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BEFORE THE
SURFACE TRANSPORTATION BOARD

FINANCE DOCKET NO. 33407

DAKOTA, MINNESOTA & EASTERN RAILROAD CORPORATION
CONSTRUCTION INTO THE POWDER RIVER BASIN

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COMMENTS OF ROCHESTER, MINNESOTA ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

Volume I

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Dated: March 6, 2001

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Pursuant to the schedule adopted by the Surface Transportation Board ("STB" or "Board")[1/], Rochester, Minnesota ("Rochester") submits its comments on the September 27, 2000 Draft Environmental Impact Statement ("DEIS").

Following preliminary comments, Rochester will: (1) respond to DEIS inquiries and (2) identify and correct certain DEIS errors.[2/] These sections will include discussions of (a) Rochester's proposed financial contribution to the Rochester by-pass; (b) environmental degradations to Rochester that would result from approval of the Dakota, Minnesota & Eastern Railroad Corporation ("DM&E") application; and (c) reasonable and feasible mitigation for that degradation. Finally, Rochester will compare the environmental impacts of the DM&E's proposed routing through Rochester[3/] with the environmental impacts of the Rochester by-pass[4/].

[1/] Decision served December 14, 2000.

[2/] Other DEIS errors are discussed throughout these comments and the exhibits hereto.

[3/] DEIS Alternative R-2 (hereinafter "R-2").

[4/] DEIS Alternative R-4 (hereinafter "R-4").

PRELIMINARY COMMENTS

1. The Availability Of Data

Shortly after the issuance of the DEIS, Rochester requested access to certain materials underlying that document from the Section of Environmental Analysis ("SEA"), including the computer spreadsheets used to calculate the data presented in a number of DEIS tables. That access was denied in a telephone conversation in which Rochester was informed that it would be "unfair" to provide it access to information not available to other interested parties. A written request from Rochester for additional information also was denied by a letter from SEA dated November 8, 2000. Exhibit 1 hereto.

In stark contrast, DM&E was permitted to (a) participate in the preparation of the DEIS through its attendance at SEA meetings during which the preparation of the DEIS was discussed and (b) provide information relied upon by the DEIS even though no other participant was permitted to attend those meetings or to review that DM&E-provided information, thus giving DM&E an "unfair" advantage over all other parties to this proceeding.[5/] SEA's approach to this matter is regrettable at best[6/] and, at

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[5/] In point of fact, DM&E relied on the DEIS before it was made available to any other party. The DM&E's U.S. Army Corps of Engineers Section 404 Permit Application ("Section 404 Application") was executed by Kevin Schieffer on September 15, 2000, twelve days before the DEIS was issued. However, DM&E was able to state that its Section 404 Application "...relies on the analysis in the Draft EIS...."

[6/] There was no obvious reason that SEA could not have (a) provided the information that Rochester requested and (b) issued

(continued...)

worst, jeopardizes the entire environmental review process.[7] Other Federal agencies, e.g. the Federal Energy Regulatory Commission ("FERC"), require that all information provided to the environmental staff be provided to all parties of record on the same date that it is provided to the agency. As a result, parties to those agencies' proceedings may participate fully rather than simply addressing a DEIS based on unknown assumptions and ex parte assertions of facts by the applicant.

Rochester strongly urges SEA to revisit its policy of withholding information from the public. It simply will not suffice for SEA, in its role as the preparer of environmental documents upon which the Board will rely, to base those documents upon private representations by the applicant, the party with the greatest financial interest in minimizing the appearance of environmental harms from its actions.[8] The matters at issue are too important to permit the fairness of the process to be placed in question.

Rochester reserves its right to contest the propriety of SEA's procedures and to assert that those procedures violate, inter alia, the Board's prohibition of ex parte communications.[9]

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[6](...continued)
a notice stating that identical data would be made available to other interested parties upon request.

[7] Environmental Defense Fund, Inc. v. Blum, 458 F.Supp 650 (D.D.C. 1978).

[8] Van Abbema v. Fornell, 807 F.2d 633, 642 (7th Cir. 1986).

[9] 49 C.F.R. § 1102.2(c).

2. Response To The Edison Electric Institute's Preliminary Comments

By letter dated November 13, 2000, the Edison Electric Institute ("EEI") submitted preliminary comments on the DEIS.

EEI's first request is that the Final Environmental Impact Statement ("FEIS") contain a separate section discussing the "Project benefits." Rochester has no objection to that suggestion.

EEI also raises a "legal issue." Without reference to either the ICC Termination Act of 1995[10/] or the National Environmental Policy Act[11/], it asserts that the Board

> lacks authority to adopt a condition on its approval of the PRB Expansion Project that would assert the obligation on the part of DM&E to construct bypasses or other alterations of the existing line for which approval has not been requested by DM&E.

EEI's assertion is in error. As explained in the DEIS,

> The Board can either (1) approve a transaction as proposed, without conditions; (2) approve the transaction with conditions to offset or reduce the potential impacts, including environmental impacts, of the proposed transaction; or (3) disapprove the transaction entirely.[12/]

These three alternatives flow directly from 49 U.S.C. § 10901(c) which states,

> Such certificate may approve the application as filed, or with modifications, and may require compliance with conditions (other than labor protection conditions) the Board finds necessary in the public interest.

[10/] Public Law 104-88, 109 Stat. 803, codified at 49 U.S.C. § 10101, et seq. ("ICCTA").

[11/] 42 U.S.C. § 4321, et seq. ("NEPA").

[12/] ES-7, footnote omitted.

DM&E is not required to go forward with its project if it finds the conditions imposed by the Board to be unacceptable. DM&E also has the right to seek judicial review of a final Board order. However, neither of these facts impinges on the Board's right to issue a Section 10901 certificate with appropriate environmental mitigation conditions.[13/]

Not only does the Board have the right to consider alternatives not proposed by DM&E, it has the legal obligation to do so. 42 U.S.C. § 4332(2)(C)(iii) requires the FEIS to consider "alternatives to the proposed action." Similarly, 42 U.S.C. § 4332(2)(E) requires the FEIS to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." See also 40 C.F.R. § 1508.25(b)(2) which defines "alternatives" to include "other reasonable courses of actions."[14/]

[13/] This is certainly not the first time that SEA has considered routing alternatives not proposed by the applicant. See, e.g. the September, 1997 UP/SP Merger--Reno Mitigation Study, Preliminary Mitigation Study ("Reno Study"), which considered a depressed railway, an elevated railway, and an I-80 by-pass. Id. at Executive Summary - 4.

[14/] In section 2.1 of its Section 404 Application, DM&E cited Council of Environmental Quality ("CEQ") regulations, 40 C.F.R. 1502.14 for the proposition that "NEPA requires that the EIS 'rigorously explore and objectively evaluate all reasonable alternatives.'" DM&E also cited the Federal Register, vol. 46, no. 55, March 25, 1981 for the following. "Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant." Emphasis added.

In brief, since Rochester has demonstrated and demonstrates further herein that its proposed by-pass is both economical and practical, it must be considered by the FEIS.[15] If, as Rochester advocates, the Board conditions its approval of the DM&E project by requiring construction and use of the Rochester by-pass, DM&E may (1) accept that decision, (2) appeal that decision, or (3) decline to build the project. However, neither it nor EEI may successfully assert that the Board is without jurisdiction to adopt a condition that is both reasonable and practical.

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[15] Missouri Mining Inc. v. I.C.C., 33 F.3d 980, 984 (8th Cir. 1994).

I. ROCHESTER'S RESPONSE TO DEIS INQUIRIES

The DEIS contains a general request[16] and specific requests for comments. In this section, Rochester responds to requests for comments germane to its interests. For SEA's convenience, these comments will be presented in the order the requests appear in the DEIS and will be prefaced with DEIS citations.

A. SEA requests further comments on which [Rochester] alternative would be environmentally preferable and the extent to which the community should share the cost of a bypass, if one is approved. ES-33.[17]

1. The Purpose Of Alternative R-4

This request, in Table ES-2, follows the DEIS's description of four alternatives, R-1 through R-4[18], and the "purposes" of those alternatives.

Rochester advocates R-4, the Rochester By-Pass, which is overwhelmingly environmentally preferable to R-2 as demonstrated herein. As R-4's sponsor, Rochester requests SEA to revise the description of the "purpose" of R-4 in the FEIS. That is, while R-4 would minimize environmental impacts by routing all new and rerouting virtually all existing through trains around Rochester,

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[16] ES-77.

[17] The DEIS reiterates this request at ES-55, ES-59, 6-41, Table 6-9, and 6-44. It also requests comments on community participation in the cost of the by-pass at 6-41.

[18] ES-33. As discussed in Wheeler, Exhibit 11, it appears that the DEIS's physical description of R-4 reflects the January, 1999 version rather than the June, 1999 version. The FEIS should be premised on the June, 1999 version.

it would not reroute all existing rail traffic around Rochester as suggested in Table ES-2.[19/]

The distinction is important. There are up to ten[20/] Rochester-area shippers and receivers of rail freight and Rochester has never suggested that this service should be eliminated. To the contrary, R-4 contemplates not just continued, but improved service to those shippers and any future rail shippers in Rochester. In brief, the DEIS is in error in asserting that R-4 would require trains accessing local shippers to operate over the deteriorated rail line.[21/]

As Rochester sees it, DM&E would provide service to Rochester shippers in one of two ways. Rochester's preferred approach would be for DM&E to set out the cars destined to Rochester on sidings outside of the city so as to avoid any through trains operating in Rochester.[22/] Alternatively, DM&E

[19/] The DEIS accurately reflects Rochester's proposal that rail operations would continue on the existing line to serve Rochester shippers at Volume II, 3.3-77.

[20/] At 3.3-53, the DEIS lists Rochester Public Utilities, Seneca Foods Corp., Rochester Iron & Metal, Tamarack Materials, Inc., General Warehouse, TexPar Energy, Inc., United Building Center, Public Delivery Track, and Greenway (formerly Agro Distribution) in Byron, as the existing DM&E Rochester-area shippers. On information and belief, IBM also receives some service on the DM&E's northwest spur about once every 3-5 years.

[21/] ES-58 and Volume IV at 6-43.

[22/] Rochester cannot be precise about the location of the sidings to be used for local traffic because, to date, the DM&E has not settled on the locations of its sidings. See, e.g. DEIS Volume II, 2-72 through 2-80, Tables 2-6, 2-7, and 2-8. However, given the DEIS's preference for Alternative C, ES-26, Rochester assumes that these sidings will be numbers 3 (MP38.2-39.7) and 4 (MP60.4-

(continued...)

could operate only through trains with loaded or unloaded cars from or to Rochester-area shippers on the existing in-city route and set out cars for Rochester shippers on its in-town siding. In either event, as they do today, switching movements would transport the cars between sidings and Rochester shippers.[23/]

In keeping with this approach, the Rochester's cost estimate for the by-pass includes $1,831,000 ($77,600 dollars per mile for the 23.6 miles between MP37.5 and 61.1) to upgrade the in-town route in order to enhance service to Rochester-area rail shippers. See Ortgies, Exhibit 2.[24/]

2. Meeting The Goals Of Alternative R-2

The DEIS suggests that two of the benefits of the DM&E proposal may be eliminated by the selection of R-4. This suggestion is without evidentiary support.

[22/](...continued)
62.0) as shown in Table 2-7 at 2-75. As noted in the Verified Statement of Leif Thorson, submitted by Rochester on June 10, 1999, the Rochester by-pass would be between M.P. 37.5 and 61.1. This will require a repositioning of DM&E's sidings 3 and 4 to Eyota Township, Twp. 106N, Range 15W, Sections 15/16-20-21 and Salem Township, Twp. 106N, Range 15W, Sections 6-7-18. Verified Statement of Bernard H. Ortgies, Exhibit 2.

[23/] See DM&E's February 20, 1998 Application, Volume 1, Exhibit D at 4. See also Rochester's survey of Rochester-area rail shippers. Verified Statement of Terry Spaeth, Exhibit 3. There is not a single such shipper that is served directly from a through train. Question 5(c). The routing from sidings to Rochester shippers is discussed in Section II.B.

[24/] At ES-58, the DEIS states that "under the bypass alternatives, the existing DM&E rail line through Rochester would not be reconstructed." The FEIS should note the substantial rehabilitation of the rail line through Rochester contemplated as part of R-4.

First, in Volume IV at 6-40, the DEIS reflects an early SEA concern that the adoption of a circuitous route bypassing numerous communities "could add so many additional miles that it would be unlikely to allow the Applicant to achieve its goal of providing efficient rail transportation." In response, Rochester notes that R-4 is only 10.8 miles longer than R-2.[25/] Since the DEIS assumes that DM&E trains will average 45 miles per hour when loaded and 49 miles per hour when empty, the R-4 routing will take a maximum of 14 minutes more than R-2. DM&E has submitted no evidence establishing that these 14 minutes will hinder its goal of providing efficient rail transportation.

In Volume IV at 6-44, the DEIS also states:

> However, if weight restrictions on the existing rail line prevent the use of rail cars loaded to industry standards (as discussed in Chapter 1), the benefits to Rochester shippers of reconstruction of other portions of the rail line would be minimized. Thus, while from an environmental impact standpoint, the bypass alternatives appear to minimize overall impact to the human environment, they may not contribute to the overall purpose and need defined for the project.

In order to place this suggestion in context, Rochester first notes that while the DEIS speculates as to the advantages to shippers from the DM&E proposal[26/], there is not a word of evidence to support the implicit assertion that Rochester shippers would benefit. The principal claimed advantages of the reconstruction of the DM&E are increased maximum car weights and increased speed. However, the DEIS does not demonstrate that any

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[25/] Table 5.1-10.

[26/] See, Volume II at 3.2-10 and 3.3-53.

Rochester shipper would be placed in a significantly more advantageous position if DM&E is able to use heavier cars or if DM&E's travel time between Rochester and DM&E's railroad connections is improved by a few minutes.

Moreover, even assuming, arguendo, that approval of R-2 would result in any material benefit to Rochester shippers, the FEIS must give more serious consideration to the assertion that any of these benefits would be minimized by the selection of R-4.

Initially, Rochester notes the obvious fact that its bypass proposal will not affect weight restrictions on any portion of the DM&E line outside of Rochester. Thus, the only possible impact of R-4 could be on movements over the existing Rochester trackage. Since R-4, which includes expenditures of $77,600 per mile dedicated to rehabilitating DM&E's Rochester mainline, is sufficient to allow DM&E to transport cars of the same weight as can be transported on the rest of the upgraded DM&E system[27], Rochester shippers will have the same benefits claimed for R-2.[28]

Second, it also is important to recognize that there are two types of track within Rochester, i.e. the mainline through

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[27] Ortgies, Exhibit 2. DM&E says that its infrastructure would be rated for 315,000 pound cars. DM&E February 20, 1998 Application, Volume 1 at 15. At the same time, DM&E bases its cost estimates on the use of 286,000 pound cars. See William J. Otter Jr.'s April 9, 1999 Verified Statement at 3.

[28] The DEIS assumes, but does not demonstrate, that Rochester area shippers would benefit from the availability of larger cars. Without such a demonstration, its suggestion as to lost benefits is pure speculation.

Rochester and the three spur lines ("Northwest", "Southeast", and the short spur line used to access Rochester Public Utilities) used by DM&E's switching movements to bring traffic from and to shippers. If the spur lines are not currently suitable for the 315,000 pound cars DM&E says can be handled on its upgraded mainline[29/] and if DM&E does not upgrade them, DM&E will not be able to offer larger cars to Rochester shippers. After all, a chain is only as strong as its weakest link. However, DM&E has not indicated that its construction proposal includes upgrading its Rochester spur lines. Thus, there are three possibilities that must be considered and resolved by the FEIS. First, DM&E could be planning to upgrade the spur lines to allow them to handle 315,000 pound cars. Second, DM&E could take the position that no such upgrade is necessary, in that the spur lines already can handle cars of that weight. Third, DM&E could say that the spur lines cannot handle 315,000 pound cars and no upgrade is planned. Of course, if DM&E states that the spur lines cannot handle 315,000 pound cars and that it does not contemplate upgrades to handle cars of that weight, then this entire "purpose" issue is moot because Rochester area shippers would not be able to use such cars.

The next variable in the required analysis is the condition of the DM&E Rochester mainline. Currently, this section of track

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[29/] That is certainly the case with regard to the Northwest spur line. As discussed in Spaeth, Exhibit 3, the Northwest spur line has been broken since the Fall of 2000 and is not being used for rail service.

is used for trains transporting up to 131 cars[30]. However, there is no evidence as to weight restrictions on this section of DM&E's mainline. DM&E has stated that its "existing infrastructure is predominantly rated for 263,000 pound cars."[31] However, it has not stated what weight restrictions are applicable to the Rochester mainline. There are two possibilities that must be resolved by the FEIS. Either (a) the Rochester mainline is currently rated for 263,000 pound cars or (b) it is rated for heavier cars. If the answer is that 315,000 pound cars can be transported over the Rochester mainline today, then even in the absence of the Rochester mainline rehabilitation expenditures proposed by Rochester as part of R-4, there is no issue as to whether R-4 meets this "purpose" of R-2.

The final variable that must be resolved in the FEIS is the extent to which any Rochester shippers would benefit from larger cars. No Rochester shipper sees a substantial benefit. In calendar year 2000, Rochester Public Utilities ("RPU") received 834 rail cars[32], each containing 100 tons of coal. RPU has stated that larger cars would be only a slight improvement by reducing the number of cars it has to handle. In fact, RPU supports a by-pass around Rochester.[33] Tamarack also sees a

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[30] This is the longest train Rochester's videotapes have shown. Verified Statement of Kim M. Hanson, Exhibit 4.

[31] DM&E February 20, 1998 Application, Volume 1, at 15, n. 3.

[32] The remainder of RPU's coal was delivered by truck.

[33] Exhibit 5.

slight benefit. Rochester Iron sees a slight benefit if the larger cars can be used over its routings, a fact not of record. Greenway and TexPar see a benefit only if it results in lower freight rates, a fact not of record.

In contrast, Seneca Foods states that it generally does not load more than 145,000 pounds in a car, far less than the maximum weight DM&E's current infrastructure can handle and thus sees no benefit. General Warehouse and United Building Center also see no benefit.[34/] Spaeth, Exhibit 3. Thus, this "purpose" issue appears to be insignificant at most.

In any event, under Rochester's R-4 proposal, this section of track would be able to handle trains of the same length as are proposed for R-2 with cars of up to 315,000 pounds. Accordingly, R-4 would meet the objective of R-2.

3. Rochester's Financial Contribution To R-4

Rochester has given serious consideration to SEA's request for comments as to the extent to which "the community" should share the cost of a bypass. Our analysis follows.

The DM&E project places Rochester in the position of having but two choices, either (a) suffering environmental degradation that will have a substantial impact on the quality of life in a unique and vibrant community that is home to one of the world's foremost medical centers and also has the highest "high-tech LQ"

[34/] Public Delivery could not be reached by Rochester, notwithstanding several attempts. There is no evidence of any benefit to this entity from larger freight cars.

of any metropolitan region in the United States[35] or (b) contributing vast sums of money to the very entity that would create that environmental degradation and profit therefrom. This choice between Scylla and Charybdis clearly is not consistent with the policy of the United States Department of Transportation ("USDOT") to reduce the "social costs of environmental degradation" and to ensure that these social costs "are more accurately reflected in the price of transportation services."[36] Simply put, DM&E should be responsible for all mitigation costs, including the cost of a by-pass.

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[35] Mayo Clinic has an estimated 23,000 employees in Rochester which comprises 31% of the total 72,000 employees in the Rochester/Olmsted County MSA. According to the study by Rochester Area Economic Development Inc. (RAEDI), Exhibit 7, Mayo's total business output in 2000 in Rochester was $1.6 billion. A 1% reduction in that business output would result in a $16 million reduction in direct economic output from Mayo operations. This would be increased to a total reduction in economic output of $22.9 million annually for the MSA when impacts on other sectors of the economy are factored in.

A community's "LQ" is its location quotient which compares the value of high-tech output as a share of total output in a metropolitan region relative to the same calculation for the United States. America's High-Tech Economy, http://www.milken-inst.org/mod30/ross_report.pdf at 55. "Quality-of-life factors are important to knowledge workers in high-tech industries. In order to retain or attract scientists, engineers, top-level programmers, managers, and other technicians, firms must pay close attention to quality of life. Retention or attraction of knowledge-intensive human capital (through migration) is essential to the vitality of high-tech industry clusters. Therefore, climatic conditions and other geographic characteristics, commuting time (congestion), violent crime rates, air quality, education quality, and other hard-to-define measures influence their location decisions." Id. at 46.

[36] USDOT, National Freight Transportation Policy, 62 F.R. 785, 788 (January 6, 1997). This policy is consistent with Congressional intent "that environmental concerns be moved higher up" on regulatory agencies' agendas. Platte River Whooping Crane v. F.E.R.C., 876 F.2d 109, 118 (D.C. Cir. 1989).

Nonetheless, Rochester recognizes that, given Board precedent and DEIS statements[37], it is unlikely to convince the Board that DM&E should bear the entire cost of mitigating the environmental consequences of its activities. Accordingly, if the Board does not adopt the no-build option, Rochester agrees to participate in the cost of the by-pass we propose in order to see the by-pass become a reality.

The DEIS[38] finds two differences between the costs of the in-town route and the by-pass route, i.e. differences between construction and operating costs for the two alternatives. A fair appraisal of R-2 and R-4 costs also must reflect the costs of reasonable and feasible environmental mitigation for both

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[37] "In past proceedings, the Board has not required communities to contribute to the funding of environmental mitigation absent a voluntary agreement between the railroad and the community to share costs. Here, however, the sole reason why certain communities have proposed a bypass is to move the railroad away from population centers. Moving the rail line would benefit the affected population by reducing residents' exposure to noise, vibration, and traffic delays at grade crossings but the railroad would not benefit, and, indeed could incur substantial additional costs, both related to the initial construction and possibly higher operating costs.

Because it appears that a bypass would thus benefit the community to the detriment of the railroad, SEA specifically requests comments on the extent to which the benefitting community should contribute to the cost of relocating the railroad, and exactly what portion of that cost the community should bear. SEA further advises the affected communities that, if the Board approves DM&E's proposal and ultimately orders it to build bypasses around the communities of Rochester and/or Brookings, those communities could incur potentially substantial costs associated with the bypasses. ES-55.

[38] ES-55.

routes.[39] Accordingly, Ortgies, Exhibit 2, contains line items reflecting construction, operation, and mitigation costs. It bears emphasis that the costs this exhibit associates with mitigation for the in-town route reflect minimal mitigation, not the level of mitigation required to maintain the environmental status quo.[40] It bears further emphasis that the Ortgies analysis is particularly conservative in that it includes (a) higher engineering and contingency percentages for R-4 than R-2, which adds $2.7 million to the cost of R-4 and (b) includes property acquisition costs for R-4 that are $0.8 million higher than Rochester's expert deems likely.[41]

The difference between the construction and operation costs for the in-town route and the by-pass, assuming minimal environmental mitigation for both routes, is $37 million, Ortgies, Exhibit 2.[42] Rochester, recognizing the extreme adverse impacts that coal train traffic would have on its economy, its safety, and its future, with great reluctance,

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[39] Ortgies, Exhibit 2, includes costs for mitigation proposed by the DEIS, such as vibration mitigation (DEIS condition 96, ES-101), as well as other mitigation that should be required for R-2 and R-4, see infra.

[40] Verified statement of Charles Reiter, Exhibit 6.

[41] Compare Ortgies, Exhibit 2, with Nigbur, Exhibit 27.

[42] Ortgies, Exhibit 2, Table 2 reflects total R-2 construction and mitigation costs of $64.6 million. Table 3 reflects total R-4 costs of $91.8 million. Table 4 reflects a net present value of the difference in operating costs of $9.9 million.

offers to contribute $40 million to the by-pass.[43] To place this offer in perspective, an expenditure of $40 million would represent by far the largest single expenditure that Rochester has incurred in its history for any public works project.

The huge sum Rochester offers to contribute toward the by-pass is contingent upon Rochester securing the necessary funds, which may necessitate a referendum of its citizens and approval of the State of Minnesota.[44] Rochester anticipates that it could complete these items by June 30, 2002. Given (a) Rochester's assumption that the Board will issue a final decision in this proceeding in late August, 2001[45]; (b) DM&E's subsequent need to secure approximately $1.4 billion for its project; and (c) DM&E's assumed three-to-five year construction schedule[46],

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[43] Rochester obviously recognizes that its offer is greater than the cost difference it has calculated. We take this approach to demonstrate the City's effort to provide a significant and reasonable contribution toward the cost of R-4.

[44] The Minnesota legislature's session in 2002 is scheduled to run from February 1 to April 30. Typically, bills of the type necessary to secure approval of sales tax increases, Rochester's likely proposed funding mechanism, are not resolved until the end of the legislative session.

[45] In STB Finance Docket No. 33388, CSX Corporation And CSX Transportation, Inc., Norfolk Southern Corporation And Norfolk Southern Railway Company -- Control And Operating Leases/Agreements -- Conrail, Inc. And Consolidated Rail Corporation, (hereinafter "CSX/NS/Conrail"), comments on the DEIS were due February 2, 1998 and the Board's decision was issued July 23, 1998. Rochester assumes roughly the same time frame for the issuance of a final decision in this proceeding following March 6, 2001 comments on the DEIS.

[46] Section 404 Application, Volume 1, Part 6, page 1.

Rochester's funding schedule will not delay DM&E's project should it be approved and financed.

Rochester's offer to provide this funding is contingent on (1) DM&E providing evidence that it has secured funding for the project; (2) DM&E actually going forward with the project; and (3) a final STB order no longer subject to judicial review requiring DM&E to construct the by-pass and operate virtually all of its trains over the by-pass if Rochester makes this contribution. We will refer to these three contingencies as "the conditions precedent."

Accordingly, Rochester requests that the FEIS recommend that any Board order approving the DM&E project contain the following findings:

(1) The environmental impacts of Alternative R-2 are so severe that Alternative R-2 should not be utilized if Rochester, Minnesota and/or any other entity or collection of entities (collectively referred to as "Rochester") contributes $40 million[47] toward Alternative R-4;

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[47] For these purposes, a "contribution" may be either in money or in-kind, i.e. providing real or personal property required for Alternative R-4. Disputes as to the value of property contributions will be resolved by SEA. Rochester shall not be required to obtain real property. Rochester may dedicate portions of its contribution to elements of Alternative R-4 construction, e.g. the three grade separations at Highway 14, Highway 63, and Highway 52.

(2) Rochester shall confirm to SEA by June 30, 2002 that it has secured approval to issue the bonds and/or has secured other financial commitments required for the paragraph (1) contribution;

(3) The timing of the contribution shall be negotiated between Rochester and DM&E and, if they cannot reach agreement within ninety days of the later of (a) the date of the paragraph (2) notice or (b) the date DM&E fulfills the conditions precedent, SEA shall determine that timing.[48/]

(4) In the event Rochester fails to make its contribution by the date required by paragraph (3), DM&E may utilize Alternative R-2, subject to its compliance with the generally applicable mitigation measures and the specific mitigation measures ordered for Alternative R-2.

(5) In the event Rochester makes its contribution by the date required by paragraph (3), DM&E shall utilize the Alternative 4 routing for all of its through trains traversing Olmsted

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[48/] The timing of the issuance of bonds and payment to DM&E and their ultimate final payout to a contractor on the project must be arranged carefully so as to avoid the imposition of "arbitrage" penalties by the Internal Revenue Service.

County other than (a) as required to serve Rochester-area shippers or (b) in emergency situations when Alternative R-4 trackage is unavailable. DM&E shall utilize its best efforts to limit the number and duration of such emergency situations.

B. SEA specifically requests comments on the environmental mitigation measures this Draft recommends. In particular, if commenters believe that the unique circumstances of a community warrant individually tailored environmental mitigation in addition to the environmental mitigation in the Draft EIS, SEA urges the commenter to submit suggestions for environmental mitigation, and why it would be appropriate, to SEA during the public comment period. ES-71.[49]

As discussed throughout these comments and the attached verified statements, the DEIS erred in calculating both the environmental impacts of DM&E's current operations and the environmental consequences of DM&E's proposed operations. These errors are so manifest that the DEIS fails to take the requisite "hard look"[50] at the DM&E project. Any STB order approving the DM&E project based on such a faulty environmental review could not be affirmed by a reviewing court. In the following subsections, Rochester presents its commentary on certain of the DEIS mitigation proposals and its requested mitigation for R-2. It is important to note that, given the DEIS's errors in calculating the environmental impacts of R-2, Rochester has not had a reasonable opportunity to devise proposals necessary to mitigate these impacts. Given the extent of the DEIS's errors, it would be appropriate for SEA to give parties an additional comment period after it correctly calculates environmental impacts.

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[49] The DEIS reiterates its request for commenters' specific proposals for additional environmental mitigation conditions and the rationales therefore at ES-74.

[50] Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 350 (1989); Kleppe v. Sierra Club, 427 U.S. 390, 410 n. 21 (1976).

1. "Consultation" Mitigation Is Meaningless

Rochester objects to the DEIS's implicit conclusion that "consultation" requirements or the like are legitimate forms of mitigation. As the Interstate Commerce Commission ("I.C.C." or "Commission") recognized years ago, mitigation conditions that do nothing more than require a railroad to "consult" with another entity are pointless. In Norfolk Southern Corp.--Control--Norfolk & W. Ry. Co., 366 I.C.C. 173, 234, 235 (1982) the Commission stated:

> The other conditions generally require applicants to consult with various persons regarding planned activities.... No affirmative benefit has been shown to arise from these consultations. It is not suggested that applicants' actions are restricted as a result of these consultations, or that applicants must comply with any suggestions resulting from the consultations. We see no point in imposing conditions upon this consolidation without demonstrable positive benefit.

In fact, when the I.C.C. ignored the logic of the Norfolk Southern decision and imposed a "consultation" condition in another proceeding, the D.C. Circuit denounced this approach. As the court stated in State of Idaho By & Thru Idaho Pub. Util. v. I.C.C., 35 F.3d 585, 596 (D.C. Cir. 1994):

> ... the conditions imposed by the Commission require only that the Union Pacific consult with various agencies about the impacts of salvage; thus, only Union Pacific will be in a position to assess the total environmental impact of salvage activities and perform an "individualized balancing analysis." We have held that NEPA prohibits such an abdication of regulatory responsibility in favor of the regulated party.

See also Illinois Commerce Comn'n v. I.C.C., 848 F.2d 1246, 1258 (D.C. Cir. 1988).

In sum, proposed conditions which do nothing more than require DM&E to consult with another entity or require DM&E to do only what it considers "appropriate" would constitute an unlawful abdication of the Board's authority. They should be reformulated to place a real burden on DM&E to do something other than talk about the problems its operations would create. The below-listed conditions[51] fall into these categories:

5 (monitoring system),

9 (quiet zones),

27 (temporary fencing),

28 (permanent fencing),

42 (mine operations),

47 (state lands),

74 (vegetation),

75 (raptors),

76 (weeds/herbicides),

77 (fire),

78 (wildlife under- and overpasses),

79 (wildlife fencing),

91 (residential noise),

93 (construction noise),

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[51] The numbering system used here tracks the condition numbers commencing at ES-78.

95 (quiet zones)[52], and

98 (Lakota Sioux).

The vibration study proposed for the benefit of the Mayo Clinic[53] falls into the same category. A study "condition" is meaningless unless DM&E bears its cost and the cost of the mitigation the study finds to be required.

2. Continued Oversight Must Be Required

Rochester seeks clarification of proposed condition 103, to wit:

> If there is a material change in the facts or circumstances upon which the Board relied in imposing specific environmental mitigation conditions, and upon petition by any party who demonstrates such material change, the Board may review the continuing applicability of its final mitigation, if warranted. (Emphasis added)

The underscored phrase is subject to varying interpretations. For example, DM&E could interpret this language as being nothing more than an opportunity to have environmental conditions deleted. However, Rochester believes an appropriate interpretation is that the Board also would be expressing its willingness to receive petitions from interested parties seeking either (a) clarifications or (b) augmentation of environmental conditions if the post-construction facts differ materially from those on which the environmental conditions are premised.

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[52] Proposed conditions 9 (ES-81) and 95 (ES-101) are functionally identical.

[53] Volume II at 3.3-69.

By way of example, the DEIS accepts one DM&E assertion that reduces calculated traffic delays but rejects a DM&E admission that would have increased those delays. Contrary to SEA's use of conservative speed figures in the Reno Study[54], i.e. speeds less than the maximum speeds claimed by the railroad, the DEIS simply accepts the DM&E's claim that it will operate loaded trains at an average speed equal to the maximum speed allowed by law, i.e. 45 mph for loaded trains and 49 mph for empty trains. At the same time, it rejects DM&E's conclusion that gate up and down time will be 40 seconds per train[55] and substitutes 30 seconds for these events.[56]

Rochester believes that the DEIS's average train speed figures are overstated[57], that its gate up and down time figure is understated, and that environmental impacts of DM&E operations that are particularly sensitive to speed, e.g. impacts on street traffic generally and impacts on emergency service providers in specific, are understated in the DEIS as a result of its underlying assumptions. As a result, if the FEIS persists in using assumptions that minimize quantifications of environmental

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[54] Supra, at 8-6.

[55] See the April 9, 1999 Verified Statement of DM&E's William R. Otter, Jr. at 6.

[56] See Volume VII-A at G-2.

[57] By way of example, it is clear that DM&E will not maintain these speeds while entering or exiting sidings, including the sidings necessary to provide service to Rochester-area shippers. Thus, the FEIS should adjust train speeds to reflect the proposed siding locations.

impacts, the Board must, at the least, provide the public with an opportunity to demonstrate the errors in these assumptions after DM&E commences operations.

The Board has permitted parties in at least one other proceeding[58] to seek augmentation of environmental mitigation conditions on the basis of material changes in the facts underlying its prior decisions. Especially considering the above-noted assumptions underlying the DEIS, it should take that approach here.

3. The Proposed And Additional Vibration Mitigation Is Required

The DEIS determined that vibration mitigation is mandatory for R-2.[59] While this mitigation is fully justified by the DEIS discussion of vibration impacts[60], Rochester notes (a) the inconsistencies in the DEIS's calculations of structures subject to vibration damage, and (b) the DEIS's understatement of vibration impacts.[61] The DEIS's inconsistencies are established by comparing Tables 3.2-21 (Volume II at 3.2-64) and 5.1-10

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[58] See CSX/NS/Conrail, Decision No. 89, slip op. at 161 (served July 23, 1998) and STB Finance Docket No. 33388 (Sub-No. 91) at 2 (served February 9, 2000).

