

To:	Matthew Wallen, Director, STB Office of Public Assistance, Governmental Affairs and Compliance	Date:	April 14, 2010
From:	John Morton		
CC:			
Subject:	Task 2 Investigate Noise and Vibration Complaints		
Project:	STB/CN Compliance Verification		

I. Introduction

The purpose of this task is to review the complaints submitted to the Board concerning locomotive horns that are sounded in existing quiet zones and other transaction-related noise and vibration concerns identified by the communities in the responses to the community questionnaires and in complaints the Board has received.

HDR reviewed the correspondence between TRAC, Canadian National Railway, and STB. HDR also reviewed the responses to the survey prepared in association with these compliance verification activities. The TRAC letters convey complaints about train noise and vibration that were submitted by citizens in various municipalities in the CN-EJE project area. The complaints can be sorted into the following four categories: excessive noise; locomotive horn use in quiet zones; ground-borne vibration, and; noise from idling locomotives.

II. Background

In Decision Number 16, the Board imposed a number of mitigation measures, including measures volunteered by CN, that the Board determined would result in meaningful and appropriate noise reduction. Mitigation measures imposed by the Board include VM-3 through VM-5 and VM-77 through VM-83, which include constructing noise control devices such as noise barriers, installing vegetation or berms, or installing enhanced warning devices to allow communities to achieve quiet zone requirements. Also, the Board imposed additional noise mitigation that requires applicants to consult with affected communities to identify locations where wheel squeal is considered a nuisance. The Board is also imposing a quiet zone condition for Barrington, noise mitigation for transaction-related construction activities, and vibration mitigation for Fermilab. Listed below are the specific noise and vibration-related requirements imposed upon CN by the Board.

- VM 3. Where necessary for implementation of a Quiet Zone, and in consultation with the affected community, FRA, and the appropriate state Department of Transportation, Applicants shall construct or install roadway median barriers to reduce the opportunity for vehicles to maneuver around a lowered gate.
- VM 4. Applicants shall cooperate with the municipalities affected to determine which improvements would be necessary for existing Quiet Zones to maintain FRA compliance.
- VM 5. Applicants shall cooperate with interested communities for the establishment of Quiet Zones and assist in identifying supplemental or alternative safety measures, practical operational methods, or technologies that may enable the community to establish Quiet Zones.

- VM 77: Applicants shall work with affected communities that have sensitive receptors that would experience an increase of at least 5 dBA [A-weighted decibel] and reach 70 dBA to mitigate train noise to levels as low as 70 dBA by cost effective means as are agreed to by an affected community and Applicants. In the absence of such an agreement, Applicants shall implement cost effective mitigation that could include such measures as (1) constructing noise control devices such as noise barriers, (2) installing vegetation or berming, or (3) installing, or providing funding for installation of, enhanced warning devices in order to provide the level of warning necessary to allow the community to request a waiver from Federal Railroad Administration (FRA) of the requirement to sound the horn and achieve quiet zone requirements.
- VM 78. Applicants shall consult with affected communities and work with their construction contractors to minimize, to the extent reasonably practicable, construction-related noise disturbances near any residential areas.
- VM 79. Applicants shall work with their construction contractors to maintain Transaction-related construction and maintenance vehicles in good working order with properly functioning mufflers to control noise.
- VM 80. In addition to the development of other noise mitigation measures, Applicants shall consider lubricating curves where doing so would both be consistent with safe and efficient operating practices and significantly reduce noise for residential or other noise sensitive receptors. Applicants shall also continue to employ safe and efficient operating procedures that, in lieu of, or as complement to, other noise mitigation measures can have the collateral benefit of effectively reducing noise from train operations. Such procedures include:
 - inspecting rail car wheels to maintain wheels in good working order and minimize the development of wheel flats;
 - inspecting new and existing rail for rough surfaces and, where appropriate, grinding these surfaces to provide a smooth rail surface during operations;
 - regularly maintaining locomotives, and keeping mufflers in good working order; and
 - removing or consolidating switches determined by Applicants to no longer be needed.
- VM 81. To minimize noise and vibration, Applicants shall install and maintain rail and rail beds according to AREMA standards.
- VM 82. Applicants shall comply with FRA regulations establishing decibel limits for train operations.
- VM 83. Applicants shall install or relocate a Wheel Impact Load Detector (WILD) on the EJ&E rail line within three years of acquisition by CN of control of EJ&EW.

