O".

Robert D. O'Neal, INCE  
Principal

Cc: Linda Costanzo, Stop & Shop Supermarket

Name	M. ID	Result. PWL		Lw / Li		Correction		Sound Reduc. Attenu		Operating Time			K0	Freq. (Hz)	Direct	Height (m)	Coordinates		
		Day (dBA)	Night (dBA)	Type	Value	nom. dB(A)	Day dB(A)	Night dB(A)	R	Area (m²)	Day (min)	Special (min)					Night (min)	X (m)	Y (m)
Mechanical Penthouse	+ MP	90.7	90.7	Lw	MP		0.0	0.0					0.0	(none)		2.44 g	157.34	48.42	11.03
Seasons4	+ HVAC	89.8	89.8	Lw	HVAC		0.0	0.0					0.0	(none)		2.44 g	159.77	53.21	11.03
Fan Condensers	+ FC	86.3	86.3	Lw	FC		0.0	0.0					0.0	(none)		2.54 g	153.17	44.09	11.13
Truck Reefer Unit 1	+ TR1	98.0	98.0	Lw	TR1		0.0	0.0					0.0	(none)		3.66 r	173.94	57.03	3.66
Truck Reefer Unit 2	+ TR2	98.0	98.0	Lw	TR2		0.0	0.0					0.0	(none)		3.66 r	177.29	55.61	3.66