[59] ES-101, condition 96.

[60] Parenthetically, Rochester asks whether SEA has considered the possibility that Federal licensing of a project that may give rise to substantial vibration damage will result in Federal liability for that damage. See the Wilson, Ihrig & Associates, Inc. warning of court action. DEIS, Volume VII-A, Appendix F.

[61] Volume II at 3.2-62 through 3.2-65; 3.3-53; 3.3-55; and 3.3-67 through 3.3-69.

(Volume IV, Chapter 5).[62] Using SEA's "conservative" determination that ground vibration could be sufficient to cause structural damage to buildings located within 100 feet of the rail line[63], Table 3.2-21[64] states that 14 Rochester structures could be damaged. Moreover, the DEIS recognizes the quality of life diminutions directly attributable to vibration and evidences concern for 72 additional Rochester structures within 200 feet of the rail line. It also recognizes that residents of 168 additional structures within 400 feet of the track would experience "inconvenience or annoyance." The DEIS also recognizes that structures containing sensitive equipment could be impacted by vibration even if they are farther than 400 feet from the DM&E line.[65]

In contrast, Table 5.1-10 finds that R-2 would result in potential vibration damage to 32 (not 14) structures within 100 feet, vibration inconvenience to 180 (not 72) structures between 101 and 200 feet and vibration inconvenience to 364 (not 168) structures between 201 and 400 feet.

While the differences between the structure counts in these two tables requires clarification in the FEIS in any event, Rochester's Geographic Information System establishes that both

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[62] Rochester requests that the FEIS identify the data source(s) used to determine the number of affected structures.

[63] Volume II at 3.2-62.

[64] Volume II at 3.2-64.

[65] Volume II at 3.3-67 to 3.3-69.

tables misstate the number of structures that would be affected most seriously by vibration, i.e. those within 100 feet of the DM&E line.[66] As reflected Spaeth, Exhibit 3, there are 22 (not 14 or 32) Rochester structures within 100 feet of the DM&E centerline, an additional 99 (not 72 or 180) structures between 101 and 200 feet of that line, and an additional 249 (not 168 or 364) structures between 201 and 400 feet of that line. These 370 structures encompass fully 390 dwelling units as well as a school, hospitals, and other sensitive receptors.[67]

Three of Rochester's major entities have serious vibration issues mandating mitigation.

PEMSTAR employs over 700 people in Rochester of which approximately 160, representing an annual payroll of approximately $8,000,000, work at its facility located at 2535 Highway 14 West, adjacent to the DM&E tracks. Its economic output for a single line of precision optical business, which is the most at risk in this building, is $35 million.[68] That figure does not include other lines of business at this location.

PEMSTAR advised SEA on April 7, 1999 that "If the DM&E proposal proceeds, with constant train traffic, we will not be able to continue operations in this facility and will incur a

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[66] Rochester assumes that the DEIS's undercount of structures results from its attempt to count structures appearing on aerial photographs. Volume VII-A at F-3 to F-4.

[67] Vibration-sensitive structures are listed in Ortgies, Exhibit 2.

[68] Rochester Area Economic Development Inc., Exhibit 7.

significant loss on our investment." It confirmed this information to SEA by memorandum to the Board during March, 2000. In an October, 2000 memorandum to Rochester, PEMSTAR indicated that, due to even more vibration-sensitive efforts on its part, its vibration concerns have "increased significantly." On November 16, 2000, PEMSTAR advised SEA that "The effect of coal trains in close proximity to [its] facilities would likely cause PEMSTAR to move the facilities, at great cost and with very significant economic impact to the company, the City of Rochester and the state of Minnesota. See PEMSTAR Position Statement, Exhibit 8 hereto (emphasis added).[69/]

No community can afford to lose an employer the size of PEMSTAR. The Board must require vibration mitigation fully capable of permitting PEMSTAR to stay at its current location.

Contrary to the DEIS's assertions[70/], the Federal Medical Center ("FMC") expects to experience significant impacts from DM&E-generated vibrations. Exhibit 9 contains related correspondence. On July 15, 1998, the Department of the Army, Huntsville Center, Corps of Engineers, advised the Facility Manager of the FMC that the DM&E's proposal

> ... will likely impact the performance of the electronic security system installed at your facility. First of all, the vibrations associated with significant train traffic will result in increased ambient noise levels coupled into the fence. This higher ambient noise level will likely require a

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[69/] See also the testimony of Dave Sippel, November 16, 2000 transcript at 147-150.

[70/] Volume II at 3.3-68 and Volume IV, Table 5.1-10.

> decrease in the sensor's sensitivity adjustment in order to keep the false alarm rate (FAR) low. There is a direct relationship between any sensor's detection probability and FAR. Therefore, adjusting the sensor's sensitivity to reduce FAR will also mean an associated decrease in probability of detection. Effectively, the fence mounted sensor's performance will be degraded... Therefore, it is the professional opinion of our engineers in the Electronic Security Center that performance of the electronic security system would be degraded if subjected to the nearby train traffic noted above. (emphasis added).[71]

Following issuance of the DEIS, Rochester received the October 11, 2000 letter from FMC included in Exhibit 9. That letter states that "the information we have received and the research we have conducted yielded vastly different information than that presented in the EIS." Among other things, the manufacturer of the fencing alarm system refused to provide a letter of certification that the system would be effective with the operations proposed by DM&E.[72] Again, the Board must require mitigation to fully resolve the problems identified by FMC.

Rochester incorporates by reference the vibration-related comments of the Mayo Clinic. Rochester further incorporates by reference the listing of Mayo facilities that are sensitive to

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[71] The July 15, 1998 letter referenced some operating characteristics that vary from DM&E's proposal. Accordingly, Rochester sent a letter to FMC on October 24, 2000 seeking clarification. FMC's reply, dated December 18, 2000, confirmed its understanding that the adverse impacts to its security system would arise whether the daily train count is 37 or 50 trains. Exhibit 9.

[72] FMC's letter also asked Rochester to reiterate FMC's previously addressed concern with respect to hazardous chemicals being transported at high speeds by its "non-evacuatable facility."

vibration to be included in the contemporaneously submitted comments of the Olmsted County Board of Commissioners.

Rochester requests that the FEIS clarify that the mandated vibration mitigation be designed to maintain the current levels of railroad-related vibration at each of the structures identified by SEA as having the potential for "damage" or "inconvenience." While we believe this to be SEA's intent, we wish to avoid a scenario in which DM&E asserts that it is only required to minimize vibration that otherwise would affect sensitive equipment, e.g. at the Mayo Clinic.

Rochester further requests that the residential and historic structure vibration mitigation discussed in Reiter, Exhibit 6 and Ortgies, Exhibit 2 be mandated.

4. Additional Required Mitigation

Rochester here lists additional environmental mitigation conditions that should be mandated for R-2. These minimal conditions are fully supported infra and/or the accompanying verified statements. As also demonstrated, these conditions would not serve to maintain the environmental status quo and should not be viewed as a substitute for R-4. They would merely alleviate some of the damage created by R-2.

Environmental Conditions For Alternative R-2

1. DM&E shall mitigate train wayside noise (locomotive engine and wheel/rail noise) at noise-sensitive receptor locations in Rochester, Minnesota within the noise contour

boundary established for Rochester. With the written concurrence of Rochester, DM&E shall mitigate wayside noise with measures such as noise barriers or building sound insulation treatments, including air-conditioning if appropriate. The design goal for noise mitigation shall be a 10-decibel (DBA) noise reduction. The minimum noise reduction achieved shall be 5 dBA. Noise barrier performance shall be determined in accordance with ANSI S12.8-1987, American National Standard Methods for Determination of Insertion Loss of Outdoor Noise Barriers. Sound insulation performance shall be determined in accordance with ASTM 966-90, Standard Guide For Field Measurements of Airborne Sound Insulation of Building Facades and Facade Elements. DM&E shall certify compliance with this condition within 2 years of the effective date of the Board's final decision. This condition shall not apply if Rochester executes an agreement with DM&E that satisfies Rochester's environmental concerns. Such agreement may call for DM&E to pay to Rochester an agreed upon sum for noise mitigation and for Rochester to assume

the burden of providing the noise mitigation measures. Should noise mitigation be selected at locations identified as containing structures that are potentially eligible for listing on the National Register of Historic Places, DM&E shall consult with the appropriate State Historic Preservation Officer to assess effects and implement appropriate mitigation measures. If DM&E and Rochester or the SHPO cannot agree on appropriate mitigation measures, such disagreement shall be resolved by SEA.[73]

2. Within 90 days of the issuance of a final rule in United States Department of Transportation, Federal Railroad Administration, Docket No. FRA-1999-6439, Use of Locomotive Horns at Highway-Rail Grade Crossings, or any successor docket, establishing supplementary safety measures fully compensating for the absence of the warning provided by railroad horns, DM&E shall reach agreement with Rochester,

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[73] This condition is a paraphrase of environmental condition 11 in CSX/NS/Conrail. See Decision No. 89 at 401-402 and Decision No. 96 at 9-10. SEA should note that Rochester's comments and verified statements establish that the methodology used in the DEIS to calculate noise impacts is flawed and must be revised in the FEIS.

Minnesota on the supplementary safety measures to be utilized, at DM&E's sole expense, to create a "quiet zone" within Rochester. If no such agreement is reached within 90 days, SEA shall select the supplementary safety measures. DM&E shall install such supplementary safety measures within six months of its agreement with Rochester or selection of the measures by SEA.

3. DM&E shall provide extra-ordinary noise mitigation, e.g. building sound insulation, for each sensitive receptor that otherwise would experience noise levels equal to or greater than 75 Ldn. The minimum noise reduction achieved shall be sufficient to reduce indoor noise to a level no greater than 45 dB. DM&E shall certify compliance with this condition within 2 years of the effective date of the Board's final decision.

4. DM&E shall (a) preserve the existing Cascade Creek recreation trail underpass and improve that underpass to eliminate poor sight lines as part of any improvement of the crossing; (b) install vegetative screening between Cooke Park and the right-of-way; (c) install

a below grade crossing for the Zumbro River trail; (d) install fencing between MP47.0 and 50.6; (e) relocate the Quarry Hill trail from the Zumbro River to 9 Avenue to the south side of the right-of-way and install vegetative screening between the trail and the right-of-way; (f) relocate the Quarry Hill trail farther from the right-of-way in the vicinity of East Park and install vegetative screening between the trail and the right-of-way; and (g) increase the vegetative screening between Quarry Hill Park and the right-of-way.

5. DM&E shall establish grade separations at Broadway Avenue (underpass), East Circle Drive (overpass), and West Silver Lake Drive/2nd Avenue NE (underpass).

6. DM&E shall provide, install, and maintain a real-time train location monitoring system to improve local emergency response vehicle dispatching. At a minimum, the system shall use appropriate technology to detect trains approaching Rochester and shall display the

train locations at an emergency response center to be specified by Rochester.[74]

7. DM&E shall not construct sidings (a) within 1260 feet of any residential area; (b) that include any grade crossing with an ADT of over 1,000; (c) that would reduce train speeds in significantly populated areas below 35 MPH; and (d) that are less than one train length from significantly populated areas.[75]

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[74] This condition is a paraphrase of Environmental Condition No. 25 of Appendix Q of Decision No. 89 in CSX/NS/Conrail.

[75] These criteria are justified and the no-build zone for sidings in Rochester is set forth in Reiter, Exhibit 6.

C. SEA is requesting comments from environmental justice communities on alternatives or mitigation measures that could reduce the impacts of increased noise levels resulting from the proposed project.... SEA is also requesting comments from environmental justice communities predicted to be affected by significant reductions in safety at individual grade crossings concerning alternatives or mitigation measures that could increase grade crossing safety. Volume VII-A, D-15.

The DEIS's treatment of environmental justice issues suffers from two principal defects. First, since the DEIS errs in its calculation of virtually every quantifiable environmental impact, it does not accurately reflect the impact on the environmental justice community.

Second, as will be reflected in the 2000 census, the results of which will be available for inclusion in the FEIS, the demographics of Rochester have changed substantially from those appearing in the 1990 census, upon which the DEIS relies for its data.[76/] If the purpose of the involved sections of the DEIS is to consider the real impacts of the DM&E proposal on environmental justice communities, the 2000 census data must be used.

Further comments on environmental justice issues are contained in the verified statement of Philip H. Wheeler[77/], Exhibit 11. As demonstrated therein, the DEIS errs, inter alia, in the following respects:

[76/] Exhibit 10 reports on Rochester's new Somali community.

[77/] As explained by Wheeler, Exhibit 11, R-4 is unlikely to trigger environmental justice concerns.

1. The scale of analysis is too large, distorting the analysis both by diluting the environmental justice population and by reducing the average level of impact.

2. Currently available neighborhood school enrollment data and real estate tax data are more reliable than and should be used in lieu of outdated 1990 census data.

3. If 1990 census data is to be used, block group level relationships should be used to derive income attributes and block level race data should be used to identify smaller neighborhoods more accurately reflecting environmental justice communities.

4. Attention should be given to adverse property value impacts on environmental justice communities.[78/]

5. DEIS errors, such as its quadrupling of the number of existing DM&E trains, result in an underestimation of the extent to which the DM&E proposal would worsen existing conditions.

6. There are serious shortcomings in the comparison of impacts on environmental justice neighborhoods with impacts on the balance of the community.

See also the verified statement of Michael LaPlante, Exhibit 12.

[78/] Rochester addresses property value issues in Section II.G, infra.

II. IDENTIFICATION AND CORRECTION OF DEIS ERRORS

A. Future Train Counts And Related Matters

Prior to discussing certain DEIS errors, Rochester wishes to comment on the question of the number of future trains that should be utilized to assess the environmental impacts of the DM&E proposal. If advocates of R-2 assert that the DEIS has overstated the environmental impacts of the DM&E project by overstating the number of trains that will move through Rochester, such contentions are not based on facts of record, e.g. commitments from DM&E that it will not exceed a particular train count through Rochester, and should be accorded no weight by the FEIS.

By way of background, on March 10, 1999, the Board issued its Notice of Availability of Final Scope of Study for the Environmental Impact Statement. At page 18, note 11, the Board stated:

> The DEIS will assess potential environmental impacts that would result from rebuilding DM&E's existing line and operating a maximum of 37 trains, including 34 unit coal trains over the rebuilt line.[79/]

Subsequently, DM&E's April 12, 1999 submission to SEA challenged the Board's assumption and asserted that the 37 trains per day figure is not "supportable by the record."[80/] While professing an inability to predict with certainty total traffic

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[79/] This conclusion was premised in part on the finding in the Board's December 10, 1998 Decision, at 36, that DM&E's market penetration could equal 40 million tons in 2002, increasing to 100 million tons in 2007.

[80/] Schieffer at 4.

and how that traffic will disperse after it leaves the DM&E system[81], Mr. Schieffer, relying on Mr. Waltman[82], offered what he termed "a mathematical illustration"[83] in support of his ultimate conclusion that, at 100 million tons of coal per year, only 28 million tons per year, or 10 coal trains per day, will pass through Rochester.[84]

On June 10, 1999, Rochester responded to DM&E's arguments. Relying on data DM&E had submitted as "highly confidential", and thus subject to the protective order in this proceeding[85], Rochester established that the DM&E proposal would result in between 33 and 39 trains per day traveling through Rochester if DM&E operates with the maximum car weights and maximum train lengths it claims. If DM&E utilizes less than the maximum car weights and train lengths, the number of trains obviously could be even greater than 39 per day.[86]

It must be emphasized that Rochester's analysis was based entirely on information provided by DM&E and that, to Rochester's knowledge, DM&E has never submitted any response to Rochester's

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[81] Id.

[82] Id.

[83] Id. at 5.

[84] Id.

[85] Rochester incorporates by reference herein the "highly confidential" version of its June 10, 1999 submission, previously provided under seal to SEA.

[86] The DEIS's failure to correlate train lengths and weight is discussed in Reiter, Exhibit 6.

June 10, 1999 submission or any evidence of record in this proceeding that rebuts Rochester's analysis. It would be grossly unreasonable for the FEIS to alter this fundamental train count assumption without giving Rochester an opportunity to respond to any new evidence on this vital topic. Moreover, given CEQ regulations, the Board is required to view 37 trains per day as "reasonably foreseeable adverse effects on the human environment."[87/]

In the event that any prospective coal shippers assert that the FEIS should not utilize a train count of 37 per day, Rochester will take this opportunity to remind SEA of other statements made by those shippers clearly indicating that the DEIS has understated the potential environmental impact of the DM&E project.

On October 5, 1998, The Western Coal Traffic League, et al. submitted its Reply Evidence And Argument In Support of the DM&E proposal. Attached to that document was the Verified Statement of Richard H. McDonald, an independent railroad transportation/engineering consultant. Mr. McDonald stated:

> I do have some reservations about the efficacy of DM&E's tightly scheduled operations, involving slots or windows for each train, at the higher traffic volumes projected for later years (100 million tons), given the proposed configuration of the railroad. However, I believe such an operation can be maintained through the gradual addition of capacity, in the form of second main track and passing sidings, as traffic builds. (page 15, underscoring added)

87/ 40 C.F.R. § 1502.22. See also, Sierra Club v. Sigler, 695 F.2d 957 (5th Cir. 1983).

Mr. McDonald also stated:

> The Coalition also claims that the connecting carriers' inability to accommodate coal trains of the length and weight planned by DM&E will prevent DM&E itself from accomplishing the uniform train lengths, weights and schedules described in its operating plan. However, to the extent this is true in the early years of DM&E's PRB coal operations, DM&E can use its nearest staging/relay yard to assemble trains of the composition required to accommodate the operating capabilities of its connections. (page 20, underscoring added)

The DEIS ignored: (1) the environmental impacts of DM&E's siding construction and operations; (2) Mr. McDonald's conclusion that DM&E may be adding a "second main track"[88]; and (3) Mr. McDonald's conclusion that DM&E will be operating even more trains than it claims as a result of a need to assemble shorter trains for the benefit of its connecting railroads.

The FEIS must fully examine the heretofore ignored elements of DM&E's proposal, i.e. sidings[89], and the additional environmental impacts caused by the changes to DM&E's operating plan that even DM&E's supporters predict. Without such an examination, the FEIS will not have taken the required "hard look" at the DM&E project.

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[88] Rochester agrees with Mr. McDonald's implicit assumption that, at the 100 million ton per year level, DM&E's revenue stream will be adequate to support the additional construction that its advocates predict.

[89] Reiter, Exhibit 6.

B. There Are Only Three (Not Twelve) Existing Daily Through Trains Operating In Rochester And Those Trains Average Approximately 84 (Not 115) Cars

Two quantitative errors, i.e. the existing train count and the length of those trains, fatally infect virtually every DEIS quantitative analysis applicable to Rochester and would prohibit court affirmance of an order based on the DEIS's analysis.[90/]

Table 3.1-9, Volume II at 3.1-34, lists the purported "Existing Rail Line-Minnesota Train Traffic." Notwithstanding the finding that "the DM&E track in Minnesota averages approximately 2-3 through trains per day"[91/], the DEIS's asserted number of trains per day for the Owatonna to Lewiston segment, which includes Rochester, is 12. This asserted train count is

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[90/] "... we cannot approve a public interest review entirely indifferent to the facts." Van Abbema v. Fornell, 807 F.2d at 642.

[91/] Id. See also, (1) 3.2-20 "At present, the occupants of these [Minnesota] residences are exposed to diesel emissions from locomotives hauling DM&E's current rail traffic - an average of 3 trains per day."; (2), 3.3-62 and 3.3-63 [use of 3 trains for measurement of Alternative R-1 operations and emissions]; and (3) the November 15/16, 2000 comments of Allan J. Vogel, Director, Office Of Freight, Railroads, & Waterways, Minnesota Department of Transportation, "When determining noise or vibration consequences of this application, the STB assumes current train levels in Minnesota that range between 8 and 14 trains per day. Our analysis and records would conclude that four trains per day in Minnesota is on the high side of the average traffic."

stated to include 9 "wayfreights[92] picking up and delivering rail cars to shippers." Id.

The DEIS uses these 12 purported trains to determine the existing environmental conditions. For example, Table FA-1 uses 12 trains per day to calculate existing noise[93] and Table 3-MN-G1 uses 12 trains per day to calculate existing traffic conditions.

However, in calculating the projected future environmental conditions, the DEIS assumes, without explanation, that the 9 wayfreights will not exist. Thus, in Volume VII-A, Tables FA-2 and 3, the DEIS adds 3 existing through trains to 8 coal trains, ignores the 9 "wayfreights", reaches a total of 11 trains, and purports to tell the world that there will be less noise in Rochester with the additional 8 coal trains than there is today. Similarly, Tables FA-6 and 7[94] add only the 3 existing through

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[92] The DEIS does not define "wayfreights." On information and belief, the DEIS's reference to "wayfreights" is to all DM&E trains that do not traverse the entirety of its trackage between Rapid City and Winona. See infra. This definition is inconsistent with DM&E's application. In Volume 1, Exhibit D, at 4, DM&E states "[L]ocal switching work along the system is done by "wayfreights." These wayfreights are based at Rochester, Waseca, New Ulm, Brookings, Huron, Rapid City, and Belle Fourche. They switch and gather up cars at various stations and customer tracks, and line them up for through trains to pick up." In other words, "wayfreights" are not identical to through trains as assumed by the DEIS. To the contrary, they are nothing more than local switching movements.

[93] But see Table 3.3-13 at Volume II, 3.3-66 which uses 3 trains per day to represent Rochester's existing noise conditions.

[94] Volume VII-A.

trains and the 34 projected coal trains and reach a total of 37 trains, rather than 46 trains including wayfreights.

The DEIS is in error as to (1) the existing through train counts, (2) the existing wayfreight/switching movement counts, (3) the length of existing through trains and wayfreights and (4) the effect of approval of the DM&E application on future wayfreight/switching movement counts.

Rochester videotaped DM&E operations in Rochester between mid-October and mid-November, 2000, during the grain harvest season DM&E states is its busiest period. See also, Neumann, Exhibit 14. As reflected in Hanson, Exhibit 4, the average daily number of DM&E through trains was 2.4.

Assuming, arguendo, that this evidence is insufficient to demonstrate the DEIS's error in assuming the existence of 12 daily trains in Rochester, other facts clearly establish that error.

On information and belief, SEA obtained the estimate of 12 trains (including 9 wayfreights) through its review of a November 13, 1998 memorandum from Bill Otter of the DM&E.[95/] As Rochester understands it, SEA's analysis may be summarized as follows.

DM&E's memo says that it operates:

(1) one commercial train "each day in each direction all year long" between Rapid City and Winona;

[95/] Exhibit 13 hereto. The handwritten notes on this exhibit were on the copy provided by SEA to Rochester and we assume they were made either by SEA or its contractor.

(2) one local train based at each of Rapid City, Huron, Brookings, New Ulm, Rochester, and Waseca which moves to and from surrounding communities providing service "on an as-needed basis"; and

(3) over all lines, "on an irregular, as needed basis, occasional extra trains" to support maintenance of way activities or to handle surges in freight traffic.

The DEIS attributes 2 loaded trains per day to the three above-described operations.

Next, the DM&E memo states that "[d]uring the grain harvest season, or when market conditions at other times cause grain to move to market in large volumes, the following extra train service is operated frequently (and tailored to the traffic needs):"

* One extra grain train from the Midland-Pierre-Blunt-Onida area east to Mankato, Waseca or Winona.
* One extra grain train beginning at Huron and also operating east to Mankato, Waseca or Winona.
* One extra grain train beginning at or near Sioux Valley (Brookings) and picking up cars enroute to the Tracy area and operating east to Mankato, Waseca or Winona.

* One extra grain train beginning at or near Walnut Grove and operating east to Mankato, Waseca **or** Winona. (emphasis added)

The DEIS attributes 4 loaded trains per day to this second group of movements.

The DEIS thus reaches a total of 6 loaded trains per day and doubles that total to reach the purported 12 trains a day through Rochester.

The errors in the DEIS's approach to estimating the existing level of DM&E traffic are obvious.

A. The daily movements back and forth between Rapid City and Winona (item 1, supra) do not have any corresponding empty movements. These are not unit trains. Rather, they are "commercial", i.e. manifest trains that transport both loaded and empty cars. Thus, these two trains per day should not have been doubled.

B. Each of the remaining listed trains do not operate daily. Rather, they operate on either "an as-needed basis" (DM&E's second and third bullet points) or only "frequently" "during the grain harvest season." There is no reason to interpret any of these phrases to mean "365 days per year."

C. As noted by DM&E, some of these trains leave its system at Mankato or Waseca and such trains would not pass through Rochester.

In brief, the DEIS's interpretation of the DM&E memorandum is erroneous and cannot serve as the basis for calculating the

environmental impacts of DM&E's current operations. Even DM&E disagrees with the DEIS. Its website states "that the existing traffic base will grow to approximately 3 trains per day."[96/]

Again assuming, arguendo, that Rochester's videotapes and DM&E's admissions are insufficient to establish the DEIS's error in assuming an existing daily train count of 12, facts necessary to estimate the number of existing DM&E through trains are readily available. The DEIS calculates existing through trains to be 6,400 feet in length.[97/] It says that trains of this length haul 115 rail cars.[98/] DM&E states that its 1997 volume was 58,436 cars.[99/] Thus, even assuming, arguendo, that DM&E transports one empty car for each loaded car, a conservative assumption, the total number of cars currently handled by DM&E is 116,872 (58,436 x 2). If this total is divided by 115, the average number of cars per through train calculated by the DEIS, the total number of annual through trains would be 1,016. And, if this number is divided by the 365 days of the year, the average number of daily through trains is 2.78, not 12. In other words, if the FEIS assumes, contrary to the facts, that DM&E's existing through trains average 115 cars, it must also be premised on an existing case of a maximum of 2.78 trains per day

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[96/] http://www.dmerail.com/traintraffic.htm (underscoring added).

[97/] See e.g. Volume VII-A, Table FA-1. But see, infra.

[98/] 3.2-78. As reflected in the attachments to Hanson, Exhibit 4, the actual average number of cars in DM&E trains traversing Rochester is 84, not 115.

[99/] February 20, 1998 application, volume 1 at 20.

and even fewer in Rochester given the trains that exit the system prior to reaching Rochester. If, in contrast, the FEIS is to be accurate, its representation of DM&E's existing traffic should be premised on through trains averaging 84 cars. This translates to four through trains per day, at least one of which exits the DM&E system west of Rochester, leaving an existing case consisting of less than three through trains per day on the Rochester trackage.[100/]

Rochester understands that SEA sought confirmation from DM&E as to its estimate of 12 existing through trains per day and that DM&E provided that confirmation. However, as demonstrated above, DM&E can't be operating more than 2.78 through trains of 115 cars each. To reach 12 through trains per day, DM&E's average number of cars per through train would have to be 26.68.[101/] Reliance on the DM&E's confirmation of such a result was a significant error.[102/]

[100/] The DEIS also misstates the proposed future number of non-coal cars. At 1-28, the DEIS states that the DM&E's future operations will transport approximately 66,000 non-coal cars annually. The DM&E's projection for 2003 is 68,300 cars. February 20, 1998 application, volume 1 at 20. This equates to 3.25 daily trains of 115 cars each and to 4.45 daily trains of 84 cars each.

[101/] 116,872 divided by 12 divided by 365. The only way that DM&E could calculate an "average train" of 26.68 cars would be by averaging its through trains with its wayfreights, i.e. local switching movements from and to sidings. Rochester discusses the errors in that approach infra. However, if the FEIS continues to use 12 trains a day as its existing case, it also must use trains averaging 27 cars.

[102/] Heretofore, both the I.C.C. and the courts have recognized that self-serving statements by railroads "are entitled to little

(continued...)

Even if, contrary to Rochester's understanding, the DEIS calculated the purported number of existing trains by including local switching movements, i.e. movements between DM&E's Rochester siding and shipper locations, the DEIS's data are in error in each of the following respects.

1) There are not 9 daily switching movements in Rochester. As demonstrated in Hanson, Exhibit 4, DM&E operates 1.28 round trip switching movements per day over the SE spur and approximately the same number of round trip switching movements easterly over the mainline.

2) There is no basis for the DEIS to assume[103] that DM&E switching movements to serve Rochester shippers operate over the entire length of DM&E's Rochester trackage. As demonstrated in the verified statement of Gary Neumann, Exhibit 14, Rochester switching movements originate at (a) the DM&E yard between 4th Avenue NW and 1st Avenue NW; (b) on the siding tracks to the west of 4th

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[102] (...continued)
credence." See Norfolk & W. Ry. Co. -- Control -- Detroit, Toledo & Ironton R.R., 360 I.C.C. 498, 512 at n. 27 (1979) and Lemoille Valley R.R. v. I.C.C., 711 F.2d 295, 318 (D.C. Cir. 1983).

[103] This assumption is implicit in the DEIS's treatment of wayfreights and through trains as giving rise to identical environmental impacts.

Avenue NW; or (c) Eyota.[104] Those movements terminate at (a) locations along the SE Spur Line (Seneca Foods, Rochester Iron, and Tamarack); (b) the RPU spur; (c) very infrequently[105], locations along the NW Spur Line (General Warehouse and IBM); or (d) the DM&E mainline (UBC).[106] Agro is served from a siding in Byron adjacent to Agro's facilities. The vast majority of local service is provided to (a) the shippers on the SE Spur for which switching movements affect only the 1st Avenue NW and Broadway intersections on DM&E's mainline and (b) RPU for which switching movements affect only 1st Avenue NW, Broadway, and 2nd Avenue NE on the mainline. Thus, even assuming, arguendo, that switching movements should form a part of SEA's analysis, but see infra, they cannot be used to determine the environmental status quo outside of the areas in which they operate.

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[104] DM&E stores cars at Eyota for some deliveries to RPU because RPU can store only 15 cars at its Silver Lake Power Plant in Rochester.

[105] As explained supra, the NW Spur Line has been out of service since last Fall.

[106] Public Delivery serves its customers directly from the DM&E yard. Hence, it requires no switching movements.

3) DM&E's Rochester switching movements are not of the same length as the through trains that pass through Rochester intersections. As demonstrated in Hanson, Exhibit 4, DM&E's switching movement on its Rochester mainline average only nine cars and its switching movements on the SE Spur average only 2.93 cars. Thus, again assuming, arguendo, that switching movements should be considered by the FEIS, it is wrong to treat them as identical to through trains. Switching movements cannot have the same impacts on vibration, noise, traffic delay, emergency services, public safety, and air quality as through trains averaging 115 cars (or the actual average of approximately 84 cars).

In sum, there would have been no justification for the DEIS to have injected an analysis of switching movements as if those movements give rise to the same environmental impacts as through trains. The obvious distinction between switching movements and through trains serves as the logical rationale for the fact that railroads are not even required to provide any data on movements other than through train movements in merger cases. As the Norfolk Southern Corporation and the Norfolk Southern Railway Company stated in their August 3, 2000 Reply (NS-2) in Finance Docket No. 33388 (Sub-No. 91), CSX/NS/Conrail at 62-63:

> Yard moves, which may take the form of a variety of switching movements needed to add, transfer or deliver rail cars and engines in a given rail yard, are of necessity quite variable. The number and location of yard moves is dependent upon the daily demands of shippers, changes in routing and system-wide rail operations. They are not included in the through train traffic estimates provided in an application filed with the STB, are not routinely counted and are not assessed by SEA for level of service (LOS) changes. 41/
>
> 41/ NS notes that DOT regulations exclude from the definition of "train" switching operations and rail car classification and assemblage in rail yards. See, e.g., 49 C.F.R. § 171.8; 49 C.F.R. § 220.5; 49 C.F.R. § 221.5; 49 C.F.R. § 232.23(a)(2).

See also, the June 24, 1996 Post Environmental Assessment in Finance Docket No. 32760 at 5-6[107], in which SEA recommended a temporary limitation on the average number of trains to be operated in Wichita, Kansas, but excluded from that limitation (1) maintenance-of-way trains, (2) light locomotive movements, (3) local and industry switching train movements, and (4) emergency trains.

If movements other than through trains are to be considered, the FEIS also must correct the DEIS's erroneous assumption[108]

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[107] Union Pacific Corporation, Union Pacific Railroad Company, And Missouri Pacific Railroad Company -- Control And Merger -- Southern Pacific Rail Corporation, Southern Pacific Transportation Company, St. Louis Southwestern Railway Company, SPCSL Corporation, And The Denver & Rio Grande Western Railroad Company (hereinafter "UP/SP").

[108] Rochester attributes this assumption to the DEIS and not to DM&E because we are unaware of any DM&E assertion that 9 daily

(continued...)

that any wayfreight/switching movements, let alone nine trains of 115 cars each, will disappear from Rochester if the DM&E's application is granted. Rather, the FEIS must reflect the fact that DM&E's operation of unit trains of coal from the Powder River Basin ("PRB") will not have any impact on the number of its switching operations (wayfreights) in Rochester. Under R-2, rail cars originating or terminating in Rochester as well as the overhead traffic through Rochester would continue to be part of DM&E's three non-coal trains and would be handled in precisely the manner they are today.[109/] Thus, if the complex analysis required to quantify the environmental impacts of switching movements in Rochester[110/] is to be completed for purposes of the "existing" case, the precise impacts so quantified must be included in the FEIS's R-2 analyses to avoid the apples-to-oranges comparison found in the DEIS. This was the approach taken by SEA in its September, 1997 UP/SP Merger--Wichita

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[108/](...continued)
trains, "wayfreights" or otherwise, consisting of 115 cars each, exist today and will disappear once PRB coal movements commence. If DM&E asserts the existence of such trains and/or that they will not be required in the future, Rochester requests that it be provided a copy of DM&E's evidence to support such outlandish claims.

[109/] As explained above, if DM&E is correct in projecting its future non-coal train carloadings, DM&E could only hold its non-coal train count to three trains a day by increasing the average length of its trains above 115 cars. More importantly, DM&E has not even asserted that its through trains can operate over the spur lines it uses to serve its Rochester shippers. Thus, it must continue to serve those shippers via local switching movements.

[110/] This analysis must, inter alia, determine the frequency, average length, and locations of the wayfreight traffic.