The Board also imposed mandatory mitigation conditions including Board Condition 8, relating to the quiet zone near Barrington, Board Condition 26, relating to wheel squeal, Board Condition 27 relating to Fermilab, and Board Condition 28, relating to reporting requirements. The text of those conditions is as follows.

- Condition 8 – Applicants shall work with Barrington, Illinois, to determine which improvements would be necessary for the City to maintain its quiet zone designation, should the transaction cause it to fall out of compliance with FRA regulations. The existing Barrington Quiet Zone includes the highway/rail at-grade crossings at Lake/Cook Road, Otis Road, Penny Road, Old Sutton Road, Shoe Factory Road, Spaulding Road, and West Bartlett Road. For 3 years from the effective date of the Board’s final decision, Applicants shall fund reasonable improvements FRA deems necessary to maintain the existing quiet zone.
- Condition 26 – Upon request, Applicants shall consult with communities affected by wheel squeal at existing locations on the EJ&E rail line, and cooperate in determining the most appropriate methods for implementing VM 80.
- Condition 27 – Applicants shall make reasonable efforts to notify the U.S. Department of Energy Fermi National Accelerator Laboratory (Fermilab) in Batavia, Illinois, of potentially significant operational changes, such as substantial increases in train speed and/or axle loadings that could affect their vibration-sensitive equipment.
- Condition 28 – In addition to VM 77 through 83 and Condition 74, Applicants shall include in their quarterly reports documentation of their efforts to implement in a timely manner their voluntary noise and vibration mitigation, which is intended to provide effective and measurable noise

reduction in areas that qualify for noise mitigation under IDOT or INDOT criteria, as discussed in Chapter 2 of the Final EIS.

III. Excessive Noise

Most of the noise complaints were reported by TRAC as concerns about “excessive noise. Noise issues raised in the May 6, 2009 letter from TRAC to STB are anecdotal, and are presented in a list of municipalities showing the number and type of complaints that TRAC had received via its on-line complaint mechanism (see Table A, Attachment 1). Those complaints were expressed using terms such as:

- 2 (complaints of) excessive noise, and;
- 5 (complaints of) disregard for quiet zone.

References to “excessive noise” complaints in the May 6th letter are brief and anecdotal. There is not enough information in this letter to suggest that residents’ exposure to post-acquisition train noise is somehow different than what the FEIS identified. Rather, the letter simply conveys that some residents submitted complaints about train noise using the on-line reporting mechanism that TRAC instituted. Considering that CN implemented a change (an increase) in train activity and the corresponding increase in train noise, these complaints are not entirely unexpected.

Noise issues raised in the June 26th letter are presented in essentially the same manner as they were in the May 6th letter. There is a list of municipalities and the type and number of complaints received by TRAC. Use of the term “excessive noise” is too subjective to suggest that residents are being exposed to more noise than was reasonably foreseeable at the time the FEIS was prepared. HDR notes that the June 26th letter identified over twice as many noise complaints as the May 6th letter contained. None of these items confirm that residents’ exposure to post-acquisition train noise is somehow different than what the FEIS identified.

CN responded to these complaints of excessive noise by commenting that the complaints were based on an individual’s subjective and undocumented claim that noise...was excessive. HDR agrees that complaints about excessive noise included in the May 6th and June 26th letters from TRAC are subjective and anecdotal, and do not contain sufficient detail to allow for action by STB or CN. HDR has not seen evidence that CN’s train operations at night differ from the noise analysis assumptions in the FEIS.