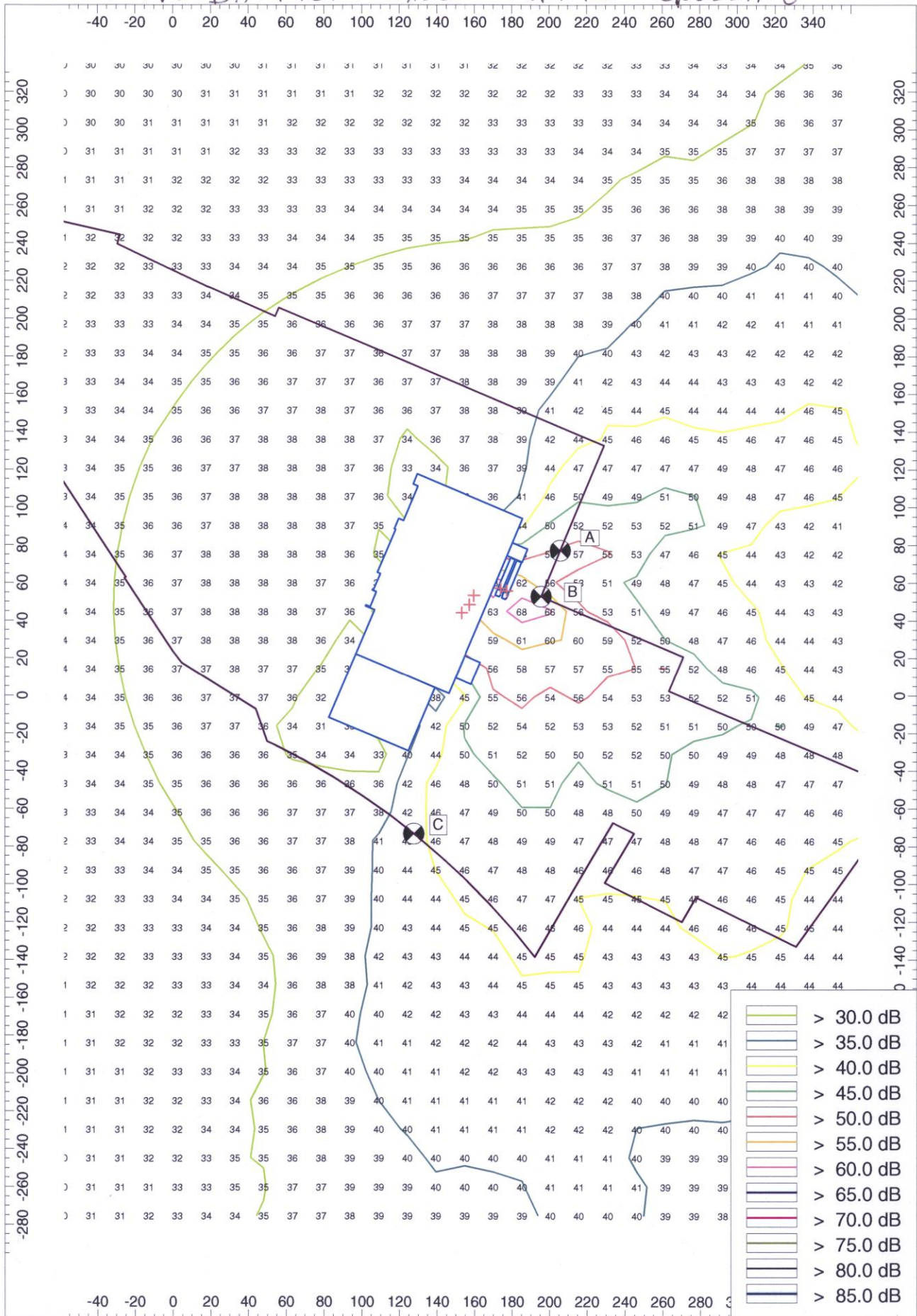








FIGURE 1. NO BARRIER CASE -- MORRILL'S CROSSING

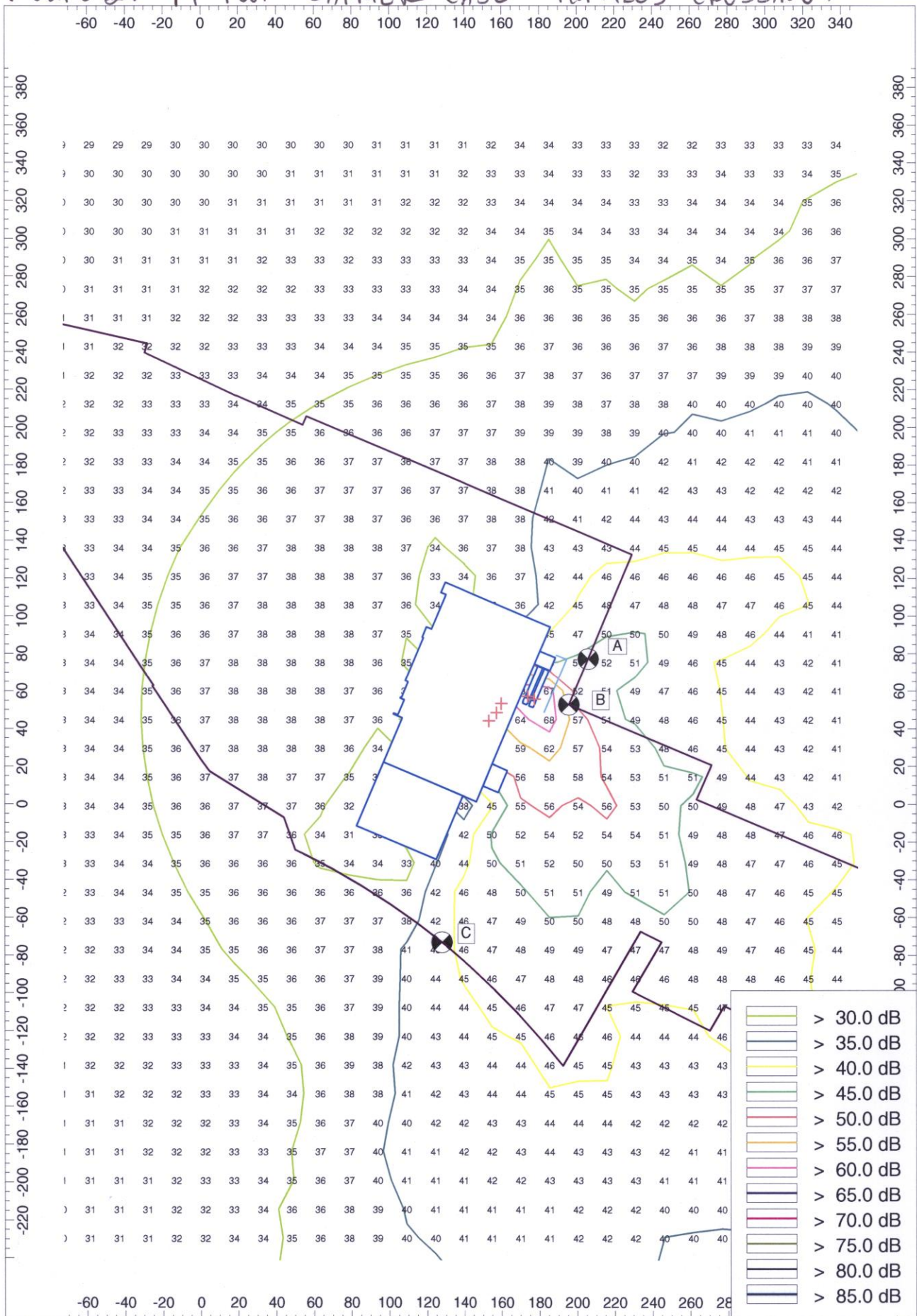


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Table 2. CADNA-Base Results

Name	M.ID	Level Lr		Limit. Value		Land Use		Height (m)	Coordinates					
		Day (dBA)	Night (dBA)	Day (dBA)	Night (dBA)	Type	Auto		Noise	Type	X (m)	Y (m)	Z (m)	
Point A + A		54.6	54.6	0.0	0.0			x	Total	1.50	r	205.90	77.14	1.50
Point B + B		60.0	60.0	0.0	0.0			x	Total	1.50	r	195.60	52.81	1.50
Point C + C		43.2	43.2	0.0	0.0			x	Total	1.50	r	127.76	-73.22	1.50

FIGURE 2. 14-FOOT BARRIER CASE -- MORRILL'S CROSSING.



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Name	MID	Level Lr		Limit Value		Land Use			Height (m)	Coordinates			
		Day (dBA)	Night (dBA)	Day (dBA)	Night (dBA)	Type	Auto	Noise		Type	X (m)	Y (m)	Z (m)
Point A	+	51.5	51.5	0.0	0.0				x	Total	1.50	77.14	1.50
Point B	+	53.2	53.2	0.0	0.0				x	Total	1.50	52.81	1.50
Point C	+	43.2	43.2	0.0	0.0				x	Total	1.50	-73.22	1.50