Mitigation Study, Preliminary Mitigation Plan at 4-10: "The analysis held the number and characteristics of local trains and switching movements constant for all conditions analyzed, both pre-merger and post-merger." DM&E must not be permitted to skew the quantitative analyses through a bald assertion that these movements will disappear in the future.[111/]

[111/] The only way that these movements can disappear is for DM&E to cease providing service for Rochester shippers. Rochester assumes that such service discontinuance is not DM&E's plan.

C. The DEIS's Noise Analysis Is Fundamentally Flawed

1. Inaccurate Calculation Of Existing Background Noise In Rochester

If an environmental analysis is to have any meaning, it must address the impacts to the environment of concern. The DEIS ignores this fundamental rule.

In Volume VII-A, Appendix F, Noise Analysis, at F-2, the DEIS describes its development of "noise models." It states that "[T]he noise model results are sensitive to the horn, locomotive and rail car noise, train length, and train speed." This statement ignores the fact that a noise model also must reflect noise that exists even without the railroad operation. This truism was reflected in a formula by the United States Department of Transportation, Federal Railroad Administration, in its December, 1999 Draft Environmental Impact Statement on the Proposed Rule for the Use of Locomotive Horns at Highway-Rail Grade Crossings, page 3-13 ("FRA DEIS").

> The degree of impact a particular noise event causes, depends principally upon the sensitivity of the receiver and the relative increase in cumulative noise exposure (event + background noise v. background noise).

Notwithstanding this fact, the DEIS does not even pretend to measure the background noise in Rochester. Rather, it states:

> All existing wayside and horn noise projections were made on noise measurements from four separate locations along the existing rail.[112/]

[112/] Appendix F at F-2.

And, notwithstanding the assertion that "[T]he measurement data provide a realistic picture of train noise in communities",[113] those four "separate" locations were:

1. A rural location approximately 5 miles west of Huron, SD;
2. A rural location further west of Huron;
3. A rural location east of Huron near Wessington; and
4. The same near-Wessington location.[114]

In brief, the DEIS noise model assumes that the DM&E's operations are added to background noise computed in "rural locations" west and east of Huron, SD. This analysis provides no information about noise in Rochester.[115] To the contrary, it masks the noise impacts on Rochester by assuming that there is virtually no background noise at all. Noise may not be purely additive[116], but if the goal of the environmental analysis is to determine whether the resulting noise will increase by 5 dBA to a level reaching at least 70 dBA[117], it is nonsensical to pretend that Rochester's background noise level is identical to the

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[113] F-4.

[114] F-5 through F-6.

[115] On the other hand, the DEIS's use of rural Huron-based data may be reasonable for the R-4 noise analysis.

[116] See Protective Noise Levels, Condensed Version of EPA Levels Document, http://www/nonoise.org/library/levels/levels.htm.

[117] 70 dBA is considered by the SEA to be "significantly adverse." 3.2-31.

background noise level of the Huron countryside.[118] It is precisely for that reason that I.C.C. noise analyses were premised on conditions applicable to the communities of concern. For example, in the June 30, 1995, DEIS in Finance Docket No. 31989, The Elk River Railroad, Inc. - Construction Exemption - Clay and Kanawha Counties, West Virginia, Appendix C at 6 states:

> A noise monitoring program was conducted on February 14, 1995, through February 17, 1995, at eight strategic sites located along the ROW (Table 1). These noise assessment locations were considered to be representative of the range of population densities and community meeting places in proximity of the ROW. For example, three sites (residential, church, and school) were chosen in the more densely populated town of Clendenin.... (underscoring added)

In sum, if the FEIS does not rely upon the background noise analysis previously provided by Rochester[119] SEA must perform a new noise analysis premised on Rochester's background noise, with the existing case reflecting three DM&E trains and the future case reflecting 37 DM&E trains.

2. The FEIS Should Reflect DM&E's Maintenance Windows In Noise Calculations

Unlike typical operating proposals, the DM&E states that its coal trains will operate "in set time slots." As DM&E puts it,

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[118] Protective Noise Levels, supra at 7, lists Ldn's in dB for various environments. "Agricultural Crop Land", which may well encompass the rural Huron, SD locations considered by the DEIS, has an Ldn of 44. The typical Ldn for an "Old Urban Residential Area", which may be representative of the sections of Rochester closest to the DM&E tracks, is 59, i.e. 200% greater.

[119] Rochester's noise analysis, previously submitted to SEA, was performed by Wm. H. O. Kroll & Associates, Inc. and is discussed in the verified statement of Edward J. Walter, Jr., Exhibit 15. Dr. Walter makes a number of recommendations for a new Rochester noise analysis.

"If a train is not ready to move from a staging yard when a slot is available, it will wait for the next scheduled slot.[120/] Consistent with this approach, DM&E states that "The operating plan provides for up to 4 maintenance windows, of up to 6 hours each..."[121/]

These facts are relevant to the noise issue because of the use of the day-night sound level (Ldn) to measure noise impacts. The Ldn methodology requires increasing all nighttime A-Levels (between 10 p.m. and 7 a.m.) by 10 decibels.[122/] Thus, if DM&E's maintenance windows require DM&E to increase the percentage of its nighttime operations, then the Ldn will increase. And, if the Ldn increases, the distance between DM&E's tracks and any particular dB level also will increase. And, as the distance increases, the number of sensitive receptors affected by that level of noise also will increase.

On information and belief, the 65 and 70 dBA contours shown in Table F-6[123/] assume that DM&E's operations will be evenly spaced throughout the day. This means that 9/24ths (37.5%) of the movements are assumed to occur at night. However, as demonstrated in Wheeler, Exhibit 11, of the 24 possible

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[120/] February 20, 1998 Application, Volume 1, Appendix D at 11.

[121/] Id. at 12.

[122/] FRA DEIS at 3-14. The DEIS is incorrect in asserting that "In calculating Ldn, the nighttime adjustment makes one event, such as a train passing by between 10 pm and 7 am equivalent to ten of the same events during the daytime hours." Volume VII-A at F-2. This error should be corrected in the FEIS.

[123/] Volume VII-A, F-16.

maintenance time distributions, 14 (58.3%) result in higher than average night time traffic. This means that the DEIS has understated the Ldn and has understated the number of sensitive receptors that would be affected by DM&E's operations.

3. The FEIS Should Revise The 5 dBA/70 dBA Test

Rochester recognizes that SEA has not recommended mitigation unless noise levels increase by 5 dBA (i.e. 50%) to a level of at least 70 dBA and has not recommended additional noise mitigation for still higher noise levels. Rochester also knows that a properly performed noise analysis will demonstrate that many hundreds of sensitive receptors in Rochester will meet this test, thus mandating the minimal noise mitigation measures previously imposed by the Board. Nonetheless, it remains important for the FEIS to justify this test in light of (a) the real world import of a noise level that even the DEIS describes as "significantly adverse", supra and (b) the fact that the Board is the only Federal agency known to utilize a test that permits such high noise levels.

As reflected in Figure 5 of Protective Noise Levels, supra, only 7 percent of this Nation's urban population currently lives in an environment with a 70 Ldn or higher noise level. According to Figure 11 of that document, at that noise level, there are "widespread threats of legal action, strong appeals to local officials to stop noise."

There are scientific rationales for that reaction to noise at the 70 Ldn level. Table VIII of Protective Noise Levels,

Yearly Ldn Values That Protect Public Health and Welfare with a Margin of Safety, lists 70 dB as the highest level that will protect hearing. And, it lists 45 dB as the level necessary to avoid "indoor activity interference and annoyance" for both "indoor residential areas" and "other indoor areas with human activities such as schools, etc." This latter figure is significant because Table II concludes that the typical sound level reductions of buildings in a cold climate, like Rochester, with "windows closed", is 27 dB. In other words, if the noise level out of doors is 72 dB, then the noise level indoors will be 45 dB, high enough to cause "interference" and "annoyance" inside every "sensitive receptor."

It is undoubtedly for this reason that a noise level of 75 decibels[124/] (i.e. 50% greater than the DEIS finds to be "significantly adverse") currently qualifies a residential community for extraordinary noise abatement measures under Federal Highway Administration rules.[125/] The noise insulation

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[124/] Rochester advocates that the FEIS calculate the number of sensitive receptors that would be affected by a noise level of 75 dBA. See infra.

[125/] See Highway Traffic Noise Analysis And Abatement Policy And Guidance, by U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch, Washington, D.C., June 1995. This document is available at www.fhwa.dot.gov/environment/ab_noise.htm. Mr. Robert Armstrong of FHWA's Office of Natural Environment, 202-366-2073, has volunteered to provide additional information as to FHWA's policies, if SEA so desires.

of private residences is an example of an extraordinary abatement measure.[126]

The scientific data and FHWA's rules establish that SEA's analysis of noise issues, which aggregate sensitive receptors that would experience noise levels of 70 dB or more, thus masking noise levels greater than 70 dB, is inadequate to reveal the environmental impacts of DM&E's proposal.[127] Moreover, since the DEIS ignores the cumulative impacts of noise and vibration discussed in Reiter, Exhibit 6, the DEIS noise analysis further masks noise impacts. Simultaneous noise and vibration causes households to perceive noise as double (10 dB) its measured value.

If the Board orders mitigation providing for nothing more than a 5 dB noise reduction, the extremely limited mitigation approach taken in CSX/NS/Conrail, it will still leave substantial portions of Rochester in what may fairly be described as a "noise danger zone." For this reason, Rochester views SEA's 70 dB test to be inappropriate and views SEA's historic noise mitigation to be not just minimal, but inadequate. This is but one of many reasons that the FEIS should find that the noise issues raised by the DM&E application cannot be entirely mitigated and recommend construction of the Rochester by-pass.

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[126] See FHWA's advance notice of proposed rulemaking, 65 Federal Register 82301 (December 28, 2000) which contemplates using a lower dBA test to justify such extraordinary abatement measures.

[127] Reiter, Exhibit 6.

In light of the enormous impacts of the DM&E's proposed operations on Rochester's noise levels and the large numbers of Rochester residents who are particularly sensitive to noise,[128] Rochester believes that the FEIS should (1) reasonably measure the noise impacts of the DM&E's proposal on Rochester (rather than the outskirts of Huron, SD); (2) reflect the cumulative impacts of noise and vibration; (3) identify not only the sensitive receptors that would experience noise levels at 70 dB and above but also the sensitive receptors that would experience significantly higher noise levels, i.e. 75, 80, and 85 db[129]; (4) adopt the 55 or 65 dB tests utilized by other agencies for the minimal Conrail-type noise mitigation; and (5) adopt the 75 dB FHWA test for extraordinary noise abatement measures.

There are abundant examples of reasoned Federal noise standards, none of which approaches SEA's acceptance of railroad noise. The FRA DEIS at 3-16, defines 65 dB as the "acceptable living environment as defined by a number of federal agencies." It references the Environmental Protection Agency finding that a community noise level of Ldn less than or equal to 55 dBA "is requisite to protect public health and welfare with an adequate margin of safety." Id. at 3-17. It further states that the Department of Housing and Urban Development's environmental noise

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[128] See the verified statement of Charlotte Sprague, Exhibit 16, on behalf of the residents of Northgate Plaza, a senior high-rise.

[129] Reiter, Exhibit 6. Reasonable precision in the calculation of actual noise increases also is necessary, inter alia, to measure the impact of noise on property values. See infra.

standards "define an Ldn of 65 as the onset of a normally unacceptable noise zone." Id.[130/] And, it further states that the Federal Aviation Administration "considers that residential land uses are not compatible with noise environments where Ldn is greater than 65 dBA."

FHWA uses 67 dB as its criterion for noise abatement for sensitive receptors, including residences.[131/] And, as noted supra, FHWA uses 75 dB as it criterion for extraordinary noise abatement.

FERC utilizes an even more stringent noise test in certificating natural gas pipeline construction. In Williams Gas Pipelines, Central, Inc., 93 FERC ¶ 61,159 (November 13, 2000), FERC stated:

> The July 26 order required that noise levels at the Peculiar compressor station not exceed an Ldn of 55 dBA at any nearby noise sensitive areas, in accordance with the guidelines adopted by the Environmental Protection Agency (EPA) in 1974. The EPA guidelines identified an Ldn of 55 dBA as the maximum noise level that will not affect public health and welfare by interfering with speech or other activities in outdoor areas. These guidelines also found that maintaining an outdoor Ldn below 55 dBA would ensure adequate protection for the indoor use environment.

In other words, the Board is the only Federal agency refusing to grant communities noise relief unless the noise increases by at least 50% (5 dBA) to at least 70 dBA (50% more noise than 65 dBA). This unique approach causes substantial harm

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130/ See also, 24 C.F.R. Part 51.

131/ 23 C.F.R. Part 772, Table 1.

to the public, violates 49 U.S.C. § 10101(8)[132], and must be revisited and revised in the FEIS.

4. The FEIS Should Require Train Horn Noise Mitigation

The DEIS asserts that "horn noise from train operations to residents located in proximity to the rail line would be significant and could not be fully mitigated without compromising safety."[133]

Rochester agrees that the impact of horn noise would be significant. By way of example, Table FA-7[134], which understates noise impacts for the reasons stated supra, says that, at 37 trains per day, the distance from the DM&E tracks to the 70 dBA contour line would be 218 feet without horns, while the contour line would move out to fully 1112 feet including horn noise.

Moreover, as demonstrated in Wheeler, Exhibit 11, (1) the DEIS ignores the fact that DM&E horns would be sounding virtually

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[132] "In regulating the railroad industry, it is the policy of the United States Government--...to operate transportation facilities and equipment without detriment to the public health and safety...." The I.C.C. recognized that it was to be "especially" guided by the rail transportation policy. Milwaukee--Reorganization--Acquisition By GTC, 2 I.C.C. 2nd 161, 208 (1984). See also, The Indiana & Ohio Railway Company - Construction And Operation - Butler, Warren, and Hamilton Counties, OH, 9 I.C.C. 2nd 783, 787-88 (1993).

[133] ES-70.

[134] Volume VII-A.

continuously from 15th Avenue, NE to 11th Avenue, NW[135] and (2) appropriately calculated noise contour lines reflecting horn noise would bring a considerable portion of Rochester (127 feet from the track centerline) within an 85 Ldn noise level, truly horrendous.[136]

Rochester strongly disagrees with the DEIS's proposed resolution of this serious problem. The DEIS recommends that the Board adopt, as a "mitigation" condition, a requirement that DM&E "consult with interested communities along its new and existing rail line to identify measures to eliminate the need to sound train horns consistent with Federal Railroad Administration standards.[137]

Other than this meaningless "consultation" recommendation, the DEIS proposes no mitigation for the severe environmental impacts associated with railroad horn noise. It takes this position because of SEA's belief "that FRA's final regulations will provide a safe, effective means to address horn noise concerns."[138]

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[135] This conclusion is mandated by the DEIS's assumption that train horn noise would start 1/4 mile before all grade crossings. Volume VII-A at F-2. Rochester assumes that the DEIS's assumption is premised on the May 26, 2000 FRA train horn NOPR.

[136] This calculation does not reflect the cumulative impacts of vibration on noise sensitivity discussed in Reiter, Exhibit 6.

[137] ES-101. See also ES-81.

[138] DEIS, Volume 2 at 3.2-62.

This conclusion is illogical. While Rochester joins SEA in its belief that the FRA's to-be-issued regulations[139/] will provide a safe and effective means to address horn noise concerns, this does not answer the question of whether a mitigation condition addressing horn noise should be recommended to and adopted by the Board. Whatever rule FRA ultimately adopts will mandate "supplemental safety measures"[140/] that must be installed prior to the creation of a quiet zone. And, it is perfectly clear that those supplemental safety measures, e.g. four-quadrant gates, will cost money to install. Thus, the question is not whether the Board should adopt a mitigation condition that could conflict with FRA's rules, but whether the Board should adopt a mitigation condition assigning the cost of compliance with FRA's rules on the DM&E, rather than Rochester.

The only reasonable approach is to place this cost on DM&E. It is the railroad, not Rochester, that (a) has requested authority to create a new route to the PRB, (b) would profit by the operation of that route, and (c) would create noise levels so high as to have a substantial negative impact on sensitive noise receptors and the quality of life in Rochester. Accordingly, DM&E should be required to pay for the installation of the supplemental safety measures FRA deems adequate for the creation

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[139/] Rochester has been advised that FRA's rules will be issued after July 1, 2001.

[140/] DEIS, Volume II at 3.2-61.

of a quiet zone in Rochester. The DEIS did not even consider this option.[141/] This error must be corrected in the FEIS.

Rochester's proposed noise mitigation is discussed in Reiter, Exhibit 6, and should be adopted by the FEIS.

[141/] DEIS Volume VII-A at F-18 and F-19.

D. The DEIS's Traffic Study Is Fundamentally Flawed

One of the reasons that Rochester sought access to the spreadsheets used to compile the numbers found in the DEIS was to resolve an obvious error in the calculation of traffic delays. That error may be seen by reference to Volume VII-A, Appendix G, Table 3-MN-G1 which purports to set forth the "Average Delay for all Vehicles (sec/veh) for "Segment 2, Lewiston to Owatonna", the segment that includes Rochester. As may be seen, the claimed average delay at every intersection is 9.8 seconds.

SEA knows full well that the average delay at an intersection is related to the ADT at that intersection. Thus, this table and all of the other tables purporting to show current and future average traffic delays are in error. In order to demonstrate this fact, SEA need look no further than its December 12, 1997 DEIS in CSX/NS/Conrail. By way of example, in Table 5-OH-11, Exhibit 17, SEA set forth the "Highway/Rail At-Grade Crossing Vehicle Delay and Queues." That table shows a different "Avg. Delay per Vehicle (All vehicles) (sec/veh)" for each of the grade crossings listed. Those delay differences are directly attributable to differences in the number of roadway lanes and the ADTs for each of the grade crossings.

The computational error leading to the DEIS's error in this regard is found at Volume VII-A, Exhibit G, G-2 through G-3. SEA there states that "Average Vehicular Delay" may be computed through the formula

$$TD = 0.5 \times TB + 0.3$$

Where:

TD = Average vehicular delay, in minutes

0.5 = Averaging factor. Assuming uniform arrivals, the average vehicle will be delayed half the time it takes the crossing to clear.

0.3 = An allowance for queue dissipation, in minutes.

In CSX/NS/Conrail, the February 2, 1998 Supplemental Errata at 2 stated that the equation for determining Crossing Delay per Stopped Vehicles is

Da = Dc(Sc/Sc-Sq) divided by 2

Where

Da = Crossing delay per stopped vehicle, in minutes.

Dc = Time the train takes to pass the highway/rail at-grade crossing, including time for gate closing and opening, in minutes.

Sc = Vehicle departure rate per minute per lane. The basis for this is a rate of 1,400 vehicles per hour per lane, according to field measurements.

Sq = Vehicle arrival rate per minute per lane. The basis for this is the daily traffic volumes for the roadway.

2 = Factor to account for the average of the minimum and maximum vehicle delay.

As may be seen by a comparison of these formulae, the CSX/NS/Conrail approach properly reflected the fact that the average delay experienced by a motorist is, in part, a function

of ADT, vehicle speed, and number of highway lanes. This has to be correct. If the goal is to determine the average delay experienced by all drivers over a course of a day, then the number of those drivers has to be part of the equation. Similarly, if two crossings have the same ADTs, but different numbers of traffic lanes, then the average delay must be less for the crossing with the greater number of lanes because the queue caused by the train will be smaller at the crossing with the greater number of lanes.

Both of these factors were ignored in the DEIS which reaches the erroneous conclusion that the average vehicular delay is independent of the ADT, speed, and number of traffic lanes. This error must be corrected in the FEIS to properly reflect the impact of the DM&E's proposal on all traffic and on emergency services vehicles.

Moreover, as demonstrated in Reiter, Exhibit 6, the DEIS traffic analysis suffers from a large number of basic errors. As discussed in detail by Mr. Reiter, the base data used in the transportation system analysis errs in its assumptions as to:

1. Vehicular traffic;
2. Train traffic;
3. The type of grade crossing protection to be used on the by-pass route; and
4. The data used for the analysis of predicted accidents.

Still further, Mr. Reiter explains that the methodology used for assessing traffic-related impacts, including safety impacts, contains a number of flaws including:

1. The use of different criteria for different communities;
2. The use of measurements focused on relative impact; and
3. In the case of traffic delay, the use of an approach that is based on faulty reasoning and fails to capture the full extent of system impact.

While each of these errors should be corrected in the FEIS, Rochester vigorously objects to being told by the DEIS that one accident every 40 years in Wyoming or one accident every 20 years in South Dakota is "significant", but that accidents in Minnesota are not "significant" unless they occur once every eight years.[142/] There is no justification for a Federal agency to discriminate between states in this fashion.

Reiter, Exhibit 6, corrects the DEIS's errors and presents Rochester's proposed mitigation and the justification for that mitigation. That analysis should be adopted in the FEIS.

[142/] DEIS, Volume VII-B, at H-4.

E. The DEIS Virtually Ignores The Impact Of DM&E's Proposal On Emergency Services And Public Transportation In Rochester.

While the DEIS provides a generalized description of the impact of the DM&E's proposal on emergency vehicle responses[143/], it contains virtually no discussion of the impact of DM&E's proposal on emergency vehicle responses in Rochester. In fact, the DEIS goes so far as to suggest, based on its gross overstatement of the number and length of existing trains and other errors discussed in Reiter, Exhibit 6, improvements in emergency services due to reductions in delay per stopped vehicle.[144/]

Rochester understands that the Mayo Clinic will be addressing the ambulance emergency service issue in its comments on the DEIS. Rochester incorporates those comments as well as the oral and written presentations at the November 16, 2000 hearing by The Honorable Walter F. Mondale, Hugh Smith, M.D., Dr. Ray Gibbons, and Dr. Dan Hankins by reference herein.

Dr. Gibbons may have stated it best:

> In this area, like the others, it is imperative that the Surface Transportation Board identify a solution that harms the fewest number of people -- it truly is a matter of life and death.

143/ Volume II at 3.2-83 through 3.2-88.

144/ Volume II at 3.3-76. But see Volume IV at 6-42. "Alternative R-2 likely would have impacts on the movement of emergency vehicles in Rochester due to the location of the Mayo Clinic, a large medical complex in the town, and certain of the Mayo Clinic's facilities in close proximity to the existing rail line."

Nonetheless, a few additional facts should be helpful for the FEIS's consideration of this issue.

First, even assuming, arguendo, that (1) DM&E will average the 45 mph and 49 mph it claims for loaded and unloaded trains, (2) the DEIS has not understated street blockage time by ignoring DM&E's position that gate up and down time will be 40 seconds, and (3) the DEIS was not in error in each of the other respects established by Reiter, Exhibit 6, Table 3.2-24[145/] establishes that the streets of Rochester will be blocked for 85.1 minutes[146/] when DM&E operates 37 trains per day. This is 6 percent of the day.

In contrast, even assuming, again arguendo, that DM&E is operating trains averaging 115 cars (rather than 84) today, three trains per day moving at 20 mph would block the streets of Rochester for 12.3 minutes per day.[147/]

Even under these assumptions, the impact of Alternative R-2 on Rochester is to increase street blockage by at least 72.8 minutes per day. This is 5 percent of the day.

The joint verified statement of Jeff Leland and Rick Lovett, Exhibit 18, establishes that the Rochester Fire Department alone

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[145/] Volume II at 3.2-87.

[146/] This figure is the average of the 88.8 minutes shown for 45 mph and the 81.4 minutes shown for 49 mph.

[147/] We have divided the 45.1 minutes shown in Table 3.2-24 by 11 and multiplied the result by 3.

must use Rochester grade crossings 926 times a year to respond to[148] emergency calls, i.e. fires, medical emergencies, personal injury accidents and fire alarms. Even if only an additional 5 percent of these movements are affected by the DM&E's operations, the fire department's vehicles will be delayed by the DM&E an additional 46 times per year in responding to incidents.

In other words, the two-plus minutes of delay projected by the DEIS for each train[149] will affect a substantial number of fire department vehicles every year. As discussed by Mr. Leland and Assistant Chief Lovett, such delays are "simply unconscionable because of the detrimental impact to human lives in the City of Rochester."

But, the fact of the matter is that the DEIS is in error in each of the respects discussed herein. And, as explained in Reiter, Exhibit 6, Exhibit P, this means that emergency services will be affected not just 6% of the time, but fully 10.42% of the time. Even assuming no increases in the number of emergency service calls, Rochester police will be delayed once every 4.1 hours, Rochester ambulances will be delayed 257 times per year, once every 32.8 hours, and Rochester fire fighters will be delayed once every 89.4 hours. These facts should be reflected in the FEIS.

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[148] This is the movement to the incident. Another movement returning from the incident also is required.

[149] Table 3.2-23 at 3.2-86.

Rochester Police Department Chief Roger Peterson's verified statement, Exhibit 19, notes that the DEIS errs in basing its conclusions on reports that are 25 and 13 years old. He further explains the role of the police department in responding to medical emergencies and the significance of delays to that effort.

Among other things, Chief Peterson objects to the DEIS's suggestion that emergency vehicles should mitigate traffic delays caused by the DM&E by utilizing the oncoming traffic lane while waiting for trains to clear crossings, a violation of state law.

Chief Peterson further testifies that, based on calendar 2000 statistics, the DM&E proposal would result in approximately 2,159 police priority 1 and priority 2 calls for service being delayed. This is almost 6 delays per day to the highest priority police activities. All of these facts should be reflected in the FEIS.

The Verified Statement of Anthony J. Knauer, Exhibit 20, addresses similar concerns for delays to Rochester's bus services. As explained by Mr. Knauer, eight weekday routes and 225 bus trips per day cross the DM&E right-of-way at five different grade crossings. Between five percent and eleven percent of these trips will be delayed if R-2 is approved by the Board. This will result in inconvenience, loss of service dependability, and missed transfers for riders.

F. The DEIS Understates The Impact Of The DM&E Proposal On Rochester's Recreational Facilities

The DEIS addresses the impacts of R-2 on recreation in Rochester in Volume II at 3.3-87 and 88. As reflected in the Verified Statement of Roy Sutherland, Exhibit 21, the DEIS understates those impacts to a considerable degree.

In support of his recommendations for mitigation if R-2 is approved, Mr. Sutherland presents, inter alia the following facts:

1. The Cascade Creek recreation trail utilizes a DM&E underpass that must be retained. The trail accommodates an estimated 200,000 trail users per year.[150/]
2. Cooke Park is bordered on the south by the DM&E. The park's baseball diamond, soccer field, playground, park shelter, and hockey rink are used by thousands of people annually.
3. The Zumbro River Trail crosses the DM&E at grade. It is used by approximately 265,000 persons per year.
4. Mayo Field's concession stand and restroom are located less than 100' from the DM&E. The field is the site of approximately 150

[150/] The DEIS makes some mention of some of the impact of the DM&E proposal on pedestrians, Volume II at 3.2-78. However, it proposes no mitigation for such impacts.

baseball games per year. "Ball shaggers" frequently go onto the DM&E ROW.

5. Quarry Hill Trail is parallel to the DM&E. It is used approximately 100,000 times per year.

6. Access to East Park is at an at-grade crossing. The youth football field, used for about 160 games annually, is adjacent to the DM&E. The youth baseball diamond is within 150' of the DM&E and is used for about 35 games a year.

7. Quarry Hill Park is bordered by the DM&E. Its Nature Center, also discussed in the memorandum of Greg Munson, is used by over 30,000 students and over 36,000 non-students per year.

All of this information and Mr. Sutherland's proposed mitigation should be reflected in the FEIS.

G. The DEIS Understates The Impact Of The DM&E Proposal On Property Values

The DEIS gives short shrift to the impact of the DM&E's proposal on Rochester's real estate values. It merely states that "... real estate values may be affected by the increased number of trains resulting in residences adjacent to the rail line becoming less desirable to potential buyers" and suggests that these impacts may be mitigated by increased numbers of railroad workers.[151/]

There is no evidence of record indicating that increased numbers of railroad workers would reside in Rochester[152/] and there is no evidence of record that railroad workers would be any more likely than other population groups to be interested in residing in sections of Rochester that would be severely impacted by noise, vibration, etc. generated by the DM&E's operations.

The FEIS should expand the discussion of property values by referencing the literature on this subject which provides estimates of the percentage losses in property values as noise increases.[153/] By way of example, the FRA DEIS cited to a joint American Enterprise Institute/Brookings Institution study in 1998 which estimated a range of 0.10 to 1.60 percent housing value reduction per increased decibel level near airports.

[151/] Volume II at 3.2-8.

[152/] The DEIS admits that "non-local construction workers would not likely relocate permanently to Olmsted County." Volume II at 3.3-85.

[153/] Reiter, Exhibit 6; Wheeler, Exhibit 11.

Similarly, Chaddick Institute Working Paper 09-00, Alternatives To The Whistle: Economic Perspectives On Public Education And Enforcement In Promoting Highway-Rail Grade Safety In Metropolitan Chicago (November 1, 2000), lists, in Table 1, fully six studies leading to the conclusion that property values decline by 0.15% to 1.30% per decibel above the ambient noise level.

With an appropriate noise study in this case, supra, the FEIS will be in a position to quantify the increased decibel levels resulting from the DM&E proposal. If the FEIS then (a) uses the midpoint of the above-noted ranges, i.e. 0.85 percent per dB (FRA) or 0.725 (Chaddick) and (b) secures the current values of the affected properties, it will be in a position to estimate the property value loss in Rochester.

By way of example, the Kroll noise analysis, which Rochester now believes understates noise impacts, projected a dB increase of 18 in Rochester. This would result in property value losses of approximately 15% (FRA) or 13% (Chaddick).[154/] And, as noted in Spaeth, Exhibit 3, the estimated value of the properties within the noise contour lines created by Kroll is $381 million. Thus, Rochester currently projects property value losses of over $53 million if the Board certificates R-2.

[154/] One real estate professional in Rochester projects a 25 to 30 percent decrease in property values. Testimony of Steve Roberts, November 16, 2000 transcript at 101.

III. COMPARISON OF R-2 AND R-4 ENVIRONMENTAL IMPACTS

Rochester's starting point for the comparison of the environmental impacts of R-2 and R-4 is DEIS Volume IV, Table 5.1-10.[155/]

A. Geology

The DEIS asserts no impacts from "geological hazards" for R-2. It asserts that the by-pass will cross approximately 2.1 miles of karst topography and that construction activities could encounter sink holes. It further asserts that operations over the by-pass could open a sink hole causing damage to rail bed and possible derailment and that an accidental spill could contaminate ground water.

Rochester engaged Short Elliott Hendrickson Inc. to examine the karst and sinkhole issues and offers the joint verified statement of Ana G. Vargo, P.G. and Ronald B. Farmer, P.E., Exhibit 22. As demonstrated by Ms. Vargo and Mr. Farmer:

1. Railroad facilities currently exist in karst and sinkhole topography.
2. Significant karst terrain with a high potential of karst features occurs along the existing DM&E rail line and alternatives (East Yard Alternative B & C and Far East

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[155/] The results shown in this table were resummarized at ES-56 through 59.

Alternative D) in Winona County and the town of Utica.[156]

3. The existing rail line passes near identified sinkholes, particularly near the town of Utica.

4. The East Yard Alternative B & C and the Far East Alternative D have identified sinkholes along the proposed rail yard.

5. There are standard approaches that may be taken for railroad construction in areas of karst topography.[157]

Ms. Vargo and Mr. Farmer conclude:

> The construction of the DM&E Railroad Alternative R-3/4 bypass of Rochester, Minnesota on karst topography will not create significant problems.

The Vargo/Farmer conclusion is entirely consistent with the conclusions of the Tennessee Valley Authority which selected a route for coal train operations over an area known to contain sinkholes[158] and with the conclusions of the Federal Railroad

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[156] Larry Nelson, regional director for the Minnesota Department of Natural Resources also testified that DM&E's proposed east staging and marshalling area in Lewiston "is located in an area of karst geology with a high sinkhole density." November 16, 2000 transcript at 181.

[157] Rochester's cost estimate for R-4 includes $800,000 for these engineering requirements. Rochester also has utilized higher contingency and engineering percentages for R-4 than R-2 to account for potential karst/sinkhole construction costs. Ortgies, Exhibit 2.

[158] Kingston Fossil Plant (KIF) Alternative Coal Receiving Systems, Roane County, Tennessee, 62 F.R. 15957 (April 3, 1997), Exhibit 23.

Administration which notes the availability of geotechnical analysis to look for indicators of sinkhole activity prior to installing track infrastructure.[159/]

In light of the Vargo/Farmer testimony and the TVA and FRA analyses, the FEIS should remove the DEIS's assertions that karst and sinkhole issues would make it difficult to insure the safety of the DM&E over R-4.[160/]

The DEIS further asserts that approximately 564.8 acres and 826.6 acres of soil would be disturbed by the construction of R-2 and R-4 respectively. It asserts no loss of farmland for R-2 and 606.0 lost acres of prime farmland for R-4. Finally, it asserts potential ground water contamination due to accidental spills for R-4 and disturbance from right-of-way clearing activities for R-4.

The FEIS should augment its ground water discussion by noting that "Nearly all of the DM&E rail line in Olmsted County crosses land mapped as highly susceptible to ground water pollution." See the contemporaneously filed comments of the Olmsted County Board of Commissioners. There is no basis for concluding that R-4 creates a greater ground water concern than R-2.

The FEIS also should reflect the geological concerns affecting R-2 as discussed in Wheeler, Exhibit 11.

[159/] Fox High Speed Rail Safety Standards, 62 F.R. 65478 (December 12, 1997). Exhibit 24.

[160/] Volume IV at 6-43.

The DEIS notes the possibility that reconstruction near Blue Earth River, required for R-2, could encounter Paleontological resources, but describes that possibility as "unlikely." It finds that construction of a crossing at the Zumbro River and other waterways, required for R-4 could encounter such resources.

The FEIS should note that the Blue Earth River is near Mankato, not Rochester.

B. Land Use

Under the subheading "Agriculture", the DEIS states that R-2 would result in (1) loss of crops encroaching on the right-of-way ("ROW"), (2) potential damage to fencing, (3) reduced access to fields, (4) increased safety concerns on roadways and rail crossings, (5) improved rail service, (6) crop damage due to maintenance activities and use of herbicides, and (7) potential contamination in the event of an accidental spill or derailment.

The DEIS states that R-4 would result in the loss of approximately 727.3 acres of agriculture land, of which 606.0 acres is prime farmland. It further states that there would be (1) damage to crops and fencing, (2) soil loss, mixing, and compaction, (3) inconvenience to farmers, (4) reduced access and bisecting of fields, (5) improved access to rail service, (6) decreased safety on roadways and crossing rail line, (7) potential contamination in the unlikely event of a spill or derailment, and (8) potential reduced income from loss of field use.