The October 14, 2009 letter from TRAC to STB addresses complaints of “excessive noise” in greater detail than the previous two letters. Some of the complaints included in this letter merit discussion. The noise analysis performed for the FEIS identified potential for wheel flange squeal, or wheel squeal near Barrington and in other portions of the EJ&E arc. Due to the volume and pitch, wheel squeal is one type of train noise that is likely to be very annoying to residents who are exposed to it. Because there are reasonably available methods to reduce wheel squeal on sections of curved track, HDR considers this a noise issue that merits further consideration and potential action. Board Condition 26 requires that upon request CN will consult with communities affected by wheel squeal and determine the most effective way to implement the requirements in VM 80.

CN has reached agreement with 22 communities, many of which address noise issues. However, there are several municipalities that do not have voluntary mitigation agreements. Seven of these municipalities responded to noise-related questions in the recent questionnaire. Table B, Attachment 1, summarizes those responses. Based on the questionnaire, CN appears to have coordinated with:

- Barrington (although Barrington is unsatisfied with the progress/outcome);
- Bartlett (it appears that CN and Bartlett have made some progress towards fulfilling Board conditions requiring CN to work with cities and help establish quiet zones);
- Deer Park (although it appears that CN has not offered or planned a meeting with Deer Park);
- Naperville (it appears that CN has worked with the City on some items, but the City would like more proactive involvement from CN);
- New Lenox (it appears that a specific noise issue was resolved, but there is general concern about increases in noise), and;

- Will County (it appears there has been discussion about quiet zones, and that there is concern about increases in noise and vibration).

Based on the questionnaire, CN appears to have not coordinated with Lynwood and that municipality has concerns about a grade separation. However it appears that Lynwood has not contacted CN about noise issues.

There is a general pattern of complaints regarding increased train activity and train noise during nighttime. The noise analysis performed for the FEIS assumed that freight trains traveling on the EJ&E would be evenly distributed throughout a 24-hour period. HDR has not seen evidence that CN's current operations are inconsistent with assumptions in the FEIS.

During this interim phase of integrating the CN and EJ&E, there may be times when CN operates trains at night in order to minimize interference with Metra schedules. This is due to CN's desire to minimize interruptions to the Metra train schedules. CN's operations on the EJ&E will evolve over time, and CN should be able to integrate more train traffic on the EJ&E during the daytime without interrupting the Metra schedules.

IV. Locomotive Horn Use in Quiet Zones

Locomotive horn use in quiet zones is a reoccurring theme in the letters from TRAC (see Table C, Attachment 1). There are nine quiet zones along the EJ&E and CN lines that are affected by the acquisition. The boundaries of these quiet zones are shown in Table 1.

**Table 1
Quiet Zones Along the EJE**

Quiet Zone Number	Rail Line	Beginning	End
1	EJ&E	Martin Luther King Drive in North Chicago, IL	Oakwood Road in Lake Zurich, IL
2	EJ&E	Main Street in Lake Zurich, IL	Northwest Highway (US 14) in Barrington, IL
3	EJ&E	Main Street (Lake Cook Road) in Barrington, IL	West Bartlett Road in Elgin, IL and Bartlett, IL
4	EJ&E	Liberty Street in Aurora, IL	111th Street near Plainfield, IL
5	EJ&E	Ferguson Road/119th Street near Plainfield, IL	Lockport Road in Plainfield, IL
6	CN	White Oak Street in Munster, IN	White Oak Street in Munster, IN
7	CN	Chestnut Avenue in Franklin Park, IL	Forest Avenue in River Forest, IL
8	CN	Camp McDonald Road in Wheeling, IL and Prospect Heights, IL	Pratt Avenue in Des Plaines, IL
9	CN	Harris Road in Mundelein, IL	Willow Road in Wheeling, IL

HDR notes that the Hough Street (Ill. Rte.59) crossing in Barrington is between Quiet Zone Numbers 2 and 3 and is not in a quiet zone. Horn use at this location may be audible in the community, and construed as horn use in a quiet zone.

The only quiet zone that would no longer qualify as a quiet zone as a result of the acquisition is Quiet Zone Number 3. Board Condition number 8, directs CN to work with Barrington to identify and fund the reasonable improvements FRA deems necessary to maintain quiet zone status for Quiet Zone Number 3.