Rochester requests that the FEIS reflect the corrections and additions to the DEIS land use analysis presented in Wheeler, Exhibit 11.

Under the subheading "Residential", the DEIS states that R-2 is adjacent to approximately 1.7 miles of residential land, that 576 residences are located within 400 feet, and that there would be increased noise, dust, safety concerns, and traffic delays.

In contrast, the DEIS states that there are only 5 houses within 400 feet of R-4[161/] that would experience increased noise, dust, and safety concerns. R-4 also would reduce the serenity of the rural setting.

As demonstrated in Spaeth, Exhibit 3, there are 390 dwelling units within 400 feet of R-2 in Rochester. The FEIS should reflect the correct number. The FEIS also should reflect the residential land use analysis in Wheeler, Exhibit 11.

Under the subheading "Business and Industrial", the DEIS states that "one business using sensitive equipment may experience disturbance" as a result of R-2. It further states that R-4 would result in approximately 2.4 acres of commercial land being converted to ROW and that one business is located within the ROW.

[161/] None of these houses is within 100 feet of the proposed ROW. Volume II, 3.3-70 at Table 3.3-17. Rochester also notes that in Volume II, 3.3-52, the DEIS states that there would be 7 houses within 500 feet of R-4. The FEIS should reflect that there are 601 houses within 500 feet of R-2. Volume II at 3.3-91 (Table 3.3-20).

As noted supra, PEMSTAR, the business to which Rochester assumes the DEIS is here alluding, has told SEA that the effect of coal trains in close proximity to its facilities would likely cause PEMSTAR to move those facilities, which employ 160 people, at great cost and with very significant economic impact to the company, Rochester, and the State of Minnesota. Rochester Area Economic Development Inc. estimates this loss for a single highly vibration-sensitive line of precision optical business to be equal to $35 million of output. Exhibit 7.

In contrast, the one business located on the by-pass ROW, Jerome Foods, employs far fewer persons and undoubtedly has a far lower economic output.[162/]

These facts must be included in the FEIS. The FEIS also should reflect the applicable comments in Wheeler, Exhibit 11.

Under the subheading "public facilities", the DEIS describes the impact of R-2 as the creation of noise, dust, vibration, and traffic delays, and states that the impacts on the Federal Bureau of Prisons facility and the Mayo Clinic will occur only during the construction phase.

The DEIS describes the impacts of R-4 operations as traffic delays at grade crossings[163/] and increased safety concerns.

As noted, supra, Rochester incorporates by reference the comments of the Mayo Clinic which establish quite clearly that

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[162/] Jerome Foods declined to provide the number of its employees.

[163/] But see Volume II at 3.3-76 describing vehicular delay for R-4 as "minimal."

the impacts of R-2 most certainly are not limited to the construction phase. FMC also has provided evidence as to the severe impact of R-2 on its operations. These facts should be reflected in the FEIS.

Rochester also sees no reason that the DEIS lists "safety concerns" for R-4, but not R-2. As noted supra, the FEIS should correct the DEIS's error in utilizing different standards of safety significance for different states.

Finally, Rochester believes the DEIS masks the relative impacts of R-2 and R-4 by simply using words such as "noise" and "traffic delays" in this table. Any realistic comparison of the impacts of "noise" and "traffic delays" as between R-2 and R-4 must include, inter alia, the numbers of cars, school buses, emergency vehicles, people, businesses, etc. that will be affected by these alternatives.

C. Public Lands

The DEIS reflects no expected impacts to public lands as a result of R-4. In contrast, during the construction phase for R-2, it projects increased dust, noise, and disturbance to approximately 1.9 miles of the Gordon W. Yeager State Wildlife Management area, a feeding area for approximately 35,000 migrating geese annually, and increased safety concerns.

During the operation of R-2, the DEIS projects noise, dust, and safety concerns that may affect wildlife and patrons of the management area.

Rochester requests that the FEIS comply with Executive Order 13186 (January 10, 2001) and determine whether approval of R-2 would have a "measurable negative effect on migratory bird populations." Rochester further requests that the FEIS reflect the public lands analysis in Wheeler, Exhibit 11.

D. Water Resources

The subheading "Surface Water" reflects similar construction and operations impacts, e.g. "temporary increased TSS [total suspended solids]", for R-2 and R-4. The principal difference appears to be that R-2 crosses 7 perennial and 8 intermittent streams while R-4 crosses 8 perennial and 28 intermittent streams.

The FEIS should note that the by-pass alignment at Salem Creek, along an existing power line corridor, was chosen to minimize disruptions to Salem Creek plant communities and that no state or federally listed species appear in the immediately affected area. Wheeler, Exhibit 11.

Under the subheading "Wetlands", the DEIS estimates the loss of 1.4 acres of riverine, 1.6 acres of palustrine-scrub/shrub, and 22.5 acres of palustrine emergent wetlands associated with R-2. The DEIS estimates the loss of 53.2 acres of wetlands, i.e. 9.5 acres of forested-scrub/shrub wetland, 8.1 acres of scrub-shrub, 2.7 acres of forested, 2.3 acres of emergent scrub/shrub, 30.5 acres of palustrine emergent, and 0.1 acres of riverine associated with R-4. The DEIS also asserts the probability of calcareous fens associated with R-4.

Rochester requests that the FEIS reflect the wetlands concerns associated with R-2 discussed in Wheeler, Exhibit 11. The FEIS also should reflect the fact that the June, 1999 version of R-4, which reflects Rochester's proposal, would avoid calcareous fens. Id.

Under the subheading "Groundwater", the DEIS notes that accidental spills or derailments are "unlikely." It further asserts that the karst topography in the project area increases the risk of contamination of groundwater in the event of an accidental spill.

Given the DEIS's determination and accidental spills or derailments are "unlikely", the FEIS should find that the karst topography issue appears to be of low concern. This conclusion is buttressed by the Vargo/Farmer verified statement[164/] as well as the TVA and FRA conclusions.[165/] Given that the bedrock geology map of Olmsted County produced by the Minnesota Geological Survey demonstrates that fully six miles of DM&E's current rail line in Olmsted County overlies the Decorah shale, the FEIS also should find no distinction between the ground water impacts of R-2 and R-4.

Rochester requests that the ground water discussion in Wheeler, Exhibit 11, be reflected in the FEIS.

[164/] Exhibit 22.

[165/] Exhibits 23 and 24.

E. Air Quality

The DEIS finds that emissions level thresholds would be exceeded for NOx at 20, 50, and 100 MNT for both R-2 and R-4. It also finds that emissions level thresholds would be exceeded for CO at 100 MNT only for R-4.

Rochester incorporates by reference the Air Quality Comments of the Olmsted County Environmental Commission (OCEC). In contrasting the air quality ramifications of R-2 and R-4, the FEIS should incorporate the following OCEC comments:

> The DM&E expansion project as planned would reconstruct the existing railroad line through Rochester and pass in close proximity to persons in such high population density facilities as Charter House, Federal Medical Center, Olmsted Community Hospital, Rochester Methodist Hospital, Mayo Clinic, Park Towers, Fontaine Towers, and St. Mary's Hospital in which a higher than normal population exists whose immune and/or respiratory systems have been otherwise compromised due to other factors. Additionally, several schools are within the vicinity of the Project that would be adversely impacted.

Rochester also agrees with OCEC's recommendation that, prior to the issuance of the FEIS, additional attention should be paid to the air quality issue. As OCEC puts it:

> Given that NOx, as well as a high proportion of the MPCA-regulated air toxics compounds of concern are known to cause health problems such as damage to lung tissue, reduction of lung function, and sensitization of lungs to other irritants, an Air Toxics Review program must be conducted and included as part of the Final EIS (FEIS) to adequately assess these health risks. Source data for the Air Toxics review must be derived from air dispersion modeling conducted specifically for Minnesota conditions and affected populations. All of these data must be integrated into a comprehensive Health Risk Assessment that identifies reasonable and worst case scenarios. This Health Risk assessment must be consistent with stated and federal health risk assessment guidelines, and be included in

the Final EIS in order for the STB to make an informed decision.

Finally, the FEIS should reflect the fact that the area in Olmsted County that OCEC describes as being in non-attainment for SO2 is Rochester. As discussed by OCEC, "the addition of such a significant increase in SO2 emissions [from the DM&E] in [Rochester] would threaten economic growth in the area and delay is compliance with NAAQS and redesignation as an attainment area."

F. Noise and Vibration

Under the subheading "Noise", Table 5.1-10 concludes that the total increase in noise receptors for R-2 and R-4 at 65 dBA and 70 dBA will be as follows:

	R-2	R-4
65 dBA -- 11 trains		
Wayside	0	0
Wayside/horn	30	1
Horn	0	22
65 dBA -- 21 trains		
Wayside	17	0
Wayside/horn	184	2
Horn	487	38
65 dBA -- 37 trains		
Wayside	48	1
Wayside/horn	402	7
Horn	1,524	69
70 dBA -- 11 trains		

Wayside	1	0
Wayside/horn	31	0
Horn	0	6
70 dBA -- 21 trains		
Wayside	8	0
Wayside/horn	63	0
Horn	365	15
70 dBA -- 37 trains		
Wayside	8	0
Wayside/horn	183	1
Horn	836	26

Rochester has discussed the DEIS's erroneous method of computing noise impacts of DM&E's proposed operations and incorporates those comments in response to this portion of the DEIS's summary table. Nonetheless, Rochester requests that SEA provide responses to the following questions in the FEIS.

First, why do the noise receptor counts in Table 5.1-10 differ from the counts in Table 3.3-14, Volume II at 3.3-66?

Second, for purposes of Table 5.1-10, what was the existing number of trains from which increases in sensitive receptors were calculated for R-2? If it was greater than three per day, what is the rationale for that approach?

Third, is Rochester correct that rural Huron locations were used as a surrogate for ambient noise levels for both R-2 and R-4? If so, what is the rationale for using rural ambient noise as a surrogate for urban noise?

Fourth, given the substantially greater number of sensitive receptors in the vicinity of R-2, how is it that, at 11 trains per day, R-4 would raise the dBA to 65 and 70 for 22 and 6 sensitive receptors while R-2 would not raise the dBA to 65 or 70 for any sensitive receptors? This result must be a function of the DEIS's error in calculating the existing number of trains in Rochester.

Fifth, if at 37 trains per day, 1,926 (402 + 1,524) additional sensitive receptors near the R-2 alignment would experience a dBA of 65 or greater and 1,019 (183 + 836) additional sensitive receptors near the R-2 alignment would experience a dBA of 70 or greater, what are the numbers of additional sensitive receptors near the R-2 alignment that would experience dBA's of 75 or greater and 80 or greater? If the FEIS does not present these numbers, Rochester requests that the FEIS explain why it is not important to identify the number of sensitive receptors that will experience noise levels 50% and 100% above the level the Board previously has found to warrant noise mitigation.

Rochester also requests that the FEIS propose the noise mitigation expenditures Rochester proposes for R-4.[166/]

Under the subheading "Vibration", the DEIS estimates that R-2 will create the potential for damage to 32 structures within 100 feet, inconvenience to 180 structures between 101 and 200 feet, and inconvenience to 364 structures between 201 and 400

166/ Ortgies, Exhibit 2.

feet. It asserts no vibration impact to the Federal Medical Center's security fence, potential vibration impact to Mayo Clinic equipment, and potential vibration impact to the Pemstar manufacturing facility.

In contrast, the DEIS states that R-4 would create vibration inconvenience to one structure within 101-200 feet and to four structures within 201-400 feet.

Rochester has addressed vibration issues, supra and incorporates that discussion, e.g. the substantial undercount of structures to be affected by DM&E-generated vibration, here. However, Rochester requests that the FEIS contain a vibration contour map or some other tool that will permit all parties to learn the locations of the "structures" that would be affected by vibration in the absence of the mitigation proposed by the DEIS.[167/] Such a tool is necessary to ensure that vibration mitigation is installed at all required locations.

G. Biological Resources

Under the subheading "Vegetation", the DEIS notes that the construction of R-2 would result in the loss of vegetation within the ROW, including 25.5 acres of wetland vegetation and potential damage or loss of woody vegetation and crops in adjacent areas. The construction of R-4 would result in the loss of vegetation on approximately 727.3 acres of crop land, 53.2 acres of wetlands, and 61.8 acres of wooded fence rows and woodlots.

[167/] Condition No. 96, ES-101.

Under the subheading "Wildlife", the DEIS projects similar effects for R-2 and R-4, but also notes that clearing for the R-4 ROW would increase habitat loss and mortality.

Under the subheading "Aquatic Resources and Fisheries", the DEIS projects temporary increases in TSS in 7 perennial streams (R-2) or 10 perennial streams (R-4) and in 8 intermittent streams (R-2) or 28 intermittent streams (R-4). Operational impacts would be similar for both alternatives.

Under the subheading "Sensitive, Threatened, and Endangered Species", the DEIS notes no expected impacts for either R-2 or R-4.

H. Transportation

The DEIS summarizes construction-related transportation for R-2 and R-4 differently, noting the installation of grade crossings for R-4, but ignoring the number of grade crossings that have to be re-installed for R-2.

Rochester requests that the FEIS reflect the number of grade crossings that must be re-installed for R-2.

The DEIS also uses different approaches to the "operation" impacts on transportation. While the DEIS correctly notes that R-2 would impact seven grade crossings with ADTs above 5,000 and that R-4 would impact no such crossings[168/], the DEIS also finds that R-4 would impact five crossings used by school buses, but ignores impacts on bus routes for R-2. Similarly, the DEIS notes

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168/ As noted supra, the DEIS states that vehicular delay would be "minimal" for R-4.

the potential for new routings of emergency vehicles for R-4, but not for R-2.

Rochester requests that the FEIS reflect the impact of R-2 on public transportation and emergency vehicles. These impacts are fully discussed supra. Moreover, since the DEIS recognizes that R-2 is crossed by 373 school buses per day,[169] this figure should be compared with the 3 to 5 school bus crossings for R-4.[170]

Rochester also requests that the above-noted errors in the DEIS transportation analysis be corrected in the FEIS.

Finally, Rochester requests that the FEIS reflect the transportation mitigation impacts of the grade separations it proposes to include for R-4, i.e. at Highway 14 in Byron, Highway 63 near the airport, and Highway 52.[171]

I. Safety

Again, the DEIS specifies the number of crossings that must be constructed for R-4, but not the number of crossings that must be re-constructed for R-2. This omission should be corrected in the FEIS.

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[169] Volume II at 3.3-77. The additional daily crossings of DM&E's tracks by the students of Rochester's Catholic schools were addressed by Diane Schwinghammer, superintendent of the Rochester Catholic Schools. November 16, 2000 transcript at 309-313.

[170] Volume II at 3.3-78, Table 3.3-19.

[171] While not noted by the DEIS, the DM&E heretofore has argued that R-4 would interfere with the operations of Rochester International Airport. That assertion is refuted by the verified statement of Steven J. Leqve, Exhibit 28.

The DEIS notes that R-2 would give rise to a "significant" increase in accident frequency at one crossing.[172] In contrast, the potential accident frequency increases for R-4 "are below the criteria for significance."

Rochester requests that the FEIS correct the DEIS's safety analysis errors discussed in Reiter, Exhibit 6, and that it reflect the safety benefits of the grade separations Rochester proposes for R-4.

J. Hazardous Materials

Under the subheading "transportation of hazardous materials", the DEIS asserts that R-2 and R-4 both would reduce the likelihood of an accidental spill of hazardous materials.

Rochester requests that the FEIS reflect the concern of the Mayo Clinic and Federal Medical Center over the impacts of hazardous materials spills caused by high-speed rail operations, particularly in light of the virtual impossibility of evacuating employees and patients at Methodist and St. Mary's Hospitals and employees and inmates at a penal institution.

Under the subheading "hazardous waste sites", the DEIS posits similar impacts for R-2 and R-4.

The FEIS should expand this discussion by noting the potential for disturbance of contaminated material in the Zumbro River bottom during the construction of the abutment reinforcing the DM&E's Zumbro River Bridge. This work will take place adjacent to a site that was considered for listing as a Superfund

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[172] The crossing is Broadway North. Volume II at 3.3-79.

site. A past remediation project that cost approximately $10 million was undertaken by People's Natural Gas, Interstate Power, and the City of Rochester on the shoreline adjacent to this site. A portion of the concrete cap that was placed on the river bottom during the Army Corps of Engineers project is shown as being removed for the proposed DM&E bridge construction. This situation should be considered in the FEIS to ensure that there will be no adverse environmental impacts and that any costs incurred to handle disturbed contaminated material will be the sole responsibility of the DM&E.

K. Energy Resources

The DEIS finds no distinction between R-2 and R-4.

L. Cultural Resources

The DEIS finds that the construction of R-2 could result in the loss of 48 historic structures and two archeological sites. In contrast, there are no sites on R-4 that are on the NRHP.

M. Socioeconomics

The DEIS finds similar impacts for R-2 and R-4.

This summary must be amended in the FEIS to reflect potential job losses in Rochester due to (1) vibration impacts on PEMSTAR and (2) the serious diminution in the quality of life in Rochester and the resulting impacts on retention and attraction of commercial and health-care activities, particularly the Mayo Clinic and the high-tech industry. The DEIS's suggestion that Olmsted County would see a net increase in workers[173/] is pure

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[173/] Volume II at 3.3-85.

speculation and should be deleted in the FEIS. The FEIS also should reflect the findings of the Rochester Area Economic Development Inc. Exhibit 7.

N. Recreation

The DEIS summary of construction impacts of R-2 includes impacts on three multi-use trails[174/] in Rochester and decreased use of facilities near the rail line. Other impacts are similar to those projected for R-4.

This summary ignores the fact that (a) the DEIS does not propose to condition R-2 on the retention of the three trails and (b) R-2 would affect recreational facilities used by hundreds of thousands of people annually[175/] while no such facilities would be impacted by R-4. Both of these errors should be corrected in the FEIS.

The DEIS also notes a potential decrease in overall quality of the outdoor experience from the operation of R-4, but does not reflect a similar concern for the vastly greater numbers of people who enjoy the outdoor experience near R-2. This error also should be corrected.

O. Aesthetics

Under the subheading "wild and scenic rivers", the DEIS projects no impacts for either R-2 or R-4.

Under the subheading "viewsheds/scenic values", the DEIS notes that the R-2 rail structures would be more noticeable and

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174/ See also Volume II at 3.3-87.

175/ Sutherland, Exhibit 21.

that R-4 would result in a permanent change of the rural landscape.

CONCLUSION

It is rare, Rochester believes unprecedented, for the Board to be faced with a railroad proposal that gives rise to a level of quantifiable environmental degradation as great as would result from the DM&E's proposal to operate coal trains through Rochester. Among other things, fully 128 structures are within 100 feet of the track would be subject to serious vibration damage. As shown in Wheeler, Exhibit 11, at least 235 homes would experience noise of 70 dBA Ldn or greater as a result of wayside noise and at least 1,268 homes would experience that level of noise as a result of train horns. Rochester's street traffic would be slowed, its emergency services would be adversely affected, there would be increased risk of injury and death, and its recreational facilities would suffer as well. Rochester also faces degraded security at the Federal prison adjacent to the tracks, the loss of a PEMSTAR facility which employs 160 people, property value reductions of $53 million and losses to the quality of life imperative to maintaining its high-tech industry and to attracting staff and patients to the Mayo Clinic.

When combined, these impacts would make Rochester a less desirable community in which to live, work, and seek medical treatment. We venture to say that there is not a single other community in the world of Rochester's size that is as dependent upon the medical arts and, as shown supra, a national study establishes that Rochester is more dependent on high-tech

industries than any other metropolitan region in the United States. Even if just 1% of the economic activity associated with the Mayo Clinic is eliminated, the loss to Rochester would be $16 million annually in direct economic output at Mayo Clinic and a total loss of $22.9 million annually to the MSA when resulting impacts on other sectors of the economy are factored in.

It is also unprecedented for the Board to be faced with an offer from a community to contribute a huge sum toward the construction and operation of a by-pass that will do something that no other option can accomplish, completely mitigate the environmental impacts of the DM&E's proposal on Rochester.

Rochester recognizes full well that its by-pass proposal is not optimal from the standpoint of the DM&E or our neighbors along the bypass route. The DM&E does not wish to add 10.8 miles to its route, even though this would be only a 1.2% addition to its proposed 878-mile route from the coal fields to Winona (and an even smaller addition from the standpoint of the amount of time for DM&E's trains to traverse that route). Our neighbors do not want their property to be taken for railroad construction and do not want their environment affected by railroad operations.

Nonetheless, the by-pass is, by far, the preferable alternative. Even leaving aside the monumental errors of the DEIS, that document concludes, among other things, that 183 sensitive receptors would experience noise levels of 70 dBA or greater as a result of wayside/horn noise if the trains operate through Rochester. If DM&E operates over the by-pass, only 1

sensitive receptor would experience such noise. If the trains operate through Rochester, the DEIS says that an additional 836 sensitive receptors would experience noise levels of 70 dBA or greater as a result of horn noise. Along the by-pass route, the number is 26.

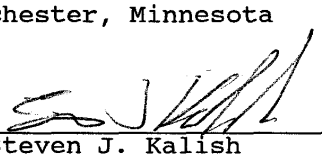
By every measure, the results are the same. More cars, more buses, more school children, more emergency services, more property, more jobs, more recreational facilities, more economic activity, more environmental justice communities and, ultimately, more people, including people particularly sensitive to noise and air quality concerns, would be affected by the Rochester routing. The differences in economic impacts are staggering. According to Rochester Area Economic Development Inc., Exhibit 7, the total ten year cost of the in-town route is over $850 million, approximately four times the cost of the by-pass.

Rochester's proposed contribution to the by-pass is more than fair. Its design of the by-pass, including three grade separations and extensive noise mitigation, would minimize the inconvenience to its neighbors. Its proposed improvement of the in-town tracks would permit improved service to Rochester shippers.

Rochester requests that the FEIS recommend Alternative R-4 as discussed herein.

Respectfully submitted,

Rochester, Minnesota

By: 

Steven J. Kalish
McCarthy, Sweeney & Harkaway, P.C.
Suite 600
2175 K Street, N.W.
Washington, D.C. 20037
(202) 393-5710

Dated: March 6, 2001
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ORIGINAL

BEFORE THE
SURFACE TRANSPORTATION BOARD

FINANCE DOCKET NO. 33407

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MANAGEMENT
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DAKOTA, MINNESOTA & EASTERN RAILROAD CORPORATION
CONSTRUCTION INTO THE POWDER RIVER BASIN

COMMENTS OF ROCHESTER, MINNESOTA ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

Volume II-Exhibits 1 through 10

Steven J. Kalish
McCarthy, Sweeney & Harkaway, P.C.
Suite 600
2175 K Street, N.W.
Washington, D.C. 20037
(202) 393-5710

Dated: March 6, 2001

BEFORE THE
SURFACE TRANSPORTATION BOARD

FINANCE DOCKET NO. 33407

DAKOTA, MINNESOTA & EASTERN RAILROAD CORPORATION
CONSTRUCTION INTO THE POWDER RIVER BASIN

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(202) 393-5710

Dated: March 6, 2001

VOLUME II EXHIBITS

1. October 12, 2000 letter from Gary Neumann to Victoria Rutson and November 8, 2000 letter from Elaine K. Kaiser to Gary Neumann

2. Verified Statement of Bernard H. Ortgies

3. Verified Statement of Terry A. Spaeth

4. Verified Statement of Kim M. Hanson

5. October 20, 1998 letter from Larry J. Koshire to Honorable Vernon A. Williams

6. Verified Statement of Charles Reiter

7. Rochester Area Economic Development Inc., February 16, 2001, Cost Comparison of Utilizing City Route vs Bypass

8. November 16, 2000 PEMSTAR Position Statement

9. July 15, 1998 letter from Ronald R. Lein to Tom Harris; October 11, 2000 letter from Constance Reese to Gary Neumann; October 24, 2000 letter from Gary Neumann to Constance Reese; and December 18, 2000 letter from Ronald R. Lein to Constance Reese

10. February 5, 2001, Post-Bulletin, Mosque Unites Islamic Community

ROCHESTER
Minnesota

October 12, 2000

GARY H. NEUMANN
Assistant City Administrator
City Administrator's Office
201 4th Street SE, Room 266
Rochester, MN 55904-3781
(507) 285-8082
FAX #(507) 287-7979

Victoria Rutson, Project Manager
Surface Transportation Board
Powder River Basin Expansion Project
1925 K Street, NW
Washington, DC 20423-0001

RE: Requests for Additional Information

Dear Ms. Rutson:

We have been reviewing the information that is contained in the DEIS. We do appreciate the volume of information in the documents. It certainly was a major undertaking to prepare.

Some additional information on certain aspects would be extremely useful for us to prepare an adequate response to issues relating to our community. I have listed below some additional information that we request be provided to the City of Rochester if it is available from you or the consultants for the project.

1. SIDINGS. Table 2-6 lists five sidings to be constructed entirely or partially within Olmsted County. Two of these sidings would be partially within the City limits of Rochester. The City would request copies of drawings of these five siding locations, particularly for the two sidings in or adjacent to the City of Rochester. We would assume that drawings are available that would show the approximate location of the sidings and their approximate distance from the centerline of the existing track. If there is a map showing the existing right of the DM&E Railroad in Olmsted County, that would be useful also.

   Page 1-27 indicates that the sidings to be constructed initially are designed to accommodate existing train traffic and 40 million tons of coal hauled annually. Are the five sidings that are listed for Olmsted County intended to be constructed under the initial construction phase and to accommodate the 40 million tons of coal or are they intended to be constructed in a subsequent phase to accommodate coal traffic greater than 40 million tons annually? Is the intent to use these five sidings as passing sidings or are they to be used for marshalling yard purposes?

2. VIBRATION. Tables 5.1-10 and 3.3-17 reference buildings potentially impacted by vibration. The City would request specific information from the STB on which 32 buildings it determined to be within 100 feet; which 180 buildings were found to be within 101 to 200 feet; and which 364 buildings were found to be within 201 to 400 feet. If there are either listings of the building locations or addresses available or a copy of a map that was used to make this determination, it would be very helpful to the City. At present, we have not been contacted by very many owners of the buildings that are likely to be within those distances. However, as more people in the community become familiar with the DEIS, we are likely to get questions on which buildings were considered to be within a specific distance category and which were not. A listing of the buildings or a copy of the map is needed to address future questions that are certain to arise.

3. NOISE. Table F-6 and other references refer to a noise distance or contour of 2,230 feet on either side of the tracks. The City would request that a map or other information that was available to determine the properties that were within the noise contour be provided to the City. This would enable the City to better understand the area of impact and the specific properties that were included in the SEA's determination.

Thank you in advance for your assistance in providing the City of Rochester with this information.

Sincerely,

Gary Neumann
Assistant City Administrator

c: Mayor and Council
Stevan Kvenvold, City Administrator
Terry Adkins, City Attorney
Steve Kalish, McCarthy Sweeney, & Harkaway

SURFACE TRANSPORTATION BOARD
Washington, DC 20423

Section of Environmental Analysis

November 8, 2000

Mr. Gary Neumann
Assistant City Administrator
City of Rochester
201 4th Street SE, Room 266
Rochester, MN 55904-3781

Dear Mr. Neumann:

Recently, you submitted a letter requesting additional information concerning the Dakota, Minnesota & Eastern Railroad Corporation's (DM&E) Proposed Powder River Basin Expansion Project (STB Finance Docket No. 33407). As you know, on September 27, 2000, the Surface Transportation Board's Section of Environmental Analysis (SEA), with the participation of the five cooperating agencies, issued a Draft Environmental Impact Statement (Draft EIS) for DM&E's proposal. SEA distributed the document widely to Federal, state, and local agencies, potentially affected communities, Native American Tribes, and members of the public. Moreover, the entire document is available on the Board's website at www.stb.dot.gov. Written comments are due on the Draft EIS by January 5, 2001.

The Draft EIS provides a detailed discussion of the various environmental impacts identified by SEA regarding this project, as well as alternatives that SEA has considered. The Draft EIS also addresses measures SEA currently recommends that the Board impose on DM&E's proposal to mitigate or alleviate potentially significant environmental impacts.

Because the Draft EIS is thorough and comprehensive, it would not be appropriate for me to provide additional materials regarding SEA's environmental analysis at this time. Rather, to be fair, everyone reviewing and commenting on the Draft EIS should have access to the same information (i.e. the material in the actual document).

Any concerns you may have about SEA's environmental analysis should be raised in your written comments. SEA and the five cooperating will consider all timely public comments on the Draft EIS in preparing a Final EIS. The Board and the cooperating agencies will then consider the entire environmental record – including all public comments, the Draft EIS, and the Final EIS – in making their respective decisions on the proposed project.

Please mail written comments on the Draft EIS to the address below. For comments over five pages in length, please mail a signed original plus 10 copies. For comments five pages or less, a signed original is sufficient. Comments must be mailed by **January 5, 2001** to:

Office of the Secretary
Case Control Unit
STB Finance Docket No. 33407
Surface Transportation Board
1925 K Street, NW
Washington, DC 20423-0001

Please write the following in the lower left hand corner of the envelope:

Attention: Victoria Rutson
Environmental Project Manager
Environmental Filing

If you would like more information, please call SEA's toll-free environmental hotline at (877) 404-3044. Thank you for your interest and participation in the environmental review process.

Sincerely,

Elaine K. Kaiser, Chief
Section of Environmental Analysis

cc: Chuck Canfield, Mayor
John Hunziker, City Council President
Stevan Kvenvold, City Administrator
Terry Adkins, City Attorney
Steve Kalish, McCarthy Sweeney & Harkaway

VERIFIED STATEMENT

SURFACE TRANSPORTATION BOARD FINANCE DOCKET No. 33407

DAKOTA, MINNESOTA & EASTERN RAILROAD CORPORATION

CONSTRUCTION INTO THE POWDER RIVER BASIN

RESPONSE TO DRAFT ENVIRONMENTAL IMPACT STATEMENT

Prepared by

Bernard H. Ortgies, P.E.
Vice President
Wilbur Smith Associates
2850 Capital Medical Blvd. Suite B
Tallahassee, FL 32308

March 1, 2001

SURFACE TRANSPORTATION BOARD FINANCE DOCKET No. 33407

DAKOTA, MINNESOTA & EASTERN RAILROAD CORPORATION

CONSTRUCTION INTO THE POWDER RIVER BASIN

Verified Statement prepared by Bernard H. Ortgies, P.E., Vice President, Wilbur Smith Associates, 2850 Capital Medical Blvd., Suite B, Tallahassee, FL 32308

My name is Bernard H. Ortgies and I am employed by Wilbur Smith Associates, Columbia, SC. I am a Senior Project Manager and Corporate Officer responsible for managing traffic and planning studies, and transportation design and construction services projects. I hold a B.S. Degree in Civil Engineering from Iowa State University and am a Registered Professional Engineer in Arizona, Alabama, Iowa, and Florida. I have 43 years of transportation infrastructure engineering and management experience in both the public and private sectors. Wilbur Smith Associates, herein referred to as the "consultant", has been retained to provide technical support to the City of Rochester, MN in regard to the above referenced STB docket item. I am making this Verified Statement on behalf of the City of Rochester, MN.

This verified statement contains five (5) sections and one Appendix as follows:

SECTION I. LOCAL SERVICE WITH BYPASS

SECTION II. INCREASED LENGTH OF ROUTE WITH BYPASS

SECTION III. COST ESTIMATE FOR EXISTING CORRIDOR

SECTION IV. COST ESTIMATE FOR BYPASS CORRIDOR

SECTION V. INCREASED OPERATING COSTS FOR BYPASS CORRIDOR

APPENDIX A. TECHNICAL MEMORANDUM – VIBRATION ANALYSIS

SECTION I. LOCAL SERVICE WITH BYPASS

Should the Bypass, Alternate R-4, around the south side of Rochester, MN be selected as the preferred alternative, rehabilitation of the existing 23.6 mile corridor would be required to improve service to the local shippers. Currently, they generate approximately 1,300 carloads of mixed manifest freight in and out bound, and approximately 834 carloads per year of coal in-bound. This is considered to be a low speed - light traffic loading typical to industrial sidings on Class I Railroads. The existing track structure through Rochester can be readily upgraded to accommodate through trains carrying local traffic by replacing defective rail sections and deteriorated ties, and performing other rehabilitative work. The cost of performing this rehabilitative work is estimated to cost $77,600 per mile, refer to Table 1. The cost of this rehabilitative work has been included in the Bypass cost estimate included in this verified statement.

The rehabilitated track would not be load restricted for two reasons. First, the shipper surveys of past and projected traffic included in the attached verified statement prepared by Terry Spaeth, City Administrator's Office, Rochester, MN do not indicate that high volumes of heavily loaded cars will be carried over this track. The survey indicates that this traffic would be equivalent to one variable length through train per day. Even if some heavy cars, up to 315,000 pounds, are in-bound, none would in all probability, be out-bound. The number of cars and operating speeds would be relatively low. Class I Railroads routinely conduct operations of this type in commercial and industrial settings on tracks in comparable condition. Secondly, the existing sidings and spurs, which are in poorer condition than the mainline, are currently providing local service to shippers. Should traffic and loadings increase dramatically, the DM&E would have to upgrade these tracks whether or not the bypass is constructed. There is no indication based on the customer surveys that such traffic changes are projected or planned. The only customer that can be reasonably expected to generate heavier in-bound carloadings of coal in the future is the

Table 1

DM&E Study

Cost Estimate for Rehabilitation of Existing Track

Item No.	Item Description	Quantity	Unit Cost	Per Mile
1	Clear ROW, Rehabilitate Drainage & Structures	1	$10,000	$10,000
2	Replace Ties Per Mile	800	$50	$40,000
3	Furnish and Install Ballast CY Per Mile	700	$10	$7,000
4	Ballast Surfacing (Track Foot)	5280	$2	$10,560
5	Replace Broken/Defective Rail (Relay No. Per Mile)	10	$500	$5,000
6	Repair/Rehabilitate GCX (1 Per Mile)	1	$5,000	$5,000
	Total Per Mile of Track			**$77,600**
	Total Cost of Existing Corridor (MP 37.5 - MP 61.1)	**23.6**	**$77,600**	**$1,831,000**

Rochester Public Utilities (RPU). The spur serving RPU may then require upgrading. This would be RPU's responsibility since it is not located on DM&E property.