Locomotive horn use in quiet zones was also not discussed in much detail in the May 6th and June 26th letters from TRAC. In a July 16th letter to STB, CN responded to TRAC's concerns about locomotive horn use in quiet zones. CN responded with valid points about horn use in quiet zones, as follows. While formal quiet zones may exist in portions of the EJ&E, a locomotive engineer always has the obligation to use the locomotive horn when approaching people or equipment working in the right of way, or in the case of pedestrians or animals on the track. Also, CN noted that there were no quiet zones in Naperville and Aurora at the time of the acquisition.

CN also investigated alleged horn use in quiet zones and determined that the presence of railroad workers in the right of way triggered the mandatory use of locomotive horns in the vicinity of Plainfield. CN also noted that in Barrington, the Hough Street/Route 59 grade crossing is not currently included in a quiet zone, although there is a nearby quiet zone in Barrington. HDR is satisfied with CN's response considering the FRA requirements for locomotive horn use. FRA issued rules to require that a locomotive horn be sounded while a train is approaching and entering a public highway-rail crossing. The rules also provide for an exception to the above requirement in circumstances in which there is not a significant risk of loss of life or serious personal injury, use of the locomotive horn is impractical, or safety measures fully compensate for the absence of the warning provided by the horn. This rule is required by law. Regardless of a designated quiet zone, safety is the primary purpose of the locomotive horns.

The October 14th letter from TRAC identifies specific concerns about excessive locomotive horn use and horn use in quiet zones. The issue of increased freight train activity at night accompanies these complaints about horn use. CN responded to these concerns in a letter to STB dated October 29, 2009. In this letter, CN maintains its position that some of the complaints relating to horn use in quiet-zones come from residents who are not located in a quiet zone.

It appears that a combination of circumstances contributes to complaints of horn use in quiet zones. Those circumstances include:

- Possible Increased in freight train activity at night;
- Mandatory horn use due to workers, equipment, pedestrians, or animals in the right of way, and;
- A break in the quiet zone in Barrington where the Hough Street/Route 59 grade crossing exists.

HDR believes that steps can and should be taken to address the issue of horn use in quiet zones. These include the following.

- Review maintenance practices to limit workers and equipment from entering the right of way between the hours of 10:00 pm and 6:00 am unless absolutely necessary. This could reduce potential horn use at night both within and outside of quiet zones.
- Inform communities that horn use may occur during nighttime more often than in the past during this interim period of CN-EJ&E integration when CN is operating more trains at night to minimize schedule conflicts with Metra.
- Ask CN to provide records of horn use in existing quiet zones, and make that information public. Compare that information with claims of horn use in quiet zones. If results of that comparison show a disparity between reported horn use and complaints of horn use, STB could consider alternative actions including a noise monitoring task. At that point, an interactive web-based GIS map could be used to document locations where specific horn use resulted in a complaint.

V. Ground-borne Vibration

The October 14th letter from TRAC discusses vibration complaints in more depth than the previous two letters from TRAC. The vibrations appear to be associated with idling locomotives and car coupling noises. Idling locomotives are discussed in the next section. Table D in Attachment 1 summarizes ground-borne vibration complaints.

Measurements of train-induced ground-borne vibration performed for the DEIS and FEIS determined that vibration emissions from CN and EJ&E trains were similar. SEA concluded that the magnitude of train-induced ground-borne vibration velocity levels associated with the passby of EJ&E trains is substantially similar to the magnitude of train-induced ground-borne vibration velocity levels associated with the passby of CN trains. On this basis, SEA did not anticipate a substantial change in vibration velocity levels associated with train pass-by events due to the Proposed Action. The locations where car coupling occurs may change from day to day (pre- and post-Acquisition) because trains may idle in different locations on the EJ&E (pre- and post-Acquisition). While there are complaints about vibration, there is no evidence that current levels and occurrences of ground-borne vibration are substantially different from SEA's assumptions or the vibration analysis results in the FEIS.