SECTION II. INCREASED LENGTH OF ROUTE WITH THE BYPASS

The Draft Environmental Impact Statement Executive Summary states of the project " It comprises nearly 1,000 miles of rail line – approximately 280 miles of new rail construction and 600 miles of rail rehabilitation – traverses three states". The Draft Environmental Impact Statement in Volume I, Chapter 1 indicates that the proposed construction is *approximately* 281 miles in length and that *approximately* 598 miles will be rebuilt.

Due to the fact that final engineering surveys and design work have not yet been completed, the exact length of the expansion project cannot be determined. It is reasonable to expect the final length to vary from the original preliminary estimates. Moreover, the exact length of the existing route to be rehabilitated (598 or 600 Miles) may very well be more or less since the records used date back to the 19th century. These types of records often contain survey errors and equations that affect the accuracy of the lengths. The total length of the corridor may vary by more than the increased length due to the addition of the bypass, which preliminarily amounts to approximately one percent of the total. In any event, the increased length due to the bypass will not significantly affect the total running time of a train over the entire corridor. Other operational factors will likely have a much greater effect on running time, such as weather conditions, equipment and track maintenance requirements, crew and equipment availability, mine operation schedules, and scheduling logistics.

SECTION III. COST ESTIMATE FOR EXISTING CORRIDOR

This cost estimate is based on the assumption that Alternate R-2 would be selected. It has been developed in two parts. The first part contains the items previously cited in various DM&E filings

and verified statements. It only includes those items and costs required to provide the improvements needed by DM&E to begin coal hauling operations. No mitigation was included for the benefit of the City of Rochester or Olmsted County. This cost estimate, refer to Table 2, Page 1, is identical to the estimate attached to the verified statement submitted by Raymond G. Gigear, Project Engineer, DM&E Railroad, Brookings, SD on April 9, 1999. The total ($24.9 Million) was also cited by David M. Levy, Project Manager, Fredrick R. Harris, Inc., Consultant to the DM&E Railroad in a verified statement dated July 12, 1999. This estimate was also referenced in a verified statement submitted by Leif Thorson of TKDA for Rochester dated June 12, 1999.

The second part of the estimate, refer to Table 2, Page 2, lists those items considered necessary to minimally mitigate the damaging impacts associated with high volume – high speed coal train operations through the City of Rochester. The items and their costs are described as follows:

Item No.1 – Trail Mitigation, Pedestrian Underpass for Zumbro River Trail

This railroad crossing has the highest pedestrian and bicycle traffic in the community due to its location being in the heart of the city and on the principal trail route. The City of Rochester Park & Recreation staff estimates that approximately 265,000 persons use this trail crossing annually. User accessibility and safety is, therefore of paramount importance to the community. This will be seriously jeopardized by the increased speeds, up to 49 miles per hour, and the increased frequency and length of the train traffic. A 10' by 10' reinforced concrete box culvert (underpass) with entrance and exit retaining walls and fencing is therefore proposed as the solution to this trail - train conflict environment. The estimate was based on an analysis of the topographic conditions at the site and typical costs in the region for comparable types of construction. The original TKDA estimate for this underpass assumed that a culvert would provide

Table 2

DM & E Study

Existing Corridor - Rail & Mitigation Improvements

Construction Cost Estimate

MP 37.5 To MP 61.1

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT PRICE	$ AMOUNT
	Rail Related Improvements Per FRH-DM&E Verified Statement			
1	Bank Widening, Ditch Cleaning, Misc. ROW	23.6 Mi	$50,000	$1,180,000
2	Rehabilitation of Existing Track with 136# New Rail, 12" New Ballast & 60% New Ties	23.6 Mi	$331,000	$7,811,600
3	Turnouts No. 10	5 EA	$52,000	$260,000
4	Replace Bridges, span length < 24'	844 LF	$2,200	$1,856,800
5	Replace Bridges, span length 24' - 44'	409 LF	$3,000	$1,227,000
6	Replace Bridges, span length >40'	225 LF	$4,000	$900,000
7	Replace plate Girder Bridge with Ballast Deck	48 LF	$6,000	$288,000
8	Culvert Replacement (one per mile at 36" Dia. by 50 ft. long)	1,344 LF	$60	$80,640
9	Fencing, Barb Wire	29.4 MI	$15,000	$441,000
10	Renew crossing gravel at grade 24 ft width	1 EA	$15,000	$15,000
11	Renew crossings paved at grade	966 LF	$2,000	$1,932,000
12	Signals Flashing Lights with Gates	14 EA	$160,000	$2,240,000
13	Signals with Flashing Lights	7 EA	$120,000	$840,000
14	Add Crossbucks w. Stop Signs	2 PR	$3,000	$6,000
15	Add Crossbucks	3 PR	$2,000	$6,000
16	Signal Maintenance on Existing System	144 EA	$400	$57,600
17	Utility Relocations	1 LS	$100,000	$100,000

Notes: 1) All data contained herein was obtained from Verified Statements referenced below.

Sub-Total	**$19,242,000**
Contingencies 14%	**$2,376,700**
Engr,Des, & Const Adm. 15%	**$3,242,805**
Rail Subtotal	**$24,861,505**
Rounded Subtotal	**$24,900,000**

References: This cost estimate was attached to the Verified Statement of:
Raymond G. Gigear, Project Engineer
DM&E Railroad, Brookings, SD
Verified April 9, 1999
The rounded total ($24.9 Million) was cited in the Verified Statement of:
David M. Levy, Project Manager
Fredrick R. Harris, Inc., Consultant to the DM&E Railroad
Verified July 12, 1999

Table 2

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT PRICE	$ AMOUNT
	Mitigation Improvements			
1	Pedestrain Underpass at Zumbro River Trail	120 LF	$750	$90,000
2	Chain Link Fence 6' (Lt. & Rt. Thru urban area from CASH 22 to TH52)	7.0 MI	$63,360	$443,520
3	Wayside Noise Mitigation	1 LS	$11,900,000	$11,900,000
4	Signals with Four Quadrant Crossing Gates (Net Increase = $281K - $160K = $121K)	9 EA	$121,000	$1,089,000
5	Broadway Ave. Underpass TH 63	1 EA	$4,638,000	$4,638,000
6	East Circle Drive Overpass CASH 22	1 EA	$3,152,000	$3,152,000
7	Second Ave. NE Overpass	1 EA	$2,504,000	$2,504,000
8	Utility Relocation for Grade Separations (City of Rochester Estimates)	1 LS	$1,352,000	$1,352,000
9	Right of Way Acquistion & Relocation for 3 Grade Separations (City of Rochester Estimates	1 LS	$3,062,000	$3,062,000
10	Relocate Pedestrian Trail SE of Quarry Hill Park & Zumbro River to Ninth Ave. NE	0.5 MI	$120,000	$60,000
11	Electric Utility Relocations for 3 Separations (RPU Estimates)	1 LS	$1,439,000	$1,439,000
12	Track Vibration Mitigation-Rubber Tie Plate Insulators (2 Per Tie)	4.3 MI	$17,000	$73,100
13	Track Vibration Mitigation-Asphalt Concrete Subbase Course (8" Thick & 12' Wide)	4.3 MI	$95,040	$408,672
14	Hardware & Communications for Train Detection for City Emergency Services)	5 EA	$20,000	$100,000

Notes: Item 1. Replaces existing pedestrian GCX
Item 2. In lieu of Barb Wire Fence in high trespass zone (DM&E MP 47.0 - MP 50.5)
Item 3.Property Acquisition, Noise Walls & 2 Levels of Home Sound Proofing
Items 4, 5, 6, & 7. Required for Whistle Free Zone DM&E MP 47.0 to MP 51.3
Items 12 & 13. Required to reduce vibration per DEIS, Refer to WSA Vibration Analysis
Item 14. Required for dispatching and routing emergency serives in Rochester, MN

Sub-Total	**$30,311,292**
Contingencies 14%	**$4,243,581**
Engr,Des, & Const Adm. 15%	**$5,183,231**
Mitigation Subtotal	**$39,738,104**
Rounded Subtotal	**$39,700,000**
Total: Rail + Mitigation	**$64,600,000**

References: 1) Base data used in this estimate was provided by the Rochester-Olmsted Council of Governments, the City of Rochester Department of Public Works, and the Rochester Public Utilities Department.
2) Average Cost of 4 Quadrant Gates ($281K) obtained from USDOT FRA DEIS "Proposed Rule for the Use of Locomotive Horns at Highway-Rail Grade Crossings-Table 4-12"
3) Applicable verified statements included in the DEIS Response Comments

satisfactory separation service. Subsequent review indicated that a larger structure as described above would be required in order to provide horizontal and vertical clearances for bicyclists, and snow removal and maintenance equipment. The consultant has therefore adjusted the cost of this item to reflect the proposed construction of the larger structure.

Item No. 2 – Trespasser Mitigation, Chain Link Fencing From CASH 22 to TH 52

The section of track between these two highway crossings (DM&E RR MP47.0 – MP 50.6) provides the greatest opportunity for trespasser access because it passes through areas that have been most heavily developed. Numerous community facilities, such as parks and playgrounds, as well as business and residential developments abut the railroad right of way. According to the U.S. Department of Transportation, Federal Railroad Administration report published in August 2000, 3,042 railroad trespassers were killed nationwide during the 1994 – 1999 reporting period. An additional 2,861 non-fatal casualties were reported for the same period. These statistics do not include trespasser casualties at highway grade crossings. The trespasser fatalities exceeded the highway-rail crossing fatalities by 2.2 percent for the same reporting period. These data indicate fencing that prevents trespassers from accessing railroad right of way must be a high priority, particularly in urban areas that are subject to high volumes of high speed train traffic. These data also indicates that preventing trespasser casualties is of equal importance to grade crossing protection. The inclusion of the cost of constructing chain link fencing is therefore considered an essential community safety mitigation item.

Item No. 3 - Wayside Noise Mitigation

A detailed analysis has been performed by the Rochester-Olmsted Planning Department (ROPD) with regard to wayside train noise impacts along the corridor. This analysis indicated that noise impacts to certain properties could not be mitigated, and therefore, would have to be acquired. Noise walls and soundproofing was determined necessary for other properties located along the corridor. These analyses have been documented in the verified statement submitted by Charles Reiter, AICP, Principal Planner for ROPD. The cost for the various types of noise mitigation cited in that verified statement, $11,900,000, has been included in Table 2 on page 2, accordingly.

Item No. 4 - Noise Mitigation, Whistle Free Zone

The noise generated by the locomotive horns cannot be effectively mitigated by noise walls and/or sound proofing of residences. Two alternatives are available to mitigate locomotive horn noise. The most preferable is building the bypass, DEIS Alternate R-4. This would shift all train traffic, with the exception of local service operations, out of the community. The second alternative, DEIS Alternate R-2, requires creating a quiet – whistle free zone through the most sensitive section of the City of Rochester. This would be accomplished by separating three of the most important grade crossings and sealing the remainder of the crossings with four quadrant gates and other appurtenances to ensure that vehicular and pedestrian traffic is protected without horn warnings. The whistle free zone would extend from East Circle Drive (RR MP 47.0) to 7th Avenue NW (RR MP 51.3). The limits of this zone coincide with the urban development limits within the City of Rochester. Three separations at Broadway Avenue (TH 63), East Circle Drive (CASH 22) and Second Avenue NE (West Silver Lake Drive) and four quadrant gates located at 15th Avenue NE, 11th Avenue NE, 9th Avenue NE, 4th Avenue NW, 6th Avenue NW, 6th Avenue NW, 11th Avenue NW and 7th Street NW would provide the

protection required for the whistle free zone. The cost of installing four quadrant signals and gates at each crossing was derived from U.S. Department of Transportation, Federal Railroad Administration, Draft Environmental Impact Statement, Proposed Rule for the Use of Locomotive Horns at Highway-Rail grade Crossings, December 1999, Table 4-12, page 4-27. The range of costs cited was $244,000 to $318,000. The average of the range, $281,000 was used to estimate the cost of such protection. The mitigation cost estimate for the existing corridor, Alternate R-2, includes the items and costs required to mitigate the horn noise component. Additional information regarding this item is contained in the attached verified statement prepared by Charles Reiter, AICP, Principal Planner, Rochester-Olmsted Planning Department.

Items No's. 5, 6, & 7 - Grade Separations

Grade separations are required to mitigate: traffic delay and congestion, safety problems, reduced air quality, emergency response problems, and facilitate development of a whistle free zone through the Rochester urban area. The separations are to be located at CSAH-22 (East Circle Drive), Second Avenue NE (W. Silver Lake Drive) and Broadway (TH-63). Detailed justification for requiring these separations is contained in the attached verified statement prepared by Charles Reiter, AICP, Principal Planner, Rochester-Olmsted Planning Department.

The construction cost estimates for these separations were developed by Toltz, King, Duvall, Anderson and Associates, Incorporated (TKDA) in a study performed for Olmsted County and the City of Rochester, MN dated January 4, 1999. These cost estimates were subsequently reviewed by the consultant. The estimates for the CSAH-22 and Broadway separations were found to be acceptable and therefore included in

Table 2, page 2, without modification. The cost estimate for Second Avenue NE was increased by $500,000 for the following reasons:

- Due to the proximity of the construction site to the Zumbro River special shoring and interim drainage facilities will be required during construction for both the railroad and the street. This is estimated to increase the cost of the separation by $300,000.
- The pumping station will require a storm sewer outfall system and detention pond to store the discharge prior release into the river. This estimated to increase the cost of the separation by $200,000.

The adjusted total cost of the Second Avenue NE separation was therefore increased to $2,504,000.

Item No. 8 - Utility Relocations for Grade Separations

Certain utilities owned by the City of Rochester Public Works Department will necessarily have to be relocated to facilitate construction of the three separations described above. The cost estimates for these relocations are included in the verified statement prepared by Richard Freese, P.E., Director of Public Works for the City of Rochester, MN. The utility relocation costs cited in the verified statement have been included in cost estimate Table 2 on page 2.

Item No. 9 - Right of Way Estimate for Grade Separations

A cost estimate for the right of way required for the three grade separations described above was prepared by the City of Rochester. This cost estimate is included in the verified statement prepared by Michael J. Nigbur, Land Development Manager, for City of Rochester, MN Department of Public Works. The cost estimate cited in the verified statement has been included in cost estimate Table 2 on page 2.

Item No. 10 - Trail Mitigation, Relocate Pedestrian Trails SE of Quarry Hill Park & Zumbro River to Ninth Avenue NE.

This trail currently runs parallel to the DM&E line on a portion of what was once railroad right of way (RR ROW). The trail begins at the Zumbro River on the west and ends in Quarry Hill Park North of the Federal Medical Center. The trail begins on the north side of the RR ROW and then crosses, via the existing GCX, at 9 Avenue NE and continues easterly on the south side of the tracks. The trail crosses under the tracks North of the Federal Medical Center and continues into Quarry Hill Park. The Rochester Park and Recreation staff estimates that based on surveys of the extensive City of Rochester trail system approximately 100,000 persons use this section of the trail per year.

The trail section between the Zumbro River and 9th Avenue NE should be relocated to the South side of the DM&E Railroad corridor. This would eliminate the grade crossing for the trail at 9th Avenue NE, and thereby provide a safer corridor for bicycle and pedestrian traffic. This would also preclude trespassers from entering the railroad right of way because it would be separated by chain link fencing described in Item No. 2. Based on previous trail cost construction experience in Rochester, MN, the relocation is estimated to cost approximately $120,000 per mile. This item has been included in Table 2 on Page 2.

Item No. 11 – Electric Utility Relocations for 3 Grade Separations

A cost estimate for the relocation of electric utilities required for the three grade separations described above was prepared by Greg A. Woodworth, Engineering Manager for Rochester Public Utilities, a Department of the City of Rochester, MN. This cost estimate is a part of Mr.Woodworth's verified statement attached hereto. The utility relocation costs cited in the verified statement been included in Table 2 on page 2.

Item No's. 12 & 13 - Vibration Mitigation

The DEIS discussion regarding vibration damage and mitigation is considered completely inadequate. Although the DEIS acknowledges that vibration would increase due to operation of larger, heavier, and faster trains on the existing corridor, no formal analysis or testing of conditions or impacts have been conducted in the City of Rochester. Moreover, no additional analysis specific to the sensitive sites and no mitigation have been specifically required in the DEIS that addresses the potential damage identified in the DEIS.

The best solution to the vibration damage problem would be the construction of the bypass, Alternate R-4. This would remove all but approximately one train per day (for local service traffic) from the community and the sensitive receptors. However, if Alternate R-2 is finally selected, a significant effort must be made to ensure that the potential for vibration damage is thoroughly investigated, analyzed, and mitigated. Appendix A outlines the minimum requirements for this analysis and the minimum mitigation which should be required by the Section of Environmental Analysis (SEA). The formal analysis and testing program may identify additional mitigation measures that need to be installed and/or employed. The FEIS should include provisions that ensure that the appropriate mitigation measures be provided and maintained by the DM&E Railroad as determined necessary by subsequent study as outlined in Appendix A. The minimum mitigation items described in Appendix A have been included in the mitigation cost estimate for the existing corridor.

Additional information regarding the impacts of vibration caused by train traffic is included in the attached verified statement prepared by Charles Reiter, Principal Planner for the Rochester-Olmsted Planning Department.

Item No. 14 – Real Time-Train Detection for City of Rochester Emergency Services

Real-Time Train Detection and Location Monitoring System would provide Rochester-area Emergency Service Providers with train location information gathered via a train detection system which would be centrally compiled and ideally displayed in the form of a electronic map of the railroad and street system network that would illustrate the real-time status of train movements in the Rochester area. The map would show train location, length, direction and speed. Emergency vehicle dispatchers would be able to use the information on the map to advise their drivers of train locations and possible alternate routes to take in order to travel to the scene of an emergency. This system would be especially beneficial in the event of accidents, train breakdowns, derailments, and slow orders. Inordinate delays of this type could have far reaching effects on safety and well being on persons and property in the event of serious emergencies.

The desire for the real-time detection and monitoring is discussed in the DEIS in the Executive Summary on page ES-80, and was discussed in the comments of Capt. Ron Thompson, Rochester Police Department, Deputy Chief Lyle Felsch, Rochester Fire Department, and Assistant Chief Rick Lovett, Rochester Fire Department, date June 4, 1998 and submitted as part of the City of Rochester's comments on the Scoping Document for the DEIS.

The consultant's review of the DEIS and the views of the Rochester emergency services units cited in previous documents resulted in the conclusion that such capability should be required to mitigate impact of delaying emergency response. The estimated cost of providing these basic Intelligent Transportation Systems (ITS) components has therefore been included in the mitigation estimate, refer to Table 2.

SECTION IV. COST ESTIMATE FOR THE BYPASS CORRIDOR

A detailed estimate for the proposed City of Rochester Bypass, DEIS Alternate R-4, has been developed. The proposed location and conceptual plans were previously documented and filed in a verified statement by Leif J. Thorson, P.E., Project Manager, Railroad Division, Toltz, King, Duvall and Anderson and Associates, Inc. (TKDA), St. Paul, MN dated June 12, 1999. Subsequently, the TKDA estimate contained in the verified statement was reviewed in detail and modified to reflect changed conditions and new or updated information developed by the Rochester-Olmsted Planning Department (ROPD), the City of Rochester, MN and the consultant. The estimate is summarized in Table 3.

The Bypass will be approximately 34.1 miles long and located south of the City of Rochester. The preliminary alignment begins at DM&E RR Mile Post 37.5 East of the City and terminates at DM&E RR Mile Post 61.1 West of the City. The approximate location of the alignment is depicted on DEIS Figure ES-15. The purpose of this alternative is to carry coal and through manifest rail traffic. The existing corridor, which would be rehabilitated to carry local traffic, would be connected to the new mainline via turnouts and connection tracks located near the bypass termini. The sidings listed in DEIS Volume I, Chapter 2, Table 2-7 between Milepost 38.2 and Milepost 39.7, and Milepost 60.4 and Milepost 62.0 would be repositioned at appropriate locations on the bypass and serve the same purpose as originally proposed for Alternate R-2. In as much as the costs of all sidings and other appurtenances have already been included in the DM&E plan for the total project but are not included in the R-2 costs, there would be no additional cost items for sidings with respect to the cost of the construction of the bypass. A preliminary review of the terrain and other conditions indicates that these sidings can be accommodated directly adjacent to the bypass alignment at the following locations:

Table 3

DM & E Study

Bypass Corridor

Construction Cost Estimate

Between MP 37.5 and MP 61.1

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT PRICE	$ AMOUNT
1	New Track 136# CWR	34.1 MI	$478,000	$16,299,800
2	Turnouts #10, low speed, hand throw	2 EA	$52,000	$104,000
3	<30 foot high bridge steel pile conc. deck	436 LF	$2,800	$1,220,800
4	>30 foot high bridge steel pile conc. deck	302 LF	$4,000	$1,208,000
5	Culverts 36" dia. assumed 2 per mile at 56 FT long	3,819 LF	$60	$229,140
6	Culverts 72" dia. assumed 1 per mile at 80 FT long	2,720 LF	$140	$380,800
7	Clearing and Grubbing	15 AC	$2,000	$30,000
8	Topsoil - stripping & respreading on slopes	486,000 CY	$2.50	$1,215,000
9	Excavation - Cut	4,750,000 CY	$3.50	$16,625,000
10	Embankment Construction	3,425,000 CY	$1	$3,425,000
11	Establish Vegetation	547 AC	$2,000	$1,094,000
12	Install Subballast 12" depth	187,000 CY	$15	$2,805,000
13	Fencing, Barb Wire	68 MI	$15,840	$1,077,120
14	Install At Grade Crossings Gravel - 24 ft width (Timber Crossing)	10 EA	$15,000	$150,000
15	Install At Grade Crossings Paved (High Type Material) 15 @ 32'	480 LF	$400	$192,000
16	Install Crossbucks with Advanced Warning & Stop Signs	12 PR	$3,000	$36,000
17	Signals w. Flashing Lights & Gates	11 EA	$160,000	$1,760,000
18	Grade Separations @ TH 52, TH 14 & TH 63	3 EA	$3,500,000	$10,500,000
19	Right of Way Acquisition, Severance & Relocations	1 LS	$5,413,800	$5,413,800
20	County Gravel Road Construction for Accessways	1 MI	$75,000	$75,000
21	Wetland Mitigation	120 AC	$5,000	$600,000
22	Utility Relocation	1 LS	$100,000	$100,000
23	Rehabilitate Existing Route for Local Service	23.6 MI	$77,600	$1,831,360
24	Waste Disposal	1 LS	$100,000	$100,000
25	Noise Mitigation	29 EA	$25,000	$725,000
26	Karst Investigation	1 LS	$800,000	$800,000

Notes: 1) Provide connections to existing route at East & West Bypass Termini
19) Right of Way Estimate provide by City of Rochester, refer to Verified Statement
23) Refer to Table ( ) for basis of estimate
24) Added to provide for disposal of unsuitable or hazardous materials
25) Sound Insulation for homes
26) Added for geotechnical investigation & remediation of karst & sinkhole problems

References: 1) Base data used in this estimate was provided by the Rochester-Olmsted Council of Governments, the City of Rochester Department of Public Works, and the Rochester Public Utilities Department.
2) Applicable verified statements included in the DEIS Response Comments

Sub-Total	**$67,996,820**
Contingencies, Engr., Design, & Const. Administration 35%	**$23,798,887**
Total Amount	**$91,796,000**

East Siding: Eyota Township, Twp. 106N, Range 12W, Sections 16-20/21-29

West Siding: Salem Township, Twp. 106N, Range 15W, Sections 6-7-18

It is understood that these proposed locations may be adjusted during the survey and final engineering/design phase when more specific information becomes available regarding train operations and topography. This would also hold true for the locations for all proposed sidings along the entire DM&E route.

The bypass is projected to carry approximately 34 coal trains per day, 17 loaded and 17 empty, at the 100 MGT level. Two through manifest trains on average would also traverse the bypass per day. The total train traffic on the bypass would average 36 trains per day based on current projections. We project that the third manifest train would use the in-town route to serve Rochester shippers.

Each item contained in the estimate, refer to Table 3, is referenced to the previously cited verified statement or defined independently as listed herein. The review indicated that most of the items, quantities, and unit costs cited directly are reasonable and appropriate for use in developing the composite estimate for the bypass. Items added or modified are justified herein.

Item No. 1 - New Track 136# CWR

This item, quantity, and unit cost is identical to the TKDA verified statement. The components were also included in the DM&E estimate listed in the verified statement.

Item No. 2 - Turnouts #10, low speed, hand throw

These devices provide connections to the existing corridor to and from the bypass which will be the corridor for all through rail traffic. The turnouts would be located near the

bypass termini. Due to the fact that the existing corridor will only serve one through train and Rochester shippers who will only require in-bound and out-bound daily access on the average, low speed – hand throw turnouts will provide satisfactory service. The unit costs for these items were cited in the TKDA verified statement. Subsequent review by the consultant indicates the unit cost is reasonable and appropriate.

Item No's 3 through 13, No. 21 & No. 22

These items, refer to Table 3, were taken directly from the previously referenced TKDA verified statement estimate. Mr. Leif Thorson indicated in a telephone interview that TKDA had used unit costs prevalent in Southern Minnesota, and had reviewed the estimate with construction contractors during the process of assembling the verified statement as part of their quality assurance program. Subsequent review by the consultant indicated that the items, quantities, and unit costs developed by TKDA are reasonable and appropriate.

Item No. 14 - Install At Grade Crossings Gravel

A field review by the Rochester-Olmsted Planning Department (ROPD) of the number of crossings originally identified by TKDA required for the bypass indicated that three (3) additional at grade crossings would be required. The quantity was therefore increased from 10 to 13. The unit cost cited in the TKDA verified statement, after review, was determined reasonable and appropriate.

Item No. 15 - Install Grade Crossings Paved

A field inventory by the ROPD of the proposed at graded crossings was performed to verify the need for paved crossings. The inventory indicated that 15 instead of the 17 crossings identified by TKDA would have paved approaches. The reduction resulted

from the addition of two separations included in Item No. 19 discussed below. This decreased the quantity from 544 lf to 480 lf. Quotations obtained by the consultant from a contractor/supplier of paved crossings indicated that they could be installed for $400 per lineal foot rather than $2,000 per lineal foot as estimated by TDKA. The quantities and unit costs were adjusted accordingly.

Item No. 16 - Install Crossbucks and Stop Signs

The original TKDA estimate included 20 sets of crossbucks at $1,000 for protection at low traffic volume at grade crossings. The field review by the ROPD of the crossing inventory indicated that 12 crossings would require non-signal protection. Due to the fact that this would be a new corridor carrying heavy volumes of high speed train traffic, it was determined that a more positive traffic control device system should be employed rather than the standard passive systems employed on the exiting route. This system would include stop ahead and stop signs complying with current standards at each crossing in addition to the standard railroad advance crossing signs and crossbucks at the crossings required by the USDOT, Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD). This level of protection is proposed for all crossings with crossing indexes less than 10,000. The methodology for determining crossing indexes is described in the subsection pertaining to grade separations, see Item No. 18. The unit cost per crossing for the set of four signs, two crossbucks, supports, and installation was therefore adjusted by the consultant to $3,000.

Item No. 17 - Signals with Gates

The original TKDA estimate indicated that 14 grade crossings would require protection using signals with flashing lights. Subsequent review indicated that only 11 crossings would require signal protection. This review also indicated that signals without gates

would not provide adequate protection. Due to that fact that this will be a new corridor carrying heavy volumes of high speed train traffic that would interact with road users potentially unfamiliar with train conflicts, it was determined that a more positive traffic control device system should be employed for those grade crossings with exposure indexes above 10,000. The exposure indexes were developed as described in the following section pertaining to grade separations. It was further determined that the signal protection should be augmented with gates. This level of protection is estimated to cost $160,000 per crossing. This is the same unit cost used to develop the estimates for the existing corridor.

Item No. 18 - Grade Separations at TH 52, TH 63, and TH 14

The original estimate for the bypass only included one grade separation at TH 52. Subsequent analysis indicated that grade separations should also be provided at TH 63 and TH 14. This is because the exposure indexes at these crossings would exceed 500,000 in the year 2008. This level is in excess of accepted thresholds for grade separations used by many state and local transportation agencies.

Specific highway-railroad separation criteria were provided in the "Southern Minnesota Railroad Safety Plan" Final Report (SHE No. A-MNDOT0001.00) dated February 15, 2000 prepared by Short Elliott Hendrickson, Inc. for the Minnesota Department of Transportation. The criteria listed in the report's Executive Summary section on "Specific Recommendations" listed the following criteria:

- Crossings with exposure greater than 300,000;
- 4 lane roadway with speeds greater than 30 mph, ADT greater than 5,000, and train speed greater than 40;

- 4 lane roadway with speeds greater than 55 mph, ADT greater than 3,000 and train speed greater than 40;
- Two or more train/vehicle collisions with the last five years at a crossing with active warning devices;
- Increase in public safety.

The AADTs and exposure indexes for the three proposed separations are listed below:

Minnesota TH – 52	AADT 24,400	Exposure Index 878,400
Minnesota TH – 63	AADT 26,000	Exposure Index 936,000
Minnesota TH – 14	AADT 14,000	Exposure Index 506,300

The exposure indexes were computed on the basis of 36 trains per day and the Average Annual Daily Traffic (2008-AADT) generated using the Rochester-Olmsted County Planning Department (ROCPD) forecasts and the ROCPD Regional Demand TRANPLAN year 2000 model. All three crossings recommended for separation on the bypass meet all except the accident frequency criteria. The accident frequency criteria is not relevant because the bypass has not yet been built and no comparable history exists.

The cost ($3,500,000 each) of constructing the two additional separations was based on the unit costs included in the previously referenced verified statements. The consultant's review of the records indicated this unit cost is reasonable and appropriate for use in developing the bypass cost estimate.

Item No. 19 - Right of Way Acquisition, Severance & Relocations

The right of way requirements for the bypass as described in the previously referenced verified statement were reviewed. The acreage was increased to accommodate the two

additional separations at TH 63 and TH 14. This review indicated that an additional 40 acres, 20 acres for each separation, would be required to site the separation structures and the earthwork. This resulted in a total right of way acreage of 587. The cost of the right of way has been estimated by the City of Rochester. The attached verified statement documenting the costs of right of way acquisition was prepared by Michael J. Nigbur, Land Development Manager for the City of Rochester Public Works Department.

Item No. 20 - County Gravel Road Construction for Accessways

After review of the TKDA verified statement referenced previously, and subsequent review of right of way acquisition requirements and field conditions by the ROPD, it was determined that accessways would be required to connect certain parcels to the existing county road network. Although the exact number, locations and lengths will not be fully identified until the final design of the bypass is completed, the preliminary analysis of the accessway needs indicates that approximately one (1) mile of new accessways will be required. These would be constructed to current county road standards and surfaced with gravel material to make them all weather passable. Roads of this type typically cost approximately $75,000 per mile in Olmsted County. This item and unit cost have been included in the bypass estimate.

Item No. 23 - Rehabilitate Existing Route for Local Service

The original estimate contained in the previously referenced TKDA verified statement included an item for rehabilitating the existing 23.6 miles of track remaining in local service upon construction of the bypass.

The original estimate was reviewed to determine if it would adequately address the rehabilitation needs to carry the current levels of local traffic. After review by the

consultant the estimate was increased approximately 37 per cent. This increase was determined appropriate in light of the condition of the track structure. The revised rehabilitation items and costs as listed in Table 1 are consistent with current Class I railroad practices and procedures for light traffic commercial and industrial sidings that operate at low speeds. The revised average rehabilitation cost per mile is $77,600. The total rehabilitation cost for the 23.6 mile local service siding is $1,831,000 exclusive of contingencies and administrative additives. Turnouts that will provide connections to each end of the existing track have been included in Table 3.

Item No. 24 - Waste Disposal

The TKDA estimate previously referenced included a line item for waste disposal although it did not identify a quantity or unit cost. This type of line is generally included in preliminary estimates to provide for disposal of hazardous wastes or other types of wastes that cannot be permitted for disposal on the right of way. Although no such waste items have been identified or quantified, it seemed reasonable to include a nominal amount of money for that purpose should such materials be encountered during construction. Based on the site conditions and waste potential that can be reasonably expected on this predominately rural corridor it appears appropriate to include $100,000 for this purpose.

Item 25 - Noise Mitigation

ROPD identified approximately 29 homes, due to their proximity to the proposed track location, that are estimated to be exposed to increased noise levels generated by train traffic on the bypass route. Noise mitigation is, therefore, considered appropriate for these housing units. This is consistent with the approach used to mitigate noise problems on the existing corridor, Alternate R-2. A line item has therefore been included

in the cost estimate. The unit cost on a housing unit basis is comparable to the recent experience on the Metropolitan Airport Commission's FAA Regulation "Part 150" program for the Minneapolis-St. Paul International Airport. The $25,000 per unit is therefore considered reasonable and appropriate for this estimate.

Item No. 26 - Karst Investigation

The DEIS included discussion in Volume II, Chapter 3, Section 3.3.2.3.1 and Volume IV, Chapter 5, Table 5.1-10 regarding the potential for karst and sinkhole activity along the bypass corridor. The City of Rochester retained the geotechnical consulting of Short, Elliott, Hendrickson, Inc., (SEH) to investigate the potential for such activity. Their investigation is documented in the verified statement prepared by Ana G. Vargo, P.G. and Ronald B. Farmer, P.E. Their analysis indicated that the investigation of the karst and sinkhole potential would cost approximately $800,000. A line item reflecting this amount has, therefore, been included in the bypass estimate.

Contingency and Administrative Additive

A contingency and administrative amount has been added to the total cost of the items included in the estimate. The amount was computed by multiplying the estimate subtotal by 35 percent. This amount was then added to the subtotal to arrive at the total estimated cost of the bypass project.

Additives are assigned based on the confidence in the quantity and unit cost estimates, and other factors such as the cost of administration, design and construction services. The additive percentage may also vary by region, type of work and risk. The 35 percent factor assigned is a mid-range value for estimates of this type and considered by the consultant appropriate for this project. This additive is also consistent with the

percentage cited in the cost estimates for the City of Brookings, SD and the City of Pierre, SD bypasses. These bypass estimates were included in the verified statement of David M. Levy, Project Manager, Frederic R. Harris, Inc., Consultant to the DM&E Railroad, Brookings, SD dated July 12, 1999. It is important to note that this contingency percentage is higher than used for Alternative R-2 by DM&E and thus may overstate the difference in cost of the two alternatives. If the Alternate R-2 contingency and administrative percentages had been used for the bypass estimate, Alternate R-4, the total cost of the bypass would be reduced by $2,652,000.

SECTION V. INCREASED OPERATING COSTS FOR BYPASS CORRIDOR

The verified statement submitted by William R. Otter, Jr., Director-Rail Operations, Fredric R. Harris, Inc., Brookings, SD dated July 12, 1999 indicated that the DM&E would incur additional operating costs on the bypass due to the increased length of the route. This referenced document contained the following statements: "The proposed Rochester bypass would add approximately $503,000 per year in additonal DM&E train operating costs. Because the bypass route is 10.5 miles longer than the existing route, DM&E would incur $110,000 in additional crew compensation costs. The additional locomotive fuel consumption to operate DM&E's trains those same 10.5 miles would be approximately $393,000 per year at the 40 Million Net Ton level of traffic."

This data was adjusted to the 100 Million Net Ton level of traffic to determine the cost impacts associated with the operations on the bypass, refer to Table 4. Logistical considerations dictate that traffic may vary from day to day and other reasons, therefore, daily train traffic is projected on an average basis. Overall, the average number of coal trains at the 100 Million Net Tons per year would be 34, 17 loaded and 17 empty. It was assumed that two of the three existing manifest trains would be reassigned to the bypass. The remaining manifest train would provide

Table 4
DM&E Study

Increased Train Operations Cost on Rochester Bypass

Operating Year	Average Manifest Trains/Day	Avg. Loaded Coal Trains Trains/Day	Loaded Tons/Train	Maximum Operating Days/Yr	Average Total Trips/Day	Coal Tonnage Per Year	Increased Cost/Yr	Present Value @7% Yr 2001	Comments
DM&E Est.*		6.7	16,403	365	13.4	40,000,000	$503,000 **		DM&E Verified Statement *
2001		0	0			0	$0	0	No Bypass Operations
2002		0	0			0	$0	0	No Bypass Operations
2003		0	0			0	$0	0	No Bypass Operations
2004	2	7	16,403	365	16	40,000,000	$600,597	490,266	First Year Bypass Operations
2005	2	10	16,403	365	22	60,000,000	$825,821	630,015	
2006	2	12	16,403	365	26	70,000,000	$975,970	695,853	
2007	2	13	16,403	365	28	80,000,000	$1,051,045	700,356	
2008	2	15	16,403	365	32	90,000,000	$1,201,194	748,043	
2009	2	17	16,403	365	36	100,000,000	$1,351,343	786,494	
2010	2	17	16,403	365	36	100,000,000	$1,351,343	735,041	
2011	2	17	16,403	365	36	100,000,000	$1,351,343	686,954	
2012	2	17	16,403	365	36	100,000,000	$1,351,343	642,013	
2013	2	17	16,403	365	36	100,000,000	$1,351,343	600,013	
2014	2	17	16,403	365	36	100,000,000	$1,351,343	560,759	
2015	2	17	16,403	365	36	100,000,000	$1,351,343	524,074	
2016	2	17	16,403	365	36	100,000,000	$1,351,343	489,789	
2017	2	17	16,403	365	36	100,000,000	$1,351,343	457,747	
2018	2	17	16,403	365	36	100,000,000	$1,351,343	427,801	
2019	2	17	16,403	365	36	100,000,000	$1,351,343	399,814	
2020	2	17	16,403	365	36	100,000,000	$1,351,343	373,658	17th Year Bypass Operations
						Totals	**$20,870,746**	**9,948,690**	

Notes:

1) Trips Per Day includes 2 Manifest Trains beginning in 2004
2) Net Tons/Car 121.5 * Cars/Train 135 *
3) Net Tons Per Loaded Train = 16,403*
4) Locomotives 4-4,400 HP *
5) Increased Cost Per Trip Per Day $102.84 **
6) Discount Interest Rate 0.07
7) BaseYear 2001
8) Increased cost: Fuel $393,000+Crew Cost $110,000 = $503,000 **
or $102.84 Per Trip ($503,000/365D/Y/13.4 T/D) **
9) U.S. ARMY CORPS OF ENGINEERS 404 PERMIT APPLICATION - POWDER RIVER BASIN TRANSPORTATION PROJECT
PART 6 - "DM&E's expected schedule for construction of the proposed project (rehabilitation and new construction) is three years from the time all federal, state and local permits have been received. DM&E requests that the 404 permit be issues for a 5-year construction period to account for the magnitude for the project and the time required for final regarding, revegetation and mitigation activities".

* The data used as the basis for these computations was taken from the verified statement of:
William R. Otter, Jr.
Director-Rail Operations
Fredrich R. Harris , Inc. for DM&E Railroad
July 12, 1999
STB Finance Document No. 33047

local shipper service via the existing track through the City of Rochester. The combination of the coal and manifest trains resulted in an average of 36 trains on the bypass per day at the 100 million ton level.

The DEIS indicated there would be a total of 37 trains on Alternate R-4 at this level, however, this analysis incorrectly assumes that no traffic would remain on the existing route. The actual number of train trips per day may vary due to logistical considerations such as shipper requirements, weather and maintenance factors, equipment and personnel availability, and operational scheduling by the mines.

The analysis depicted on Table 4 provides a representative estimate based on the information provided by the DM&E and the experience of other Class I railroads that are providing comparable service to a wide range of shippers. Numerous operational factors can influence operational costs and may cause them to vary over time, e.g., day to day and year to year. However, the approach used to prepare this estimate is considered sound and indicative of costs that may be incurred by the DM&E when they operate over the Rochester bypass.

The discount rate used in the present value analysis was obtained from U.S. Office of Management and Discounts (Federal Register Nov. 10, 1992) Budget Circular A-94 on Benefit – Cost Analysis of Federal Programs; Guidelines and Discounts (Federal Register November 10, 1992). The 7 percent rate was also cited in the "Recommended standard values for use in economic analysis" by the Minnesota Department of Transportation, Office of Investment Management, December 1999.

Bernard H. Ortgies, P.E.
Vice President
Wilbur Smith Associates

Verification

I, Bernard H. Ortgies, verify under penalty of perjury under the laws of the United States, that the foregoing is true and correct. Further, I certify that I am qualified and authorized to file this verified statement. Executed on March 1, 2001.

Bernard H. Ortgies

Notary Public

My Commission Expires: June 19, 2003

NOTARY PUBLIC - STATE OF FLORIDA
JANICE L. TIGHE
COMMISSION # CC842568
EXPIRES 6/19/2003
BONDED THRU ASA 1-888-NOTARY1

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APPENDIX A

SURFACE TRANSPORTATION BOARD DOCUMENT No. 33407

DAKOTA, MINNESOTA & EASTERN RAILROAD CORPORATION

CONSTRUCTION INTO THE POWDER RIVER BASIN

Appendix to Verified Statement Prepared by

Bernard H. Ortgies, P.E., V.P
Wilbur Smith Associates

TECHNICAL MEMORANDUM – VIBRATION ANALYSIS

Prepared by

B. R. Mian, P.E.
S. Chakraborty, Ph.D.
Bernard H. Ortgies, P.E.

Wilbur Smith Associates

Wilbur Smith Associates

DM&E Study – DEIS Review

Technical Memorandum – Vibration Analysis

As requested, we have reviewed the vibration related sections of the Draft Environmental Impact Study (DEIS) prepared by Wilson, Ihrig & Associates for the DM&E Railroad[1]. The DEIS is not site specific and therefore, only contains a general evaluation based on topographical maps of the area and information available in the literature. The DEIS states that the following factors are important in a vibration study:

- Characteristics of the source;
- Weight and length of the train, along with speed of travel;
- Site geology;
- Impact criteria, and;
- Type of structure.

This memorandum provides an overview of the steps that are required to quantify the impact of ground borne vibrations for this project, the results of a general assessment analysis, recommendations for further analysis, and preliminary recommendations for mitigation.

I. Screening Procedure

This first step involves the identification of potential noise and vibration receivers close to the proposed right of way within certain screening distances. In addition to identification, this step classifies the structures into several broad categories based on sensitivity (residential, industrial, high sensitivity structures with low vibration tolerances). Typically, the acceptable ground borne vibration criteria are expressed in terms of Root Mean Square (RMS) velocity levels in decibels (VdB referenced to 1 micro inch/sec). Velocity itself may be specified in terms of either a Peak Particle Velocity (PPV), which indicates the absolute maximum value, or a RMS Velocity, which is an average of the squared amplitude over some interval of time. The PPV value has a greater impact on the structural integrity of the building, while human perception is affected more by the RMS level. Acceptable limits for each category are as follows[2]:

Category 1 – High sensitivity. Usually includes vibration sensitive research and manufacturing facilities and hospitals with vibration sensitive equipment like Magnetic Resonance Imaging (MRI) machines and electron microscopes. Ground borne vibration impact levels are restricted to a maximum of 65 VdB, although the performance of certain equipment may require even lower levels.

Category 2 – Residential buildings. Levels restricted to 72 VdB for frequent events (more than 70 vibration events per day) and 80 VdB for infrequent events.

Category 3 – Institutional land use with primarily daytime use. Levels restricted to 75 and 83 VdB for frequent and infrequent events.

The screening procedure has been conducted for the proposed railway on a preliminary basis in the DEIS. Potentially sensitive structures have been identified, notably the Charlton North Diagnostic Facility housing sensitive equipment about 850 ft from the rail line, and the PEMSTAR manufacturing facility about 150 ft from the line. A more complete list is contained in Table 1.

II. General Assessment

This step is used to develop a curve defining vibration levels as a function of distance from the track. The ground borne vibration amplitude at specific locations identified in the screening process may be estimated from such a curve. The curve is generalized (not site specific) and provides a conservative estimate of the overall levels that might be expected. It does not account for the frequency response characteristics of the path (ground) and the receiver (building spectra), or the degree of coupling between them.

Harris, Miller, Miller and Hanson Inc.[2] have presented a series of standard curves for three broad categories (locomotive powered freight, light rail, and rubber-tired traffic) which may be used for general assessment purposes. The curves are defined at specific operating velocities (50 mph for locomotive powered freight traffic), and provide conservative Root Mean Square (RMS) velocity level estimates as a function of distance from the track. The RMS velocity may be adjusted for certain site specific factors, which include the following: operating speed, condition and stiffness of suspension/wheels on train cars, nature and condition of the rail and support system (ties, ballast etc.), geologic conditions, and receiver characteristics of the superstructure.

We have conducted a general assessment concerning the severity of ground borne vibration impact at the Federal Medical Center, Charlton North Diagnostic Facility, and the Pemstar Manufacturing locations.The ground borne vibration levels were estimated following the procedure outlined by Harris, Miller, Miller & Hanson, Inc. [2] The procedure involves the computation of RMS velocity levels (ground borne vibration, in VdB) as a function of distance from the track for various levels of track loading/train type. The procedure is not site specific, and in most cases, provides an upper bound estimate for the anticipated vibration level. The procedure also accounts for certain factors affecting the vibration source and the propagation path,

Table 1

Wilbur Smith Associates

DM&E Study

City of Rochester Sensitive Vibration Site Analysis

Control Point Description	RR MP	CL Track Dist.	Notes
East Circle Drive	47.0	-	GCX
Federal Medical Center	47.5-47.8	150' South	Electronic Surveillance Systems
Eleventh Ave NE	48.4	-	GCX
Holmes Elementary School	48.4	450' South	School
Town Hall Estates Nursing Home	48.7	300' South	Special Care Facility
Silver Lake Drive	49.0	-	GCX
Begin RPU Power Plant Spur	49.0	-	Rail Switch
Broadway (TH63)	49.1	-	GCX
Avalon Hotel	49.1	150' South	NRHS
Rochester Armory	49.1	550' South	NRHS
First Ave NW	49.2	-	GCX
Mayo Clinic Complex	49.2	1,800' South	Sensistive Electronic Equipment
Methodist Hospital	49.2	1,200' South	Sensistive Electronic Equipment
Whiting House	49.2	400' South	NRHS
Charter House Assisted Living & Advanced Care Community	49.25	650' South	Special Care Facility
Charlton North Diagnostic Facility	49.25	850' South	10 MRI Stations
Begin South Siding	49.3	-	Rail Switch
Fourth Ave NW	49.4	-	GCX
Begin Siding for SE Rochester Spur	49.4	-	Rail Switch
Sixth Ave NW	49.5	-	GCX
End South Siding	49.5	-	Rail Switch
Begin North Commercial Siding	49.65	-	Rail Switch
Eleventh Ave NW	50	-	GCX
Switch End North Commercial Siding	50.5	-	Rail Switch
Begin NW Rochester Spur Track	50.65	-	Rail Switch
Pemstar Manufacturing Building	51.0	150' South	Sensitive Electronics Manufacturing
Seventh Street NW	51.3	-	GCX

GCX - At Grade Rail Crossing
NRHS - National Register of Historic Sites

including the following: condition of rail and wheels, presence of crossovers and special trackwork, the use of specialized track support systems, geologic conditions (if known), and characteristics of the receiver (foundation, structure type) etc.

Federal Medical Center and Pemstar Manufacturing Facility

The vibration impact criteria for facilities of this type is usually limited to 65 VdB. Specific instruments within the facility may require even lower levels. Based on our calculations, we estimate that the vibration impact criteria at the Federal Medical Center and the Pemstar plant will be exceeded by the operation of unit coal trains using the proposed DM&E Railroad at a distance of 150 feet from the facility. This estimate is based on the following assumptions:

i. Trains run at 45 to 49 mph.
ii. The suspension and wheels on the train, as well as the rail, are well maintained.
iii. No special track support system has been used (floating slabs, ballast mats etc.).
iv. No crossovers/special trackwork on the rails.

Under the conditions stated above, the vibration levels are expected to be between 68 and 71 VdB. These levels may increase by 10 to 20 VdB due to improper maintenance and track/wheel wear.

Charlton North Facility

The Charlton North medical facility is located approximately 850 feet from the track, and about 1000 feet from several rail switches associated with existing rail sidings and spurs. No guidelines have been provided forthese distances (850 and 1000 feet) in the FTA manual[2]. The vibration impact at this location may not exceed the impact criteria (65 VdB). However, the MRI systems housed at this facility may specifically require lower vibration levels for proper operation.

General Assessment Summary

The general assessment analysis indicates that the following conclusions and recommendations are appropriate.

- The vibration impact will exceed the limiting criteria for some of the sites listed in Table 1.
- Mitigation will be required to reduce the impact to the sensitive receptors.
- Due to the number and type of sensitive sites through City of Rochester, mitigation should be provided between East Circle Drive (DM&E MP 47.0) to Seventh Street NW (DM&E MP 51.3).
- Detailed Analysis as described below should be undertaken to ensure that the mitigation will effectively reduce the impacts to acceptable levels.

III. Detailed Analysis

This work is typically carried out during the final stages of planning, and would involve sophisticated testing and analysis in a site-specific manner. The detailed analysis would provide accurate projections of vibration impact, along with the criteria for final design of mitigation measures. The Detailed Analysis procedures are summarized as follows.

- Survey and characterization of existing vibrations: The levels of background and existing railroad induced ground vibration at chosen locations are determined during this step. The DEIS states that the current levels of vibration cannot be exceeded along the proposed alternatives. Data collection will be required at a number of locations such as the Federal Medical Center, Mayo Clinic (MRI locations) and the PEMSTAR manufacturing plant. Other sites may be identified during the development of the test plan.
- Prediction of future vibration and impact: This step typically involves performing in-situ site-response measurements. The test data is used to develop measured force functions and transfer mobility functions that characterize the propagation from the source (RR) to the receiver. The procedure requires the use of specialized receivers (accelerometers or geophones), digital data acquisition systems, spectrum analyzers, and signal processing software, in addition to highly trained personnel. In essence, the technique is used to normalize the vibration model and remove the effects of the travel path.

The Detailed Analysis will provide the guidelines for final design of the mitigation measures. The measures adopted are based on the particular site, and may include one or more of the following as applicable:

- Adequate wheel/rail maintenance – badly maintained wheels (including wheel "flats") and rail track may contribute as much as 20 dB to vibration levels. Since most practical vibration control measures cannot attenuate vibration beyond about 15 to 20 dB, proper maintenance schedules play a vital role in mitigation measures.
- Location of special trackwork – the presence of turnouts and crossovers may significantly increase vibration levels. It is thus preferable to locate such trackwork away from sensitive receivers as far as practically possible. If such cannot be done, crossovers may be designed specifically to produce lower levels of vibration.
- Design/modify track support systems – the track support system may be optimized over certain frequency bands (typically between about 15 to 40 Hz) in order to reduce vibration at the source. This is usually accomplished using one or more of the following devices: resilient fasteners, ballast mats on concrete pads, resiliently supported ties, floating slabs (concrete slabs on resilient elements), and straightness specifications for rail.

- Isolation of sensitive buildings – In certain cases it may be cost effective to isolate one or more sensitive structures impacted by ground borne vibration. The foundations may be modified to provide vibration isolation for the entire structure. Certain floors may be stiffened or otherwise isolated if the vibration criteria impact instruments operating only at that level.
- Trenches – trenches may be used either near the track (active isolation) or closer to a specific structure (passive isolation) in order to provide mitigation. The trenches may be filled with foam or other material, or left open supported by sheet piling. It should be noted that not much experience is available with this particular technique within the United States.
- Operating speed – limitations may be imposed on the operating speed of the trains. A halving in train speed typically results in a reduction of about 6 dB in vibration amplitude.
- Ground modification – the soil next to the track may be physically or chemically altered (grouting etc.) in order to diminish amplitude and increase the attenuation characteristics of the source to receiver path.

IV. Recommendations

DM&E should be required to manage its maintenance program to ensure that the track and switch conditions, and on track equipment do not generate excessive vibration due to the condition of the facilities and equipment. In addition the following mitigation methodologies should be employed as a minimum:

- Installation of rubber tie plate insulators
- Installation of floating slab or subbase below the ballast.

These elements are estimated to cost on a per mile basis as follows.

Rubber tie plate insulation pads: two per tie, 2,850 ties per mile @ $3 each, or $17,100 per mile

Asphalt Concrete Subbase: 8" thick, 12' wide, @150 lb/cf @$30 per ton or $95,040 per mile

We further recommend that a site-specific detailed assessment(s) be performed at sensitive sites in Rochester to better characterize the vibration levels and develop criteria for final design of the mitigation elements.

References:

1. *"Draft Environmental Impact Statement"*. Finance Docket No. 33407 – Dakota, Minnesota, & Eastern Railroad Corporation, Powder River Basin Expansion Project, Surface Transportation Board, Washington, DC 20423
2. "*Transit Noise and Vibration Impact Assessment*". Final Report, 1995. Prepared by Harris, Miller, Miller & Hanson, Inc. for the U.S. Department of Transportation, Federal Transit Administration, DOT-T-95-16.

Prepared by: B.R. Mian, P.E., S. Chakraborty, Ph.D., & B.H. Ortgies, P.E., V.P.

VERIFIED STATEMENT OF TERRY A. SPAETH

ROCHESTER AREA RAIL SHIPPER INFORMATION

My name is Terry Spaeth. I am the Administrative Assistant for the City of Rochester, Minnesota. I have been in this position for 3.5 years. For 11 years prior to that, I was employed as a land use planner for the Rochester – Olmsted Planning Department. My mailing address is 201 4th Street SE, Rochester, Minnesota 55904.

On or about December 1, 2000, I contacted the Rochester area rail shippers listed at 3.3 – 53 of the DEIS. These businesses either receive or ship freight from their facilities via the DM&E railroad line in the Rochester area. I asked several questions pertaining to their specific rail service usage and needs. These questions are found on the attached survey forms. The question that that this specific verified statement is concerned with, is as follows: **"Would your business shipping needs benefit from the larger rail cars that can accommodate 315,000 pounds, and could possibly be utilized if the DM&E Railroad were to make improvements to its rail line facilities in the City of Rochester?"**

Mr. Tom Williamson, Rochester Public Utilities Silver Lake power plant supervisor, indicated that there would potentially be only a slight benefit to RPU because it could mean less rail cars that need to be unloaded.

Mr. Gary Sheehan, Seneca Foods Corporation manager, indicated that it would not be of any additional benefit to their company because they generally do not load more than 145,000 lbs. on a rail car.

Mr. Pete Lang, Tamarack Materials manager, indicated that on occasion, larger rail cars would be of some benefit, depending upon the amount of drywall materials they are expecting to receive with a shipment.

Mr. DuWayne Schmiedeberg, General Warehouse manager, indicated that he did not feel that larger rail cars would be of any significant benefit to the users of their warehouse facility. He also indicated that the NW spur line that serves their business has been broken since earlier this fall, and that no rail service is presently being provided to their facility because of that. He also indicated that a representative from DM&E indicated that they were not sure if they were going to repair the broken track by spring 2001.

Mr. Bill Kucherik, United Building Center manager, indicated that larger rail cars would not be of any benefit to their business since they are such an infrequent user of rail service.

Mr. Eugene Jennings, owner of Rochester Iron & Metal Recycling indicated that larger rail cars could potentially be of benefit, because of better freight rates, but mentioned that is only of benefit to them if the whole route from origin to destination can accommodate the larger rail cars.

Mr. Mike Kuhlmann, representative of Greenway (formerly Agro Distribution) in Byron, Minnesota indicated that larger rail cars may potentially be of benefit to their business if it means that freight rates can be competitive with trucking.

Mr. Harold Hinkle, representative from TexPar Energy, Inc. indicated that if the rail service becomes more economically feasible for them, they would possibly benefit from being able to utilize the larger rail cars.

INFORMATION RELATED TO POTENTIAL VIBRATION IMPACTS

I have reviewed the Table 3.2 – 21 of the DEIS, and am not able to ascertain where SEA has arrived at the figures for the number of structures potentially impacted by vibration within the City of Rochester. Table 3.2 – 21 indicates that there are 14 structures potentially impacted by vibration located within 100 feet of the DM&E rail line, and that there are an additional 72 structures located between 101 and 200 feet of the rail line, and an additional 168 structures between 201 and 400 feet of the DM&E rail line. This provides for a total of 254 structures potentially impacted by vibration.

Please note that the numbers in Table 3.2 – 21 also do not correspond to the numbers contained in Table 5.1 –10 of the DEIS. Table 5.1 – 10 suggests potential damage to 32 structures within

100 feet of the DM&E rail line, inconvenience to 180 structures within 200 feet, and 364 structures within 400 feet of the DM&E rail line.

In February, 2001, I had requested that the Rochester – Olmsted Planning Department staff provide information related to numbers of parcels and structures located within the potential vibration impact zone of 400 feet of the DM&E rail line. Utilizing the Olmsted County Geographic Information System (GIS) and parcel data from the Olmsted County Assessor's Real Property Data Base, the Planning Department has provided the following information (as also indicated in the verified statement prepared by Phil Wheeler). Within 100 feet of the centerline of the DM&E rail line there are 22 structures, between 101 and 200 feet, there are an additional 99 structures (121 total), and between 201 and 400 feet, there are an additional 249 structures, for a total of **370** structures. A total of 269 of those 370 above mentioned structures are utilized for residential purposes, and contain a total of 390 dwelling units. In addition to those structures, there are other potential sensitive receptors within the area, such as the Federal Medical Center and the PEMSTAR manufacturing facility.

REAL PROPERTY MARKET VALUE INFORMATION

For the purpose of obtaining information related to real property market value information, I had requested that the Rochester – Olmsted Planning Department utilize their GIS system to overlay the 65 decibel noise level contour zone, as indicated by the noise study performed for the City of

Rochester by Wm. H.O. Kroll & Associates, with the year 2000 parcel information provided by the Olmsted County Assessor's Real Property Data Base system.

The Kroll noise study has identified the 65 decibel noise level contour line to extend approximately 1260 feet on both the north and south sides of the existing DM&E line through the City of Rochester, and reflects both wayside and horn noise. Within that noise contour zone, their lies a total of 2133 parcels of land. Of those, there are 442 parcels identified as having no building value (in other words, vacant parcels). Based upon the Olmsted County Assessor's records, these 442 vacant parcels have a year 2000 market value of $9,080,200. The remaining 1691 parcels have both a land and building value assigned to them. The total land value on those 1691 parcels is $48,700,700, and the building value on those 1691 parcels is $323,279,900.

The total land and building value on the 2133 parcels within the 65 decibel level noise contour zone, based upon the Olmsted County Assessor's records is $381,060,800.

VERIFICATION

STATE OF MINNESOTA

COUNTY OF OLMSTED

I, Terry Spaeth, being duly sworn, depose and say that I have read the foregoing statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

Subscribed and sworn to before me this 27th day of February, 2001.

Terry A. Spaeth

EILEEN SCHNEIDER
Notary Public
Minnesota
My Commission Expires Jan. 31, 2005

Notary Public

My Commission Expires 1-31-05

QUESTIONS FOR DM&E ROCHESTER AREA LOCAL SHIPPERS

1. What is the name of your company?

   Rochester Public Utilities
   Tom Williamson

2. At what address do you receive DM&E service?

   425 west Silver Lake Drive

3. How many train carloads (loaded and empty) do you receive and/or ship annually using the DM&E service?

   Recently, approximately 650 full carloads annually.

4. Is this annual number likely to decrease, increase or stay the same in future years? If you project increases or reductions, please estimate the percentage or numerical change you expect in your annual carloads.

   Increase, shipments are based on electrical generation required under generation sales contracts.

5. Please describe the service that you receive from the DM&E.

   a. Approximately how many days per year does the DM&E either deliver cars to you or receive cars from you?

      120 days (3 days per week about 40 weeks per year)

   b. Is there a specific (monthly/weekly) schedule for your shipments from/to the DM&E or does it vary throughout the year?

      Normally cars arrive between February 1 and December 1, with the most arriving in the summer months.

   c. Are carloads brought to or taken directly from your company by a through train? If yes, estimate the number of through trains that stop at your facility annually.

      No.

6. If you receive loaded or empty train carloads from the DM&E via a local switch engine describe:

   a. Where the DM&E will typically decouple your cars from the through train.

      Unknown

   b. Where the DM&E will store the cars until the switch engine delivers it to your company.

      At times, on the siding located along 7th Street NE.

7. Are there any movements other than direct movements in to or out of your facility, such as back and forth movements, that are needed for the DM&E to serve to your facility? If so, please describe these movements and their approximate annual frequency.

   No.

8. Would your business shipping needs benefit from the larger rail cars that can accommodate 315,000 pounds and could possibly be utilized if the DM&E Railroad were to make improvements to its rail line facilities in the City of Rochester?

   Indicated that there would potentially be only a slight benefit to RPU because it could mean less rail cars to unload.

9. Has the DM&E advised you of any improvements or changes in your services that are likely to result from approval of its Powder River Basin proposal pending before the STB? If so, please describe.

   Yes. Nothing has been formally proposed. They have indicated that changes to the siding may be required in order to deliver cars to the location.

QUESTIONS FOR DM&E ROCHESTER AREA LOCAL SHIPPERS

1. What is the name of your company?

   Rochester Iron & Metal Recycling (ship out recyclables)
   Gene Jennings, 288-3228

2. At what address do you receive DM&E service?

   1950 - 3rd Avenue SE

3. How many train carloads (loaded and empty) do you receive and/or ship annually using the DM&E service?

   Gene would not answer this question directly, due to his concerns about competitors seeing the information. He did indicate they receive rail service nearly every day.

4. Is this annual number likely to decrease, increase or stay the same in future years? If you project increases or reductions, please estimate the percentage or numerical change you expect in your annual carloads.

   Project steady increase based upon $1 million equipment expenditures that facilitates the use of rail cars. His business is dependent upon rail service.

5. Please describe the service that you receive from the DM&E.

   a. Approximately how many days per year does the DM&E either deliver cars to you or receive cars from you?

      Nearly every business day.

   b. Is there a specific (monthly/weekly) schedule for your shipments from/to the DM&E or does it vary throughout the year?

      Varies - notify railroad on a month to month basis.

   c. Are carloads brought to or taken directly from your company by a through train? If yes, estimate the number of through trains that stop at your facility annually.

      No.

6. If you receive loaded or empty train carloads from the DM&E via a local switch engine describe:

   a. Where the DM&E will typically decouple your cars from the through train.

      Rochester (probably at the siding adjacent to DM&E office).

   b. Where the DM&E will store the cars until the switch engine delivers it to your company.

      Rochester (on side track adjacent to Seneca Foods).

7. Are there any movements other than direct movements in to or out of your facility, such as back and forth movements, that are needed for the DM&E to serve to your facility? If so, please describe these movements and their approximate annual frequency.

   No.

8. Would your business shipping needs benefit from the larger rail cars that can accommodate 315,000 pounds and could possibly be utilized if the DM&E Railroad were to make improvements to its rail line facilities in the City of Rochester?

   Would possibly be of benefit because of potentially better freight rates, but also indicated that it is only of benefit to them if the whole route from origin to destination can accommodate larger rail cars.

9. Has the DM&E advised you of any improvements or changes in your services that are likely to result from approval of its Powder River Basin proposal pending before the STB? If so, please describe.

   Gene indicated that DM&E had indicated to him that they did not foresee any changes to current rail service with the proposed project.

QUESTIONS FOR DM&E ROCHESTER AREA LOCAL SHIPPERS

1. What is the name of your company?

   Seneca Foods
   Gary Sheehan, 280-4500

2. At what address do you receive DM&E service?

   330 - 20th Street SE

3. How many train carloads (loaded and empty) do you receive and/or ship annually using the DM&E service?

   Average approximately 500 per year over last few years. In past years, have had as many as 1,000 per year.

   - Receive seed via train.
   - Ship out frozen and canned goods.

4. Is this annual number likely to decrease, increase or stay the same in future years? If you project increases or reductions, please estimate the percentage or numerical change you expect in your annual carloads.

   Likely stay the same, possibly increase in the future.

5. Please describe the service that you receive from the DM&E.

   a. Approximately how many days per year does the DM&E either deliver cars to you or receive cars from you?

      Depends on car availability. Average approximately 3 days per week.

   b. Is there a specific (monthly/weekly) schedule for your shipments from/to the DM&E or does it vary throughout the year?

      Varies.

   c. Are carloads brought to or taken directly from your company by a through train? If yes, estimate the number of through trains that stop at your facility annually.

      No.

6. If you receive loaded or empty train carloads from the DM&E via a local switch engine describe:

   a. Where the DM&E will typically decouple your cars from the through train.

      Rochester (near DM&E rail yard).

   b. Where the DM&E will store the cars until the switch engine delivers it to your company.

      Rochester (by DM&E rail yard or side rail by Seneca Foods).

7. Are there any movements other than direct movements in to or out of your facility, such as back and forth movements, that are needed for the DM&E to serve to your facility? If so, please describe these movements and their approximate annual frequency.

   No.

8. Would your business shipping needs benefit from the larger rail cars that can accommodate 315,000 pounds and could possibly be utilized if the DM&E Railroad were to make improvements to its rail line facilities in the City of Rochester?

   Larger cars would not be of any additional benefit because they generally do not load more than 145,000 pounds on a rail car.

9. Has the DM&E advised you of any improvements or changes in your services that are likely to result from approval of its Powder River Basin proposal pending before the STB? If so, please describe.

   DM&E has sent letters to the company. Gary did not know specifics of the letters.

QUESTIONS FOR DM&E ROCHESTER AREA LOCAL SHIPPERS

1. What is the name of your company?

   Tamarack Materials (lumber and drywall)
   Pete Lang, 280-8800

2. At what address do you receive DM&E service?

   1638 - 3rd Avenue

3. How many train carloads (loaded and empty) do you receive and/or ship annually using the DM&E service?

   Get in approximately 5 rail cars weekly which equates to 260 carloads annually.

4. Is this annual number likely to decrease, increase or stay the same in future years? If you project increases or reductions, please estimate the percentage or numerical change you expect in your annual carloads.

   Stay the same, but possibly increase (annual growth 15%).

5. Please describe the service that you receive from the DM&E.

   a. Approximately how many days per year does the DM&E either deliver cars to you or receive cars from you?

      Average 1 car per day.

   b. Is there a specific (monthly/weekly) schedule for your shipments from/to the DM&E or does it vary throughout the year?

      Varies throughout the year.

   c. Are carloads brought to or taken directly from your company by a through train? If yes, estimate the number of through trains that stop at your facility annually.

      No.

6. If you receive loaded or empty train carloads from the DM&E via a local switch engine describe:

   a. Where the DM&E will typically decouple your cars from the through train.

      Minnesota City. They are decoupled from BN and hauled west on the DM&E line.

   b. Where the DM&E will store the cars until the switch engine delivers it to your company.

      If on rear of large through train, they will drop directly in Rochester. If in middle or front of through train, they will store in Waseca.

7. Are there any movements other than direct movements in to or out of your facility, such as back and forth movements, that are needed for the DM&E to serve to your facility? If so, please describe these movements and their approximate annual frequency.

   No.

8. Would your business shipping needs benefit from the larger rail cars that can accommodate 315,000 pounds and could possibly be utilized if the DM&E Railroad were to make improvements to its rail line facilities in the City of Rochester?

   Possibly so, but it would be dependent upon the amount of drywall materials they are expecting to receive with each shipment.

9. Has the DM&E advised you of any improvements or changes in your services that are likely to result from approval of its Powder River Basin proposal pending before the STB? If so, please describe.

   Person indicated that possibly the business manager had been contacted by DM&E, but did not know for sure.

QUESTIONS FOR DM&E ROCHESTER AREA LOCAL SHIPPERS

1. What is the name of your company?

   General Warehouse
   DuWayne Schmiedeberg, Manager, 288-8855

2. At what address do you receive DM&E service?

   2915 Valleyhigh Drive NW

3. How many train carloads (loaded and empty) do you receive and/or ship annually using the DM&E service?

   100 – 150 cars annually (mostly canned vegetables from the Lakeside Foods Processing Plant in Plainview, Minnesota).

4. Is this annual number likely to decrease, increase or stay the same in future years? If you project increases or reductions, please estimate the percentage or numerical change you expect in your annual carloads.

   The warehouse manager indicated that DM&E told them there is a bad section of track on that spur that needs to be repaired. He also informed me that DM&E told him that they may repair it next spring, but there is a chance they may not repair it at all. If that happens, the tenants who use the rail will leave for warehouse service elsewhere.

5. Please describe the service that you receive from the DM&E.

   a. Approximately how many days per year does the DM&E either deliver cars to you or receive cars from you?