VI. Noise from Idling Locomotives

Table E (see Attachment 1) summarizes complaints about noise from idling locomotives. Idling locomotives do not produce ground-borne vibration, since the train is not rolling on the tracks. Rather, idling locomotives emit low frequency noise at levels that appear to annoy nearby residents. Locomotives are known sources of low frequency noise, but the STB's environmental noise rules do not address low frequency noise from locomotives or noise from any other source on a spectral (tonal) basis.

The noise analysis performed for the FEIS modeled idling locomotives and determined that noise from a limited number of locomotives idling for a fixed duration would not expose residents to noise levels in excess of STB noise assessment thresholds.

VII. Results

CN's activities and responses to written complaints about noise and vibration appear reasonable. The complaints about noise and vibration appear consistent with the results of the noise and vibration studies performed for the EIS. Project stakeholders need to provide more detailed, factual feedback to facilitate a more detailed discussion of their concerns. VM 83 required CN within three years to install one Wheel Impact Load Detector (WILD) on the EJ&E to help detect potential wheel issues that cause an increase in noise and vibration from an increase in the impact of the wheel on the rail. CN has completed the installation of three WILDs on the EJ&E. There is not uniform satisfaction with communication between CN and affected communities. Although some communities are satisfied with the communication and progress, others are not.

VIII. Conclusions and Recommendations

CN's proposed changes to freight train activity on the EJ&E have resulted in complaints about train-related noise and vibration. The integration of CN and EJ&E is a process that continues to evolve. As this process evolves, the stakeholders, the Board, CN and EJ&E continue to learn more about the process and its noise and vibration effects. The Board's Conditions and CN's voluntary commitments are intended to minimize noise and vibration problems. However, it is not reasonable to assume that the Conditions and Voluntary Commitments would preclude complaints from stakeholders.

At this point in the integration process, the Board is aware of complaints about noise and vibration. Recommending specific actions to address these complaints requires a level of detail that is absent in the complaints. For example, detailed information (such as date, time, and location) about locomotive horn use in an existing quiet zone allows a factual discussion and evaluation. The lack of that level of detail precludes a detailed discussion and evaluation of this particular issue. HDR encourages municipalities and stakeholders to provide more detailed, factual information when reporting complaints. This will facilitate a factual assessment of the issues. In lieu of this level of detail, there is no basis to recommend noise monitoring activities in an attempt to measure locomotive horn use in quiet zones.

Board Conditions require CN to work with affected communities; communities should contact CN to initiate the communication and work with CN to maintain it. In this manner, both CN and affected

municipalities share the burden of communication. HDR recommends that the Board direct CN to contact Lynwood and Deer Park to initiate a dialog about their concerns. HDR also recommends that the Board direct CN to continue to discuss noise and vibration issues with Barrington, and report on outcome of those discussions to the Board.

ATTACHMENT 1

**Table A
Complaints of Excessive Noise**

Municipality	Date of Complaint Letter		
	May 6, 2009	June 26, 2009	October 14, 2009
Aurora	3	8	3-month summary
Barrington Hills	1	1	3-month summary
Barrington	5	7	3-month summary
Bartlett	2	3	3-month summary
Crest Hill		1	3-month summary
Deer Park	2	4	3-month summary
Elgin		1	3-month summary
Frankfort	4	9	3-month summary
Hoffman Estates	3	8	3-month summary
Joliet	1	3	3-month summary
Lockport			3-month summary
Lake Zurich	2	1	3-month summary
Long Grove			3-month summary
Mundelein			3-month summary
Naperville			3-month summary
New Lenox		3	3-month summary
Park Forest		1	3-month summary
Plainfield	3	4	3-month summary
Unincorporated Will County		3	3-month summary
Wayne			3-month summary
West Chicago			3-month summary
Totals	26	57	83