      2-3 times per week.

   b. Is there a specific (monthly/weekly) schedule for your shipments from/to the DM&E or does it vary throughout the year?

      Varies.

   c. Are carloads brought to or taken directly from your company by a through train? If yes, estimate the number of through trains that stop at your facility annually.

      No.

6. If you receive loaded or empty train carloads from the DM&E via a local switch engine describe:

   a. Where the DM&E will typically decouple your cars from the through train.

      The warehouse manager thinks they decouple the cars at the siding near TH 52 and 7th Street NW.

   b. Where the DM&E will store the cars until the switch engine delivers it to your company.

      Same location as above.

7. Are there any movements other than direct movements in to or out of your facility, such as back and forth movements, that are needed for the DM&E to serve to your facility? If so, please describe these movements and their approximate annual frequency.

   No.

8. Would your business shipping needs benefit from the larger rail cars that can accommodate 315,000 pounds and could possibly be utilized if the DM&E Railroad were to make improvements to its rail line facilities in the City of Rochester?

   Would not be of any significant benefit to the users of their warehouse facility. He indicated that the Nw spur line that serves their facility has been broken since earlier this fall, and that no rail service is presently being provided to their facility because of that. Also indicated that a DM&E representative indicated they were not sure if the broken track would be repaired by spring of 2001, or if at all for that matter.

9. Has the DM&E advised you of any improvements or changes in your services that are likely to result from approval of its Powder River Basin proposal pending before the STB? If so, please describe.

   No.

QUESTIONS FOR DM&E ROCHESTER AREA LOCAL SHIPPERS

1. What is the name of your company?

   IBM
   Bob Maroo

2. At what address do you receive DM&E service?

   3605 Highway 52 North

3. How many train carloads (loaded and empty) do you receive and/or ship annually using the DM&E service?

   Once every 3-5 years. They use rail service for bringing large equipment (boilers, etc.) to the plant site.

4. Is this annual number likely to decrease, increase or stay the same in future years? If you project increases or reductions, please estimate the percentage or numerical change you expect in your annual carloads.

   Not likely to increase use.

5. Please describe the service that you receive from the DM&E.

   a. Approximately how many days per year does the DM&E either deliver cars to you or receive cars from you?

      N/A

   b. Is there a specific (monthly/weekly) schedule for your shipments from/to the DM&E or does it vary throughout the year?

      No.

   c. Are carloads brought to or taken directly from your company by a through train? If yes, estimate the number of through trains that stop at your facility annually.

      No.

6. If you receive loaded or empty train carloads from the DM&E via a local switch engine describe:

   a. Where the DM&E will typically decouple your cars from the through train.

      Rochester.

   b. Where the DM&E will store the cars until the switch engine delivers it to your company.

      Rochester.

7. Are there any movements other than direct movements in to or out of your facility, such as back and forth movements, that are needed for the DM&E to serve to your facility? If so, please describe these movements and their approximate annual frequency.

   No.

8. Would your business shipping needs benefit from the larger rail cars that can accommodate 315,000 pounds and could possibly be utilized if the DM&E Railroad were to make improvements to its rail line facilities in the City of Rochester?

   N/A

9. Has the DM&E advised you of any improvements or changes in your services that are likely to result from approval of its Powder River Basin proposal pending before the STB? If so, please describe.

   No.

QUESTIONS FOR DM&E ROCHESTER AREA LOCAL SHIPPERS

1. What is the name of your company?

   UBC - United Building Center
   Bill Kucherik, 288-2433

2. At what address do you receive DM&E service?

   2751 - 7th Street NW

3. How many train carloads (loaded and empty) do you receive and/or ship annually using the DM&E service?

   One train carload of lumber material per year in 1999. None so far in 2000.

4. Is this annual number likely to decrease, increase or stay the same in future years? If you project increases or reductions, please estimate the percentage or numerical change you expect in your annual carloads.

   Likely to stay the same or decrease in future years.

5. Please describe the service that you receive from the DM&E.

   a. Approximately how many days per year does the DM&E either deliver cars to you or receive cars from you?

      1 per year.

   b. Is there a specific (monthly/weekly) schedule for your shipments from/to the DM&E or does it vary throughout the year?

      No specific schedule.

   c. Are carloads brought to or taken directly from your company by a through train? If yes, estimate the number of through trains that stop at your facility annually.

      No.

6. If you receive loaded or empty train carloads from the DM&E via a local switch engine describe:

   a. Where the DM&E will typically decouple your cars from the through train.

      Rochester.

   b. Where the DM&E will store the cars until the switch engine delivers it to your company.

      Rochester.

7. Are there any movements other than direct movements in to or out of your facility, such as back and forth movements, that are needed for the DM&E to serve to your facility? If so, please describe these movements and their approximate annual frequency.

   None.

8. Would your business shipping needs benefit from the larger rail cars that can accommodate 315,000 pounds and could possibly be utilized if the DM&E Railroad were to make improvements to its rail line facilities in the City of Rochester?

   No, since they are such an infrequent rail service user.

9. Has the DM&E advised you of any improvements or changes in your services that are likely to result from approval of its Powder River Basin proposal pending before the STB? If so, please describe.

   No (may have received an update letter on the project from DM&E).

QUESTIONS FOR DM&E ROCHESTER AREA LOCAL SHIPPERS

1. What is the name of your company?

   Greenway (Formerly known as Agro Distribution)
   Mike Kuhlmann – 775-2323

2. At what address do you receive DM&E service?

   302 Front St. – Byron, MN.

3. How many train carloads (loaded and empty) do you receive and/or ship annually using the DM&E service?

   It varies, dependent upon freight rates. Some years they may ship out up to 500 car loads of grain, other years it may be as low as 25 carloads. They also indicated that they receive up to 80% of their fertilizer via rail service.

4. Is this annual number likely to decrease, increase or stay the same in future years? If you project increases or reductions, please estimate the percentage or numerical change you expect in your annual carloads.

   It depends upon freight rates. If freight rates are competitive with trucking, they will use more rail service.

5. Please describe the service that you receive from the DM&E.

   a. Approximately how many days per year does the DM&E either deliver cars to you or receive cars from you?

      Varies substantially. They typically ship out grain from May through November.

   b. Is there a specific (monthly/weekly) schedule for your shipments from/to the DM&E or does it vary throughout the year?

      Varies throughout the year.

   c. Are carloads brought to or taken directly from your company by a through train? If yes, estimate the number of through trains that stop at your facility annually.

      They are generally brought in 10 rail cars via a wayfreight.

6. If you receive loaded or empty train carloads from the DM&E via a local switch engine describe:

   a. Where the DM&E will typically decouple your cars from the through train.

      Trains are decoupled on the siding track at Greenway. There run adjacent to the through line track in Byron.

   b. Where the DM&E will store the cars until the switch engine delivers it to your company.

      N/A

7. Are there any movements other than direct movements in to or out of your facility, such as back and forth movements, that are needed for the DM&E to serve to your facility? If so, please describe these movements and their approximate annual frequency.

   No

8. Would your business shipping needs benefit from the larger rail cars that can accommodate 315,000 pounds and could possibly be utilized if the DM&E Railroad were to make improvements to its rail line facilities in the City of Byron?

   They would utilize larger rail cars if freight rates were competitive by utilizing the larger rail cars.

9. Has the DM&E advised you of any improvements or changes in your services that are likely to result from approval of its Powder River Basin proposal pending before the STB? If so, please describe.

   They receive periodic mailing updates from DM&E.

VERIFIED STATEMENT

OF

KIM M. HANSON

My name is Kim M. Hanson. I currently serve as a Senior Clerk Typist in the City of Rochester's Administrator's office under the direction of the City Administrator, Assistant City Administrator and the Development Administrator. I have held this position for 16 years.

I reviewed 29 VCR tapes from a camera that was posted at two different locations – one being at the Senior Citizen's Center building on Broadway and the other from the Charter House directly across from the DM&E office area between 4th Avenue NW and 1st Avenue NW. The dates of the videotapes of the train traffic were October 17, 2000 through November 17, 2000.

I reviewed these tapes on a Panasonic Color Monitor with a Time Lapse VCR. This enabled me to stop and view the trains as they were crossing the intersections at a slower speed.

You will find attached a Through Trains summary, Switching Movements SE Spur summary, SE Spur Line Trains summary and a North Broadway Main Line Short Trains summary. This information was tabulated and summarized after reviewing all 29 tapes.

The tapes will be available for review during regular working hours at City Hall, 8:00 a.m. to 5:00 p.m., Monday through Friday at the City Administrator's office, 201 4th Street SE, Room 266 - City Hall, Rochester, Minnesota 55904-3781.

VERIFICATION

STATE OF MINNESOTA

COUNTY OF OLMSTED

I, Kim M. Hanson, first being duly sworn, depose and say that I have read the forgoing statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

Subscribed and sworn to before me this 4th day of January, 2001.

Kim M. Hanson

Kim M. Hanson

Notary Public

My Commission Expires 1-31-05

LISA MICHELE MULLENBACH
Notary Public
Minnesota
My Commission Expires Jan. 31, 2005

THROUGH TRAINS

(Over 23 cars in length for purposes of analysis)

DATE	# OF TRAINS	LENGTH (# OF CARS)
10-17-00	3	47, 93, 53
10-18-00	3	120, 90, 50
10-19-00	1	113
10-20-00	1	81
10-21-00	3	71, 72, 116
10-22-00	3	115, 80, 79
10-23-00	2	75, 76
10-24-00	3	59, 83, 87
10-25-00	2	88, 72
10-26-00	3	99, 82, 80
10-27-00	2	91, 126
10-28-00	1	78
10-29-00	No taping was done during this day.	-
10-30-00	No taping was done during this day.	-
10-31-00	No taping was done during this day.	-
11-01-00	0	-
11-02-00	3	86, 110, 75
11-03-00	3	99, 66, 60
11-04-00	3	85, 81, 131
11-05-00	2	46, *, 72
11-06-00	3	86, 56, 74
11-07-00	2	70, 105
11-08-00	1	61
11-09-00	5	110, 74, 72, 114, 83
11-10-00	2	121, 51
11-11-00	3	122, 73, 139
11-12-00	3	74, 94, 67
11-13-00	2	75, 81
11-14-00	3	73, 94, 68
11-15-00	3	58, 50, 113
11-16-00	2	54, 73
11-17-00	3	93, 69, 115
Total # of Trains	70	
Averages	2.4	83.6

*Over 59 cars counted when tape ended.

Switching Movements SE Spur

(Note: The number 2 represents 1 train each direction)

Date	Number of Trains
October 17, 2000	**0**
October 18, 2000	**2**
October 19, 2000	**2**
October 20, 2000	**0**
October 21, 2000	**0**
October 22, 2000	**0**
October 23. 2000	**2**
October 24, 2000	**2**
October 25, 2000	**2**
October 26, 2000	**4**
October 27, 2000	**2**
October 28, 2000	**0**
October 29, 2000	**No taping during this day**
October 30, 2000	**No taping during this day**
October 31, 2000	**No taping during this day**
November 1, 2000	**3**
November 2, 2000	**0**
November 3, 2000	**4**
November 4, 2000	**0**
November 5, 2000	**0**
November 6, 2000	**3**
November 7, 2000	**0**
November 8, 2000	**3**
November 9, 2000	**0**
November 10, 2000	**1**
November 11, 2000	**0**
November 12, 2000	**0**
November 13, 2000	**3**
November 14, 2000	**2**
November 15, 2000	**1**
November 16, 2000	**1**
November 17, 2000	**0**
Avg. # of Movements	**1.28**

SE SPUR LINE TRAINS

Date	Number of Cars	Direction
10-18-00	3	east
10-19-00	6	west
10-23-00	1	east
10-24-00	1	east
10-24-00	1	west
10-25-00	6	east
10-25-00	5	west
10-26-00	5	west
10-26-00	2	east
10-27-00	2	east
11-01-00	1	southeast
11-01-00	3	northwest
11-01-00	3	northeast
11-03-00	3	west
11-03-00	2	northwest
11-03-00	2	northwest
11-06-00	5	southeast
11-06-00	4	northwest
11-08-00	6	northwest
11-10-00	4	northwest
11-13-00	1	southeast
11-13-00	1	northwest
11-13-00	1	northwest
11-14-00	2	east
11-14-00	2	west
11-15-00	1	west
11-16-00	6	east
	Total # of Trains	27
	Total # of Cars	79
	Average # of Cars	2.93

NORTH BROADWAY
MAIN LINE
SHORT TRAINS

Date	Number of Cars	Direction
10-18-00	9	west
10-18-00	9	east
10-18-00	10	west (backwards)
10-19-00	3	east
10-19-00	7	west
10-20-00	10	west (backwards)
10-23-00	1	east
10-23-00	20	west
10-23-00	20	east
10-24-00	16	west (backwards)
10-25-00	10	east
10-25-00	4	west (backwards)
11-14-00	10	west
11-14-00	10	east
11-14-00	10	west
11-14-00	6	east
11-14-00	10	west
11-14-00	10	east
11-14-00	7	west
11-16-00	6	west
11-16-00	13	west (backwards)
11-16-00	1	east
11-17-00	8	east
11-17-00	15	west
11-17-00	15	east
11-17-00	3	west
11-17-00	1	east
Total # of cars	244	
Total # of trains	27	
Average # of cars	9	

1737
COM

rpu

we pledge, we deliver

October 20, 1998

Honorable Vernon A. Williams, Secretary
Surface Transportation Board
1925 K Street, N.W.
Washington, DC 20423-0001

RE: Finance Docket No. 33407
Dakota, Minnesota & Eastern Railroad Corporation (DM&E)
Construction Into The Powder River Basin

Dear Secretary Williams:

By letter dated February 9, 1998, Rochester Public Utilities (RPU) advised Chairperson Morgan of its support of the DM&E expansion into the Wyoming Powder River Basin. Since that date it has been suggested that RPU's letter may appear to be in conflict with the position of the City of Rochester that the environmental degradation resulting from the projected 37 coal trains per day would be so substantial that DM&E should construct a route around Rochester.

In order to eliminate any potential confusion, RPU wishes to amend its earlier letter. RPU continues to believe that the introduction of competitive service to the Powder River Basin would be in its interest as well as that of other coal users. However, as reflected in the National Environmental Policy Act, environmental impacts cannot be ignored. The more we learn about the impacts that DM&E operations will have on Rochester, the more convinced we are that those impacts can only be fully mitigated if the DM&E constructs a route around the City. While such a route undoubtedly will be more expensive, that expense is no different conceptually than other expenses that electric generators have been required to incur in order to reduce environmental damage.

RPU urges the Surface Transportation Board to utilize its powers to obtain the best result for all concerned; a new railroad for Powder River Basin service operating on a route that avoids the heart of Rochester.

Respectfully submitted,

Larry J. Koshire

Larry J. Koshire, P.E.
RPU General Manager

c: Honorable Linda Morgan (courtesy copy)
Honorable Gus Owen (courtesy copy)
Mr. Gary Neumann, City of Rochester
✓ bc: Mr. Steve Kalish, McCarthy, Sweeney & Harkaway

Rochester Public Utilities, 4000 East River Road NE, Rochester, MN 55906-2813
telephone 507.280.1540 facsimile 507.280.1542

Dakota, Minnesota and Eastern Railroad Corporation Application to extend Rail Service into the Powder River Basin

STB Finance Docket No. 33407

Verified Statement prepared by Charles Reiter, AICP, Principal Planner, Rochester-Olmsted Planning Department, 2122 Campus Drive SE, Rochester, MN. 55904

My name is Charles Reiter and I am employed with the Rochester-Olmsted Planning Department, which is the public agency providing land use and transportation planning services for the City of Rochester and Olmsted County, Minnesota. My title with the department is Principal Planner, and my primary responsibility is the management and execution of transportation planning activities for the department. I have been employed full time by the Planning Department since February, 1977, and have been in charge of transportation planning activities within the agency since 1985.

In my review of the Draft Environmental Impact Statement (DEIS) I have identified a number of concerns and issues. These include what I believe to be the use of inaccurate data in various analyses, errors or flaws in the methodology used for analysis purposes, incorrect conclusions as to the significance of impact and, in certain instances, a failure to identify or consider mitigation for conditions representing major impact to the community.

In my verified statement I will be addressing the following areas of concern:

1. Transportation
2. Noise and Vibration
3. Sidings

I. TRANSPORTATION

There are various errors and issues associated with the transportation analysis contained in the DEIS that I will address in this section of my verified statement. These include

a) the use of inaccurate base data;

b) the use of criteria to assess the significance of impact which 1) treat communities differently, or 2) analyze relative impact, showing WHERE the impact would be greatest along the corridor but not addressing whether the level of impact IS significant;
c) the use of methodologies which do not fully describe the transportation impact of the proposal and the level of degradation that would occur in the City of Rochester;
d) an assessment which does not consider the cumulative impact of the proposal to the transportation system;

In response to these issues and concerns with the DEIS, I will offer in the next part of this verified statement an alternative analysis that in my professional judgment addresses the shortcomings of the DEIS and quantifies more accurately the transportation system impact that would occur to the City of Rochester. As part of this discussion I will also identify feasible and reasonable mitigation that addresses the impact this analysis quantifies. The analysis will:

a) consider impacts at the crossing, corridor and system level;
b) consider not only individual motorist delay and increases in accidents at individual crossings, but corridor and system level impacts of the proposed project;
c) demonstrate that there is significant transportation impact to the City of Rochester as a result of adding 34 additional trains per day into the community which justifies the improvements included in Rochester's proposed mitigation alternatives.

Part 1: Summary of Issues and Concerns with the DEIS

A) Inaccurate Data used in Transportation Assessment

A number of instances were found in the DEIS where erroneous or out-of-date data were used in a transportation analysis that affect the results of an analysis and the conclusions drawn from that analysis. In addition, there are instances where data that one would expect to be consistent (such as the volume of vehicular traffic at highway-rail crossings) was found to be different in the safety and traffic delay analysis. The use of these flawed datasets affects the analysis in a number of ways, including overstating existing conditions relative to future conditions, as well as understating future conditions and thus minimizing the

magnitude of change expected as a result of the project. The use of erroneous or flawed data was found in both the safety analysis and the transportation systems analysis.

The areas in which I have identified concerns with base data used in the transportation system analysis are the following:

1. Assumptions regarding vehicular traffic at highway-rail crossings;
2. Existing and future train traffic;
3. Assumptions in Rochester Bypass Alternatives R-3/R-4 regarding the type of grade crossing protection to be used on the bypass route;
4. Inaccuracies in the data used for the analysis of predicted accidents at highway-rail crossings.

1. Vehicular Traffic Assumptions at Highway-Rail Crossings

In my initial review of the accident prediction and traffic delay analysis it was apparent that the vehicular traffic volumes utilized did not reflect current traffic volumes observed at various highway crossings of the DM&E corridor. There appeared to be multiple errors, including traffic counts that were out of date as well as traffic counts at certain low volume crossings that were much higher than expected. An effort was undertaken to verify the year of the counts used in the accident prediction and traffic delay analysis using readily available datasets, including the Minnesota Department of Transportation (MNDOT) State Aid Count Maps and the Federal Railroad Administration (FRA) Grade Crossing Inventory Database. From this assessment it appears that the vehicular traffic counts that were used by the DEIS range from 6 to 12 years old, with the 1994 State Aid Count Map being the source for many of crossing counts used in the analysis.

Exhibit A summarizes my findings as to the vehicular traffic data that was used in the accident prediction and traffic delay analysis. Included in the table is the count data used in each DEIS analysis, the source of the count where it could be verified, and identification of those crossings where the count is clearly in error, which primarily occurs in the R-3/R-4 Bypass alternatives. Page 2 of Exhibit A identifies the specific errors in the R-3/R-4 alternatives, which involve the use of traffic counts that are higher than exist, resulting in an

overstatement of traffic conditions in terms of delay or predicted accident levels on the bypass.

The use of out-of-date data affects the assessment of accident levels, since the use of old, lower traffic levels will understate predicted accidents. Using lower traffic volumes also affects the traffic delay analysis in terms of estimating potential queuing impacts and the number of vehicles impacted by train delay.

More current traffic counts were available that could have been used to complete various traffic related analysis. MNDOT's State Aid Count program is conducted on a four-year cycle, meaning 1998 data would have been available from MNDOT for every crossing. In fact, The Southern Minnesota Rail Corridor Safety Plan[1] identified traffic counts at every highway-rail crossing in the State of Minnesota using data available through 1998. Another source of current data that could have been utilized (and was submitted as part of the City of Rochester's January 4, 1999 submittal on the Final Scope of the EIS) were count estimates prepared by the Rochester-Olmsted Council of Governments[2] for all crossings on the existing DM&E corridor as well as the proposed bypass corridor. In fact, as noted in Exhibit A, it appears these count estimates were utilized when no other source of data was available, yet older data was used on other crossings.

2. Train Traffic Assumptions

The DEIS overstates existing train traffic levels, identifying 12 trains per day as the existing level of traffic on the corridor between the cities of Lewiston and Waseca in Southeastern Minnesota. As described elsewhere in the City of Rochester's response to the DEIS, data supports the fact that the actual number of existing trains is less than three per day. The use of 12 trains as the baseline affects the accident prediction analysis and the traffic delay analysis by inflating the level of existing accidents and traffic delay and thus minimizing the

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[1] Southern Minnesota Rail Corridor Safety Plan, February 15, 2000, prepared by Short, Elliot, Hendrickson, Inc. for the Minnesota Department of Transportation.

[2] Rochester-Olmsted Council of Governments (ROCOG) is the federally designated planning agency for carrying out mandated transportation planning activities under Federal Statutes applicable to transportation. ROCOG's offices are at 2122 Campus Drive SE, Rochester, MN. - Phone (507-285-8232)

change in impact that would be created by the proposed increase to a higher level of train traffic.

I would also note in Appendix G, Traffic and Transportation, the DEIS goes through great detail identifying the amount of traffic delay that would occur at each individual grade crossing under six different scenarios, taking into account three different levels of annual coal traffic (20, 50 and 100 million tons) and two different train lengths (6400' and 7400'). The analysis assumes, however, that the number of trains per day would be the same under both train lengths. In fact, using 6400' trains will increase the number of trains needed to ship 50MT of coal from 18 to 20 trains per day, and to ship 100MT of coal from 34 to 40 trains per day. Exhibit B illustrates the calculations that I completed to illustrate the difference between the number of 6400' and 7400' trains needed to ship various levels of coal.

The difference in the number of trains will affect the outcome of the accident prediction analysis that was completed as part of the safety assessment and will have an affect on the traffic delay assessment that was completed as part of the transportation system assessment.

3. Grade Crossing Protection assumptions used in Rochester Bypass Alternatives R-3/R-4

Appendix H contains the results of the safety analysis, which looked at existing and predicted accident levels to determine where a significant increase in predicted accidents could be expected. The analysis relies on the methodology developed by the FRA, which accounts for the type of grade crossing protection present, the number of tracks, the number of roadway lanes, the type of roadway surface and historic accident levels in the calculation of predicted accidents.

Tables 3-MN-H191 to H195 in Appendix H list the results of the accident analysis for alternatives R-3 and R-4. In reviewing this table one can see the assumptions that were used in the accident prediction formula. For the purposes of this study, the analysis assumed that passive grade crossing protection would be utilized at every crossing (this is

found in the column entitled "Proposed Device") and that all of the roadway corridors were paved (this is found in the column entitled "Hwy Paved, Yes=1, No=2).

It is my assessment that the assumption that all crossings would be protected with passive devices in the R-3/R-4 alternative is flawed. The applicant has proposed in the various community plans they have presented to local jurisdictions a set of criteria that identifies what type of grade crossing protection would be used at crossings with various levels of vehicular traffic. These criteria are illustrated in Exhibit C. MNDOT also has criteria that they utilize to determine the appropriate level of grade crossing protection published in the *Railroad-Highway Grade Crossing Issues*[3], illustrated in Exhibit D

Using the applicant's criteria, I have assessed the base level of grade crossing protection that should have been used in completing the accident analysis for alternatives R-3/R-4. This is illustrated in Exhibit E. I have also included in that table a listing of which roadways are paved and which are gravel surfaced, which should be reflected in the analysis as well.

The use of incorrect crossing protection assumptions and pavement surface type affects the outcome of the accident prediction analysis and will result in an overstatement of the number of accidents that can be expected in Alternatives R-3/R-4 compared to Alternative R-2.

4. Errors in Accident Analysis Input Data

In reviewing the accident analysis input data in Appendix H it appears there are some errors regarding the factors that are used in the analysis. This includes incorrect data regarding the number of highway lanes and the number of tracks at certain crossings, and the characterization of tracks as either mainline or local service tracks. Exhibit F is a table of crossings on the existing corridor which identifies the assumptions used in the analysis and the correct data based on our findings in the field. Photos of the crossings with incorrect data have been provided to illustrate the correct crossing information.

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[3] *Railroad-Highway Grade Crossing Issues*, Office of Railroads and Waterways, Minnesota Department of Transportation, 1996, pp. 15-18

Another apparent error in the analysis is the breakdown that was used consistently throughout the accident analysis regarding the number of day and night trains. The FRA Handbook on the Grade Crossing Inventory file indicates that equal 12 hour periods are used to define the daytime and nighttime hours of operations, with day hours extending from 6 AM to 6 PM and night hours beginning at 6 PM through to 6 AM. If the proposed traffic is occurring equally throughout the day, the number of daytime trains should be 50% of the total daily trains. Throughout Appendix H in all the tables one can see that the assumption used is that 2/3 of the train traffic would be daytime traffic and only 1/3 would be nighttime traffic. This error (using a noise-based definition of day and night rather than a traffic-based definition) will affect the outcome of the accident prediction analysis as assumptions regarding vehicular traffic distribution and historic accident adjustment factors are affected by the distribution of day/night train traffic.

B) The methodology used for assessing traffic related impact contains a number of flaws including:

a) in the case of safety analysis, the use of criteria that treat communities differently;

b) in the case of traffic delay, the use of measures that primarily measure relative impact

c) in the case of traffic delay, the use of an overly simplistic methodology that is based on faulty reasoning and which does not capture the full extent of system impact.

1. Safety Analysis - using criteria that treat communities differently

For impact categories where conditions can be quantitatively measured the DEIS typically establishes criteria for the purpose of assessing whether the level of impact due to the project is significant. For the Safety / Accident Analysis conducted as part of the DEIS, an existing accident rate threshold was established as a baseline for the purpose of categorizing crossings into one of two groups. For intersections with higher existing accident rates, referred to as "Group A" crossings, a smaller increase in accidents due to the project is considered to be more significant than for crossings in "Group B". The DEIS established different thresholds in each state for the Group A/B breakdown, as reported on page H-4 of Appendix H. The minimum accident rate needed to qualify as a Group A crossing in each state is as follows:

- Minnesota – Frequency of 1 accident every 8 years, or 12.5 every 100 years
- South Dakota – Frequency of 1 accident every 20 years, or 5 every 100 years
- Wyoming – Frequency of 1 accident every 40 years, or 2.5 every 100 years

The significance of the classification into Group A or B is that in Group A an increase in accident rate of 1 additional accident every 100 years due to the project is considered to be significant, while in Group B an increase of 5 additional accidents every 100 years is needed before it is considered significant.

It appears on its face that this system places motorists in Minnesota at a much higher risk for accident without consideration of the need for a higher level of grade crossing protection than it does motorists in either South Dakota or Wyoming. A crossing in Wyoming with an existing accident rate of 2.6 accidents every 100 years, if predicted to experience an increase of 1 additional accident, will be considered significantly impacted. Conversely, in Minnesota, a crossing with an existing accident rate of 12 accidents every 100 years would not be considered to be significantly impacted unless the predicted accident rate after construction equaled or exceeded 17 accidents every 100 years. Thus, the grade crossing accident rate in Minnesota before a potentially significant impact is identified needs to be over four and one-half times higher than the rate in Wyoming.

The system the DEIS establishes for assessing accident-related safety risk does not equitably measure the risk of accident to drivers across the three state area and therefore will understate the significance of impact to residents of Minnesota communities. It would seem that a similar level of accident increase, no matter where it occurs in the 3-state area affected by the project, should be treated equally; thus, one set of criteria should apply uniformly across the project area.

The criteria established for Minnesota and applied within Olmsted County to Alternative R-2 (existing corridor upgrade) suggest only one crossing, US Trunk Highway 63 (Broadway Ave) would be significantly impacted by the projected increase in accidents due to the project. My interpretation of this finding, which the DEIS does not comment on, is that except for the crossing at TH 63 the grade crossing protection currently in place at all other

crossings throughout the City of Rochester and Olmsted County is adequate to address the safety impact of the project.

Alternatively, if the South Dakota criteria were applied to Alternative R-2, the number of significantly impacted crossings identified in Olmsted County would increase to 15, and with the Wyoming standards the number of impacted crossings would be 25 out of a total of 34 crossings in Olmsted County. In the City of Rochester, only one crossing (TH 63) is significantly impacted according to the Minnesota criteria, but 7 out of 11 at-grade crossings would be significantly impacted using the South Dakota criteria and all 11 crossings would be identified as significantly impacted using the Wyoming criteria. Exhibit G contains our analysis of accident projections using the criteria from each state to assess the impact to each crossing.

It appears what the DEIS method is doing is in fact a de-facto prioritization scheme and not an impact assessment, based on the concept that only highway-rail grade crossings that have an existing accident rate in the top 50 of a given state are worthy of the tougher scrutiny allotted to crossings placed in Group A. The thresholds established for each state were checked against the FRA PCAPS database to verify that the thresholds represented the 50th highest accident rate in the state. By using the 50th highest accident rate, the methodology significantly narrows the window of impacted grade crossings that are placed in Group A in a state such as Minnesota, with a high number of crossings statewide (5147), versus a state such as Wyoming, with only 516 crossings statewide. In Minnesota, only 1% of all crossings in the state, and only one on the entire DM&E system, are classified as Group A crossings. Comparatively, in Wyoming over 10% of the crossings in the state fall into Group A with the much lower threshold of only 2.5 accidents every 100 years. An analysis of the PCAPS database for each state illustrating the percentage of crossings that would fall in Group A using the thresholds for Minnesota, South Dakota and Wyoming is included as Exhibit H.

The use of the 50th highest highway-rail crossing accident rate in a state as a threshold seems to be derived from the prioritization process used by a number of states to allocate highway-rail crossing safety funds. It is not a measure of impact but a relative measure of comparative priority that would typically be used in allocating scarce program dollars. In my professional judgment the criteria used to measure impact should be the same in across the

project area, not differentiated by state, and not based on the 50th highest grade-crossing accident rate in each state.

2. **Traffic Delay Analysis – use of criteria that measure relative impact**

Appendix G of the DEIS describes the methodology used for assessing the traffic delay that would be created by the train traffic resulting from the project. It is key to understand that, as noted on page G-5 of Appendix G, that "LOS (Level of Service) criteria presented in the Highway Capacity Manual (HCM) for two-way stopped control (TWSC) intersections may not be completely representative of the conditions at highway/rail intersections. However, the thresholds can be beneficial if used as a *measurement for ranking* the crossings in terms of delay severity." (emphasis added). The DEIS acknowledges with this statement that the traffic delay data presented is relevant primarily for comparing on a relative basis the various highway-rail crossings and not as a measure of absolute impact.

3. **Traffic Delay Analysis – comments on the manner in which Level of Service (LOS) is utilized:**

The manner in which LOS analysis is utilized in the DEIS raises a number of methodological concerns from my perspective as a transportation professional:

- First, LOS as established in the HCM is a qualitative measure of traffic impact based on empirical observation of conditions at street intersections. The necessary empirical observation needed to develop relevant LOS criteria for highway-rail crossings has not been completed by the transportation research community.

- Second, the assumption that TWSC operations are similar in nature to the judgment that a motorist needs to exercise at a highway-rail crossing seems to mischaracterize what happens at a highway-rail crossing. Operations at a TWSC intersection rely on motorist judgment regarding the adequacy of gaps in the through traffic flow of the crossing street, while at a highway-rail crossing the judgment exercised by a motorist is limited to only a small proportion of drivers during the short period of time when a train is approaching a crossing with non-gated control.

The judgment that is required of motorists at a highway-rail crossing seems more similar to that exercised at a signalized intersection, where decisions during the amber phase of the signal cycle require motorists to judge whether to proceed or stop. Furthermore, as with signalized intersections, traffic flow characteristics at a highway-rail crossing are highlighted by zero flow rates when the crossing is interrupted by a passing train, just as signalized intersections are highlighted by zero flow rates during the red phase of the signal. Common transportation references that draw the analogy between signalized intersections and highway-rail crossings include theTraffic Flow Fundamentals[4] and Traffic Flow Theory: Transportation Research Board Special Report 165[5];

- Third, the methodology takes a procedure (LOS as utilized in the HCM) that is designed for peak hour analysis and applies it to a 24 hour period. The standard HCM approach uses the peak hour as the critical time of the day during which to measure traffic impact. The methodology used in the DEIS will effectively mask critical conditions observed during the higher volume hours of the day by averaging out conditions over 24 hours.

  Traffic can vary across the 24 hours of a day by an order of factor of 100 or more, yet the analysis utilized in the DEIS would suggest that the impact would be the same in the middle of the night as during the afternoon rush hour, as shown in the following calculations using the formulas found in Appendix G and project information from the DEIS. For the purposes of this comparison, I am using data from Table 3-MN-G38 in Appendix G, FRA Crossing ID 193282A, which is 11th Ave NW in Rochester. I have used traffic data collected by the City of Rochester to determine the hourly traffic % for the PM Peak Hour and Nighttime Low Hour values that are reported in the table. This information will be made available to the SEA at its request.