Table B
Summary of Noise-related Responses to Recent Questionnaire

Municipality	Replies to Noise-related Items on the Questionnaire		
	Have you requested consultation with CN on noise related issues in your community?	Has your community requested CN's assistance with the establishment or maintenance of a quiet zone?	Noise-related Comments from Municipality
Barrington	Yes	Yes	Talked about items with CN, but no action or results are seen in most instances. What does talked about or contacted mean without a documented commitment to implement what was discussed? See follow-up letter with suggested questions the STB should ask now or when 20 trains are operating daily to measure the efficacy of the STB ordered mitigation.
Bartlett	No	Yes	CN agreed to provide money for a quiet zone at Stearns Rd. if the Village signed a voluntary mitigation agreement.
Deer Park	Yes	Yes	CN has never offered and/or planned a meeting with the Village of Deer Park.
Lynwood	No	No	Still waiting to hear from CN about their planned grade separation. I am aware that I can reach out to them; however, I did think someone from CN might contact me.
Naperville	Yes	Yes	CN has worked with the city proactively in some areas such as establishing a quiet zone (which was already underway prior to the acquisition), it was only after we received this survey that CN contacted the city regarding train monitoring. CN has not been as proactive in many of the voluntary mitigation items as we would like.
New Lenox	Yes	Yes	We did have an issue with loud squealing locomotive last summer, but that issue was resolved. There is an increase in the track usage noise level due to heavier trains.
Will County	Yes	No	We have only discussed quiet zones since Crest Hill & Joliet have signed agreements. There is also serious track usage noise and vibration issues due to heavier CN trains running on old EJ&E track.

Table C
Complaints of Locomotive Horn use in Quiet Zones

Municipality	Date of Complaint Letter		
	May 6, 2009	June 26, 2009	October 14, 2009
Aurora		5	3-month summary
Barrington Hills	2	1	3-month summary
Barrington	12	2	3-month summary
Bartlett		1	3-month summary
Crest Hill			3-month summary
Deer Park	5	5	3-month summary
Elgin			3-month summary
Frankfort			3-month summary
Hoffman Estates	3		3-month summary
Joliet			3-month summary
Lake Zurich			3-month summary
Long Grove			3-month summary
Mundelein			3-month summary
Naperville		3	3-month summary
New Lenox		1	3-month summary
Park Forest			3-month summary
Plainfield	3	21	3-month summary
Unincorporated Will County			3-month summary
Wayne			3-month summary
West Chicago			3-month summary
Totals	25	39	64

Table D
Ground-borne Vibration

Municipality	Date of Complaint Letter		
	May 6, 2009	June 26, 2009	October 14, 2009
Aurora	1		3-month summary
Barrington Hills	1	1	3-month summary
Barrington	3	1	3-month summary
Bartlett			3-month summary
Crest Hill			3-month summary
Deer Park	1	1	3-month summary
Elgin		1	3-month summary
Frankfort	2	1	3-month summary
Hoffman Estates	1	4	3-month summary
Joliet			3-month summary
Lake Zurich	1	2	3-month summary
Long Grove			3-month summary
Mundelein			3-month summary
Naperville			3-month summary
New Lenox			3-month summary
Park Forest			3-month summary
Plainfield	3	5	3-month summary
Unincorporated Will County			3-month summary
Wayne			3-month summary
West Chicago			3-month summary
Totals	13	16	29

Table E
Noise from Idling Trains

Municipality	Date of Complaint Letter		
	May 6, 2009	June 26, 2009	October 14, 2009
Aurora			3-month summary
Barrington Hills	1	1	3-month summary
Barrington	1	1	3-month summary
Bartlett			3-month summary
Crest Hill		1	3-month summary
Deer Park			3-month summary
Elgin		1	3-month summary
Frankfort	1	2	3-month summary
Hoffman Estates		1	3-month summary
Joliet			3-month summary
Lake Zurich			3-month summary
Long Grove		1	3-month summary
Mundelein			3-month summary
Naperville	1	1	3-month summary
New Lenox			3-month summary
Park Forest	1		3-month summary
Plainfield			3-month summary
Unincorporated Will County			3-month summary
Wayne			3-month summary
West Chicago			3-month summary
Totals	5	9	14