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[4] May, Adolf D,, Traffic Flow Fundamentals, University of California, Prentice-Hall Inc,, 1990, Chapter 12, Queuing Analysis, Section 12.2.3

[5] Gerlough, Daniel L. and Huber, Matthew J., Traffic Flow Theory, Transportation Research Board Special Report 165, National Academy of Sciences, Washington D.C., 1975, Section 8.6.1

	Traffic	# of Trains (N)	Blocked Crossing Time per Train (TB)	Average Vehicular Delay (TD)	Average Delay for All Vehicles
Formula from DEIS for Daily Computation			L/(Vx88)+0.5 (page G-2 of App G)	0.5xTB+0.3 (page G-2 of App G)	TBxNxTDx(24/1440)x0.0833 (page G-4 of App G)
Formula Adapted to Hourly Calculation			Same	Same	TBxNxTDx(24/60)x0.0833 (page G-4 of App G)
Daily Value	12400	37	2.37 Min (45 MPH / 7400')	1.5 Min (0.5x2.37+0.3)	10.84 seconds 2.37x37x1.5x(24/1440)x0.0833
PM Peak Hour Value (4-5 PM – 9.34% of ADT)	1158	1.54	2.37 Min (45 MPH / 7400')	1.5 Min (0.5x2.37+0.3)	10.84 seconds 2.37x1.54x1.5x(24/60)x0.0833
Nighttime Low Hour Value (2-3 AM – 0.22% of ADT)	27	1.54	2.37 Min (45 MPH / 7400')	1.5 Min (0.5x2.37+0.3)	10.84 seconds 2.37x1.54x1.5x(24/60)x0.0833

- Fourth, the results that are presented in the DEIS do not identify transportation "system" impact but simply report in the impact of a single train on an individual motorist. The DEIS fails to consider or analyze the system impact in any of the urban areas bisected by the DM&E rail corridor. Reviewing the results in the DEIS for any "homogenous" section of the corridor (i.e., a section where train traffic and train speed are constant, such as the Lewiston to Owatonna corridor in which Rochester is located), one can see that the average delay per motorist is exactly the same at every crossing no matter the traffic volume or number of highway lanes on the crossing street. This is can be seen by looking at page 1 (of 5) in Table 3-MN-G5 for the Lewiston to Owatonna section of the corridor and Table 3 – MN – G37 for the Rochester section of the corridor. Every crossing, ranging from a traffic volume as low as 39 ADT at milepost 2300 to as high as 19,200 ADT at milepost 004910 in Rochester, the average delay per vehicle is reported to be exactly the same, at 9.8 seconds.

C) The DEIS does not address the environmental impact of the proposed activities in line with the general guidance established in the Final Scoping Document issued on

March 5, 1999, thus failing to adequately describe and assess the level of degradation that the project will create in the City of Rochester;

1. Transportation System Impacts

Impact Category #11 on page 27 of the Final Scoping Document, "Transportation Systems", identified that the EIS would "describe the potential effects of the new rail line construction and operation on the existing transportation network in the project area", and would "propose mitigative measures to minimize or eliminate potential adverse project impacts to transportation systems, as appropriate".

The analysis contained in the DEIS is not a "system" analysis but an analysis of impacts to individual motorists at individual crossings. As shown in the following chart, transportation system impact can occur at multiple levels in a transportation system, yet the DEIS reports only on impact to individual motorists and only at the level of individual highway-rail crossings.

Table 1

	Number of Trains Considered	Number of Motorists Considered	Number of Crossings Considered	Time Period Considered
This is what the DEIS Considers ➲	One Train	One Motorist	One Crossing	Closure due to one train
This is not ➲ considered by DEIS	Peak Hour Trains	Peak Hour Motorists	All or a Subset of Crossings	Closure due to peak hour trains
This is not ➲ considered by DEIS	Daily Trains	Daily Motorists	All or a subset of Crossings	Closure due to daily trains
This is not ➲ considered by DEIS	Annual Trains	Annual Motorists	All or subset of crossings	Closure due to annual trains

The analysis should have looked at a number of factors including different scales of time and geography to adequately analyze how the project affects the transportation system. Most analysis done for highway projects considers both peak hour and daily effects. The

DEIS looks only at effects to individual driver at one crossing created by a single train passing a location.

As the analysis methodology is currently structured, the operative factor in determining whether any impact of significance occurs to the transportation system is train speed. Reviewing the equations that are utilized in estimating the Criteria of Significance emphasizes how important train speed is to the analysis. The first criteria, increase in absolute delay to motorists stopped by a train, states that an increase of 30 seconds per driver must occur for it to be significant. This calculation depends on only two factors, the speed of the train and the length of the train. Given the comparative parameters of the existing train traffic and coal train traffic, it is readily evident there will be no finding of impact as train speeds increase from 20 MPH to 47 MPH, even with train lengths increasing from 5450' to 7400'. In fact, the calculations can be reworked taking 30 seconds as a given and assuming existing and proposed train lengths, and find that if train speed increases by as little as 2 mph, the conclusion will be that there is no impact.

The second criteria relates to an adapted Level of Service analysis which states that the delay created by trains at a crossing during the course of a day, when averaged out across all motorists using the crossing, must exceed 20 seconds (in the least restrictive finding). Again, the equations used take into account variables that are directly related to the train traffic, in this case train speed, train length, and the number of trains per day. One can again work backwards taking the critical delay factor (20 seconds) and determine, if train speed and length are given, how many trains per day would be needed to reach 20 seconds of delay per driver at a crossing. Given 47 MPH trains and 7400' trains as proposed in the project, that number is 73 trains per day. Again, the calculations as presented do not take vehicle traffic into account; whether a grade crossing is used by 500 or 50,000 cars a day, the results of the analysis would be the same – 20 seconds of delay is not reached until there are 73 trains per day.

We took the formulas for calculating Level of Service utilized in the DEIS for the Powder River Basin Project as well as the recent Canadian National / Illinois Central merger proposal to evaluate the impact of changes in different factors on the outcome of the analysis. The following tables illustrate the results of this analysis, and provide further proof that traffic levels are a minor consideration and train speed is the major factor in

the Level of Service analysis. In these tables we first compare different levels of traffic assuming constant train speed and length; the results of this show no change when using the DEIS formulas and some increase when using the CN/IC formulas. In the second set of calculations in each table we vary the train length, increasing it by 50%, and the result is a much more significant change than resulted from increasing the ADT from 2,000 to 50,000 (2400%). Finally, in the third part of each table we reduced the speed by approximately 50%, and see increases significantly larger than that created by either the traffic increases or train length increases tested. This conclusively demonstrates that train speed and not traffic is the major consideration in the transportation system analysis completed for the DEIS

Table 2

Traffic Delay Analysis
STB Methodology in DM&E Powder River Basin
Case

	## of Lanes	ADT	Train Speed	Train Length	Trains per Day	Trains per Hour	Total Blocked Time/Train (minutes)	Crossing Delay per Stopped Veh (min)	Average Delay for all Vehicles (sec/ veh)	Percentage Change in Delay over Baseline
Baseline	4	2,000	45	6400	37	1.54	2.12	1.4	8.86	
@ various	4	10,000	45	6400	37	1.54	2.12	1.4	8.86	0%
traffic	4	25,000	45	6400	37	1.54	2.12	1.4	8.86	0%
levels	4	50,000	45	6400	37	1.54	2.12	1.4	8.86	0%
Change	4	2,000	45	9600	37	1.54	2.92	1.8	15.88	79%
due to	4	10,000	45	9600	37	1.54	2.92	1.8	15.88	79%
train	4	25,000	45	9600	37	1.54	2.92	1.8	15.88	79%
length	4	50,000	45	9600	37	1.54	2.92	1.8	15.88	79%
Change	4	2,000	25	6400	37	1.54	3.41	2.0	21.06	138%
due to	4	10,000	25	6400	37	1.54	3.41	2.0	21.06	138%
train	4	25,000	25	6400	37	1.54	3.41	2.0	21.06	138%
speed	4	50,000	25	6400	37	1.54	3.41	2.0	21.06	138%

Traffic Delay Analysis

STB Methodology in CN/IC

Case

	## of Lanes	ADT	Train Speed	Train Length	Trains per Day	Trains per Hour	Total Blocked Time/Train (minutes)	Crossing Delay per Stopped Veh (min)	Average Delay for all Vehicles (sec/ veh)	Percentage Change in Delay over Baseline
Baseline	4	2,000	45	6400	37	1.54	2.12	1.1	7.01	
@ various	4	10,000	45	6400	37	1.54	2.12	1.1	7.46	6%
traffic	4	25,000	45	6400	37	1.54	2.12	1.3	8.48	21%
levels	4	50,000	45	6400	37	1.54	2.12	1.7	11.00	57%
Change	4	2,000	45	9600	37	1.54	2.92	1.5	13.38	191%
due to	4	10,000	45	9600	37	1.54	2.92	1.6	14.24	191%
train	4	25,000	45	9600	37	1.54	2.92	1.8	16.19	191%
length	4	50,000	45	9600	37	1.54	2.92	2.3	21.00	191%
Change	4	2000	25	6400	37	1.54	3.41	1.7	18.18	260%
due to	4	10000	25	6400	37	1.54	3.41	1.8	19.35	260%
train	4	25000	25	6400	37	1.54	3.41	2.1	22.01	260%
speed	4	50,000	25	6400	37	1.54	3.41	2.7	28.54	260%

I will further illustrate my point regarding the importance train characteristics play as opposed to other traffic by using information found in Attachment G-1 of the Final Environmental Impact Statement for the proposed CONRAIL Acquisition, dated May, 1998. In that analysis only 2 locations were identified as having the potential for significant transportation impact. The common characteristic of these locations is the low train speeds (20 MPH or less) that existed. ADT volumes at these locations were as low as 5023 ADT with projected train traffic levels increasing from 21 to 47 trains per day. Other locations in the study with much higher ADT (up to 15,600 in one case) with similar train level increases (23 to 41 per day) did not meet the significance threshold, a fact that can be attributed primarily to higher assumed train speeds (15 MPH vs 30 MPH). While the number of motorists affected was much greater at crossings with high ADT, the only crossings identified as significantly impacted were those with low train speeds. The conclusion to be drawn that is relevant to the Powder River project is that

the methodology used, being influenced primarily by train speed, will always find there is NO IMPACT when train speeds are increased unless there is a dramatic increase in train traffic, much higher than that even proposed in this application.

The overall conclusion to be drawn from the previous four pages of discussion is that attempting to use a single measure to capture the complexity of factors that will affect impact transportation system performance results, particularly for periodic events that significantly impede the operation of the system, is very difficult at best. An adequate analysis to fully assess the impact to the transportation system should, I believe, include the following characteristics

1. It should assess crossing level impacts
2. It should assess corridor level impacts
3. It should assess system level impacts

Out of necessity such an analysis would need to include a mix of analysis and screening steps, focusing more effort on locations of critical concern rather than treating all crossings to one simple level of analysis. The analysis in the DEIS does not really provide any useful information except to inform us that each individual train will create less delay as it passes by a grade crossing.

In Part 2 of this section I will address the factors that I believe should have been addressed in the analysis and provide results of this analysis in terms of the City of Rochester alternatives.

2. The Use of only Historic ADT

The DEIS analysis is further flawed in that it fails to take into account reasonably expected future conditions, in conflict with 40 CFR 1508.7, as referenced below:

Sec. 1508.7 Cumulative impact.

"Cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes

such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The traffic and safety analysis in the DEIS assumes a static level of ADT at each crossing and that only train traffic will increase. The use of static traffic levels potentially understates the significance associated with future accident rate increases at highway-rail crossings and future traffic delay increases at crossings. As a result, it does not accurately assess conditions that will exist in the community in the future and thus could miss identifying the need for mitigation to address impacts that the project is contributing to. As an illustrative example, assume the following conditions at an at-grade crossing:

Current train traffic – 3 trains per day	Projected train traffic – 37 trains per day
Current vehicular traffic – 10,000 ADT	Projected vehicular traffic – 15,000 ADT

Using exposure (train traffic x ADT) as an illustrative measure to assist in making the point that static traffic assumptions can lead to preparers missing potential future impacts, let's assume for a moment that an exposure threshold of 500,000 is a key measure of impact. Let's look at how the numbers would work in this case:

- Current exposure
  3 trains x 10,000 vehicles = 30,000 exposures

- Future exposure using DEIS method of holding everything static except train traffic-
  37 trains x 10,000 vehicles = 370,000 exposures

- Future exposure using expected condition of both train traffic and vehicular traffic growth
  37 trains x 15, 000 vehicles = 555,000 exposures

If 500,000 is the key threshold, an evaluation prepared using the DEIS assumption of static traffic conditions would suggest no critical impact is expected, even though the real expected impact of 555,000 exposures suggests that indeed mitigation needs to be considered in response to future conditions. The point of this analogy is to indicate that the DEIS approach of using no community change can miss potentially significant conditions that the increase in train traffic will contribute to in a major way.

If the decision to forego the use of projected traffic is based on the assumption that it is difficult to develop adequate projected traffic data, this assumption is based on flawed reasoning. Resources exist at the state level to provide a general, consistent assessment of future traffic growth in cities and counties. MNDOT and most other state agencies as part of their system performance monitoring activities establish projection factors for all functionally classified roadways within their jurisdiction that provide a excellent baseline for establishing future traffic levels. In larger communities such as Rochester, additional resources in the form of local community planning agencies exist which can also provide community growth and traffic projections.

D) The DEIS does not assess the cumulative effect of related transportation impacts

At every highway–rail crossing affected by the project there are multiple traffic and transportation-related effects that occur. These include traffic delay, highway-rail accidents, emergency response delay, and potential pedestrian and bicyclist concerns. The approach utilized in the DEIS is to individually consider possible types of impact and determine if they are significant. No effort is made to look at the coincident effect of multiple impacts occurring at a single location to determine if the cumulative effect of the project on users of transportation system is potentially significant at a given location. The lack of cumulative impact analysis is inconsistent with the guidance provided in 40 CFR 1508.

Part 2: Alternative Transportation System Impacts Analysis

In this section I will summarize the analysis the City of Rochester completed to assess the transportation system impact of the proposed Powder River Basin project and establish a level of reasonable and feasible mitigation which Rochester feels is warranted and justified. In my judgment this analysis is technically superior and significantly more comprehensive in terms of assessing the impact the proposed project will have on the transportation system in the City of Rochester than that completed for the DEIS.

A) Methodology for Assessing Transportation Impact

The scope of the EIS stated that for transportation systems the EIS would propose mitigative measures as appropriate to minimize or eliminate potential adverse project impacts to transportation *systems* and safety. The criteria identified for describing potential impact was 1) Average Delay per Vehicle (calculated based on crossing blockage time created by train traffic across a 24 hour time period) and 2) the absolute increase in delay time to a single stopped motorist. While certainly one aspect of transportation impact, what these factors measure are the effects at individual crossings, not at a system level, and impact to individual drivers, not to the users of the system as a group.

In using only the average delay measure, the DEIS fails to effectively assess the balance between costs and benefits that users of the transportation system will experience as a result of the changing dynamics created by the increased level of train traffic. While the DEIS goes to great lengths to discuss prospective economic benefits to rail users and the operator of the rail line, it does not address the economic tradeoffs that result which negatively affect other users of the transportation system. In the case of increasing train traffic from 3 to 37 trains a day, the impact being imposed on transportation system users include costs associated with increased travel time and delay, higher emission levels, a likely increase in the number of highway-rail crossing accidents and operating costs.

A thorough transportation system analysis should consider objectives such as minimizing travel costs (in time or dollars), insure that an adequate level of safety is maintained, provide for system reliability and redundancy and insure that adequate system capacity is provided.

It is my position as a transportation professional that in order to adequately assess the impact of the proposed project on the transportation system, no single measure of impact is sufficient and a range of tools are needed to assess impacts at different geographic scales and different time scales. Such an analysis should include evaluation not only at the level of individual crossings but at the corridor and system levels as well. The methodology should be complete enough to identify and encompass all issues, yet able to be completed in a relatively efficient and straightforward manner.

To accomplish these goals, the analysis should be approached in a stepwise or phased manner that identifies critical issues and locations where more intense analysis needs to be focused. To accomplish this, a combination of screening and technical methods was identified and utilized to fully assess the impact of the project on the City of Rochester. This approach is consistent with current literature in the field, including papers presented at recent Transportation Research Board Annual meetings by Nicholsen and Reed [6] and by Schrader and Hoffbauer[7], and further documented in great detail in NCHRP Report 288.[8]

The proposed analysis methodology used to assess the impact to the system is as follows:

a) CROSSING IMPACT: Delay and traffic interruption Impacts were assessed on an event, hourly, daily and annual basis at individual highway-rail crossings using equations from Section 8.6.1 of Transportation Research Board Special Report (SR) 165. These equations describe impacts occurring at bottlenecks on a street or highway, such as that created when a roadway is blocked by a crossing train. A description of the equations used in this methodology is included on page 1 of Exhibit J.

   Similar to the DEIS, these equations estimate delay and the number of vehicles queued, but do not use the simplifying assumptions that were built into the methodology used in the DEIS. Additionally, we complete the analysis for each train event in order to capture the range of impacts that can be expected to occur temporally across the day, and then aggregate the results of individual event analysis to create hourly, daily and annual summaries. SR 165 also identifies the number of additional vehicles that would be impacted while queues are dispersing,

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[6] "A Procedure for the Provision of Highway-Railroad Grade Separations", Paper 00-0819, by G. Rex Nicholson and George L. Reed, prepared for and presented at the 79th Annual Meeting, Transportation Research Board, Washington D.C., January 2000

[7] "A Methodology for Evaluating Highway-Rail Grade Separations", Paper 01-3051, by Michael H. Schrader and John R. Hoffpauer, prepared for and presented at the 80th Annual Meeting of the Transportation Research Board, January 2001.

[8] National Cooperative Highway Research Program Report 288, "Evaluating Grade Separated Rail and Highway Crossing Alternatives", Transportation Research Board, National Research Council, 1986

which give a more accurate picture of the delay impact, and the total elapsed time from the start of blockade until free flow conditions resume.

The equations in SR 165 were evaluated and found to provide a more accurate assessment of the impact of queue dispersion than the simplified equations used in the DEIS, which applies a fixed queue dispersion factor of 0.3 minutes. The factor of 0.3, was found to overestimate queue dispersion on low volume roads, but to underestimate, sometimes by a factor of up to 40%, the delay associated with queue dispersion on highway corridors with over 10,000 ADT.

In addition to the traffic delay impacts, we re-analyzed predicted accident rates at each crossing using the FRA's PCAPS software using a corrected set of base data and projected highway volumes. From this analysis projected increases in accident rates were calculated and costs associated with predicted accidents were estimated.

The information developed in this phase for each individual crossing was aggregated by alternative (R-2 and R-3/R-4) so that the following comparisons could be completed:

- Compare the original DEIS analysis (pre- and post-construction) with revised results using correct base data
- Compare alternative R-2 with alternatives R-3/R-4

b) SCREENING ANALYSIS: The second step of the process was to conduct a screening analysis to determine if more detailed analysis of corridor impact and grade separation benefit should be completed for specific crossings. Five screens, based on references in Nicholson and Reed and Hakkert and Gitelman[9], as well as

[9] Hakkert, A.S., an Gitelman, V., *Development of Evaluation Tools for Road-Rail Crossing Consideration for Grade Separation,* NCHRP Record 1605, pp. 96-105, TRB, National Research Council, Washington DC

guidelines established by the Minnesota Department of Transportation[10] were used to identify those corridors and crossings where further analysis would be completed.

c) LEVEL OF SERVICE ANALYSIS: For the critical crossings identified in Step 2, a alternative Level of Service analysis was completed using an adaptation of Chapter 11, Arterial Streets, from the Highway Capacity Manual. This methodology evaluates Level of Service on a corridor basis using average travel speed as the measure of LOS. I believe the Chapter 11 adaptation utilized is a better measure of LOS than that used in the DEIS because

- it allows us to work within the parameters of the peak hour (as the HCM is designed to do) and does not force us to average traffic out over a 24 hour period as the DEIS methodology requires;
- since average daily traffic is one of the direct inputs into the Chapter 11 equations no simplifying assumptions regarding % of daily traffic occurring in the peak hour need not be made;
- the Chapter 11 methodology uses signal cycle red time as a key input. The characterization of a highway-rail crossing operation as being similar to the operation of a traffic signal is found in a number of technical references (See Footnotes 4 and 5) and provides what we feel is a more appropriate adaptation than the Two-way Stop Control analogy provided in the DEIS.

In this adaptation, we recalculate the typical traffic signal timing pattern for a corridor to reflect the additional red time created by the introduction of trains every 40 minutes. We run the Chapter 11 methodology using this adjusted red time to determine what happens to average travel speeds in the corridor, which are then used to measure the Level of Service. We look at the same Level of Service significance tests used in the DEIS (does Level of Service drop from LOS C or better to a LOS D or worse, or is it projected to be at a LOS E or F) to identify whether further consideration of grade separation is warranted.

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[10] Minnesota Rules 1998, Chapter 8300.2740, "Grade Separation at Crossing", Office of the Revisor of Statutes, State of Minnesota, November 1998

d) ECONOMIC ANALYSIS: For critical corridors identified in Step 2, an economic analysis was also conducted to determine the Benefit/Cost ratio of grade separation using GRADEDEC[11], a program developed by the FRA to evaluate highway-rail crossing alternatives. For purposes of the evaluation, GRADEDEC scenarios were built using a defined baseline corridor consisting of 15 crossings, stretching from CR 104 west of Rochester to CSAH 11 (50th Ave) east of Rochester. In place of default values provided with the program for factors such as accident rates and accident and emission cost data, we input current values reflective of corridor conditions and the latest environmental research.

Each critical location was tested to see if construction of a single grade separation at that location would produce a B/C ratio greater than 1.0. Two vehicular traffic assumptions, one assuming 0% future growth in ADT (consistent with the DEIS approach) and one scenario using traffic growth projections provided by the Rochester-Olmsted Council of Governments[12] was completed.

e) SIMULATION ANALYSIS: The impact of train traffic on the transportation system can extend beyond the immediate area of a highway-rail crossing, particularly in urbanized downtown areas with street patterns featuring short blocks and intersecting streets on a 300 or 600 foot grid. This pattern creates an interconnected web where queuing and delay radiates upstream from the crossing and affects intersecting streets as well. In order to understand the magnitude of this effect an assessment of street system operations in downtown Rochester was completed using the traffic simulation model CORSIM[13]. While the individual crossing analysis completed in (a) above treats each crossing in isolation, it does not identify the effects that ripple through the system due to upstream queuing. Through the use of CORSIM we attempt to quantify the full "system" delay impacts of train traffic in downtown Rochester.

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[11] GRADEDEC Ver. 2.0, Federal Railroad Administration, Hickling Lewis Brod Inc, Silver Spring MD

[12] See Footnote 2.

[13] TSIS/CORSIM Version 4.32, Federal Highway Administration Office of Operations Research, developed by ITT Industries Inc., Colorado Springs, CO, developed under contract by the Federal Highway Adminstration, is a software program that evaluates street system operation at the microscopic level. See Exhibit ___ for a more complete description.

f) SPECIAL FACTORS: In addition to these factors, further analysis was conducted to analyze the effect train traffic would have on the city transit system, on emergency response vehicles, and on the school bus transportation system in Rochester. While the DEIS concludes that the nature of emergency response calls is of such a random nature that it cannot be quantified, we believe that adequate information exists for ambulance, fire and police services to quantify the likely impact in terms of the number of times emergency vehicles will be delayed in the course of a year based on historic data.

B) Results of the City of Rochester's transportation system assessment

The analysis demonstrated that there would be significant impact to the transportation system of Rochester as a result of 34 additional trains per day passing through the community which justifies the inclusion of three grade separated crossings as part of the mitigation improvements in Rochester. The following paragraphs will summarize the findings from each phase of the analysis, with a summary of the results in the final section to tie all the information together.

1. Results of the Analysis of Individual Crossings

a) Traffic Delay

The DEIS measured project impact related traffic delay by determining the Average Delay for all Vehicles and comparing it to Level of Service criteria adapted from the Highway Capacity Manual. Since the methodology depends heavily on train characteristics and not traffic characteristics in computing impact, the analysis finds the following results in terms of the change in traffic delay at the different project thresholds:

20MT of Coal (7400' Trains) – Average Delay decreases 67%
50MT of Coal (7400' Trains) – Average Delay decreases 37%
100 MT of Coal (7400' Trains) – Average Delay increases by 10%

The results of this analysis suggest that the impact of the project in terms of traffic delay will result in significant improvements at lower levels of traffic and only a slight deterioration once full train traffic levels are achieved. While average delay is certainly one aspect of the traffic delay impact, the analysis conducted in the DEIS masks significant impacts that occur when considering the impact to motorists as a group as opposed to individually.

Utilizing the methodology identified previously from NCHRP Special Report 165, we have re-analyzed the impact using current ADT information and train traffic characteristics reported in the DEIS for 7400' trains in order to capture the additional delay on high volume corridors that is missed by using the simplified queue dispersion factor of 0.3 minutes in the equation for Average Vehicular Delay found in Section G.2.2 of Appendix G, and also to allow aggregation of impacts above the level of the individual motorist.

Table 3 provides highlights of the key impacts that were found when data is aggregated at higher levels than the individual motorist. For purposes of this analysis we used all crossings located in the Rochester urbanized area, stretching from CR 104 west of Rochester to CSAH 9 east of Rochester, as illustrated in Exhibit I. The summary tables for each individual crossing from the analysis is included in Exhibit J.

Table 3 URBAN AREA CORRIDOR SUMMARY – TRAFFIC DELAY

Measure	Existing Conditions	Rochester Analysis 37 Trains / No ADT Growth	Rochester Analysis 37 Trains & Projected ADT Growth	DEIS Analysis 37 Trains / No ADT Growth	DEIS Analysis 37 Trains & Projected ADT Growth
ADT	110,687	110,687	150,082	110,687	150,082
Vehicles Queued	910	6810	9234	6810	9234
% of ADT	0.8%	6.2%	6.2%	6.2%	6.2%
Frequency of Impact	1 out of 121 vehicles	1 out of 16 vehicles	1 out of 16 vehicles	1 out of 16 vehicles	1 out of 16 vehicles
% Change over Existing		648%	915%	648%	915%
Vehicles Affected	1224	9227	14195	Not Calculated	Not Calculated

Measure	Existing Conditions	Rochester Analysis 37 Trains / No ADT Growth	Rochester Analysis 37 Trains & Projected ADT Growth	DEIS Analysis 37 Trains / No ADT Growth	DEIS Analysis 37 Trains & Projected ADT Growth
% of ADT	1.1%	8.3%	9.5%	NA	NA
Frequency of Impact	1 out of 90 vehicles	1 out of 12 vehicles	1 out of 12 vehicles	NA	NA
% Change over Existing		654%	1060%	NA	NA
Ratio of Affected Veh to Queued Veh		1.355	1.537	NA	NA
Vehicle Minutes of Delay (Daily)	1939 (DEIS)	11,300	17,383	10,383	14,077
% Change over Existing		483%	796%	435%	626%
Annual Cost of Delay	$171,036 (DEIS)	$996,754	$1,533,325	$915,867	$1,241,709
% Change over Existing		483%	796%	435%	626%

FOOTNOTE1 : By capturing not only delay affecting vehicles that join the queue at a highway-rail crossing but the vehicles affected by queue as it is dispersing, the SR 165 methodology identifies a higher level of time delay and a higher level of costs associated with that delay than the DEIS methodology

FOOTNOTE 2: The individual analysis sheets for each crossing that form the basis of this analysis are considered workpapers which have been prepared and will be made available to SEA at its request. .

- Table 3 Summary: Highlights of System Impacts at Highway- Rail Crossings

What the Rochester analysis has identified is that there is a significant increase in the number of motorists affected by train delay on a daily basis if one looks at the impact from a system-wide perspective as opposed to focusing on individual motorists. Whereas under current conditions only 1 out of every 121 motorists will end up in queue at a highway-rail crossing, with the project that frequency will increase to 1 out of every 16 motorists. This represents a 648% increase in motorists affected under current ADT levels, and with projected ADT levels the increase would be 915%.

The SR 165 methodology used by Rochester furthermore identifies those additional motorists who are not part of the queue when a rail crossing is closed but who are affected during the time the queue dissipates. When these motorists are added to the totals we see the frequency of motorists affected by train delay further increases to 1 out of every 12, and the percentage increase in the number of motorists affected over today's conditions rises by 654% with current ADT and 1060% with projected ADT. At that point, a full 9.5% of all motorists on a daily basis are affected by train delay, compared to 1.1% today.

The delay identified represents a significant indirect cost to the individuals in the City of Rochester. On an annual basis, using a hourly value of time of $14.50 (See Exhibit K for calculation of this value), we estimated annual costs due to delay at crossings of approximately $1 million dollars ($996,754), growing to over $1.5 million dollars annually with projected 2020 ADT. We would note that using the DEIS methodology for calculating delay would underestimate this indirect cost by 11% for existing ADT conditions (calculated using values from the last row of Table 3 as follows: (483%-435%)/435%)) and with the higher projected ADT levels would underestimate this indirect cost by 27% (calculated using values from the last row of Table 3 as follows: (796%-626%)/626%)).

We would note that the cost of delay identified from this analysis captures only a portion of the system delay that is created by train traffic in the city. In our simulation analysis, which will be discussed in a later section of this statement, we identify additional vehicle delay that is created on intersecting streets due to spillback of queues on rail crossing corridors. This spillback effect, which is not captured in the analysis of individual crossings, more than doubles the indirect costs generated solely by evaluating traffic on the rail crossing corridor.

- Individual Crossing Highlights

Our analysis found that the impacts created on individual corridors vary greatly depending on the relative relationship of ADT to corridor capacity. On major roadways such as Broadway Ave and 11th Ave Northeast, the difficulty created by queue creation and dispersion on roadways that are operating near capacity dramatically increases the

number of vehicles affected on a percentage basis, and further illustrates the understatement of impact that the DEIS methodology results in.

Table 4 illustrates results for 11th Avenue Northeast from our analysis. We believe that looking at results on the level of an individual corridor begins to suggest which corridors, even in advance of our screening analysis, demand additional analysis attention in subsequent steps of the analysis process.

Table 4 11th Avenue Northeast Traffic Delay Analysis

Measure	Existing Conditions	Rochester Analysis 37 Trains / No ADT Growth	Rochester Analysis 37 Trains & Projected ADT Growth	DEIS Analysis 37 Trains / No ADT Growth	DEIS Analysis 37 Trains & Projected ADT Growth
ADT	12,866	12,866	15,130	12,866	15,130
Vehicles Queued	111	792	931	792	931
% of ADT	0.9%	6.2%	6.2%	6.2%	6.2%
Frequency of Impact	1 out of 115 vehicles	1 out of 16 vehicles	1 out of 16 vehicles	1 out of 16 vehicles	1 out of 16 vehicles
% Change over Existing		614%	739%	614%	739%
Vehicles Affected	201	1387	1919	Not Calculated	Not Calculated
% of ADT	1.6%	10.8%	12.7%	NA	NA
Frequency of Impact	1 out of 64 vehicles	1 out of 9 vehicles	1 out of 8 vehicles	NA	NA
% Change over Existing		590%	855%	NA	NA
Ratio of Affected Veh to Queued Veh		1.75	2.06	NA	NA
Vehicle Minutes of Delay (Daily)	236 (DEIS)	1,699	2,350	1,207	1,420
% Change over Existing		620%	895%	411%	501%
Annual Cost of Delay	$20,844 (DEIS)	$149,866	$207,290	$106,492	$125,234
% Change over Existing		618%	894%	411%	501%

The most telling statistics in this table which illustrate the greater severity of the problem on high volume corridors nearing capacity are in the row reporting the ratio of affected vehicles to queued vehicles, and in the rows reporting the % change in Vehicle Minutes of Delay and Annual Cost of Delay. When comparing the results for 11th Ave to the system summary in Table 3, one sees that the ratio of vehicles affected to vehicles queued was 1.35 (for existing ADT) and 1.54 (for projected ADT) for the system as a whole, but is 1.7 (for existing ADT) and 2.06 (for projected ADT) for 11th Ave. Similar increases are observed for the % changes in vehicles minutes of delay and annual cost of delay. What this suggests is that there are critical corridors much more sensitive to the impact of train delay, which suggests that alternative solutions such as grade separation would be worthwhile considerations.

The individual corridors where results far exceed the averages for ratio of affected vehicles to queued vehicles, for the % change in vehicle minutes of delay, and the % change in annual cost of delay, included:

a) 7th St NW – under projected ADT conditions
b) 6th Ave NW – under projected ADT conditions
c) 4th Ave NW – under projected ADT conditions
d) Broadway – under existing and projected ADT conditions
e) 11th Ave NE – under existing and projected ADT conditions

- Comparison of the R2 and R4 alternatives:

Table 5 on the next page summarizes the comparative statistics for Alternative R-2 (existing rail corridor) and Alternative R-4 (bypass corridor). Alternative R-4 assumes the construction of grade separations at Trunk Highways 14, 52 and 63, consistent with Bypass Alternative proposed by the City of Rochester.

Table 5 ALTERNATIVE R-2 VS R-4 COMPARISON

Measure	ALTERNATIVE R-2 (Existing Corridor)	ALTERNATIVE R-4 (BYPASS) Grade Separation at 14/63/52 assumed
ADT @ Grade Crossings	127,322	13,186
Vehicles Queued with 37 Trains	7,834	815
% of ADT	6.2%	6.2%
Vehicles Affected	10,359	847
% of ADT	8.1%	6.4%
Vehicle Minutes of Delay (Daily)	12,687	1,039
Annual Cost of Delay	$1,119,099	$91,648

The results of this comparison illustrate the significant difference in traffic delay impact under the two alternatives. The number of motorists impacted and the costs of delay in alternative R-2 is 1123% higher than in Alternative R-4 (10,359 vs. 847), and due to the higher congestion levels existing in the City of Rochester along the existing corridor, the percentage of vehicles affected as a share of total traffic is 25% higher (8.1% vs. 6.4%)

b) Highway – Rail Crossing Accidents

The DEIS conducted an analysis of the significance of projected increases in highway-rail crossing accidents utilizing the methodology recommended by the FRA, which first calculates a Hazard Prediction Factor for a crossing (based on standard factors such as speeds, number of tracks, day & night trains and ADT), then applies an accident history factor, and finally adjusts the results with a normalizing factor so that at a national level the level of predicted accidents closely matches actual accident experience. As is pointed out in the Rochester response to the DEIS, the analysis completed was based on a number of faulty data assumptions, including the number of existing trains and out of date ADT counts.

We analyzed the predicted increase in accidents using corrected baseline data and found, as we had assumed, the DEIS overstates existing baseline accident experience. By assuming there are 12 existing trains per day on the corridor, the DEIS analysis overstates the existing accident rate, which when compared against projected accident rates (with 37 trains assumed) will result in an understatement of the expected change in accident experience, which is the key factor in determining whether a significant change occurs. Also, following up on earlier comments regarding the use of different criteria of significance in the various states affected by the project, we tested for the presence of significant impact using not only the Minnesota criteria but also the South Dakota and Wyoming criteria to see how the results would compare.

Given our concern that the use of the 50th highest accident rate in each state is primarily an effort to identify candidate crossings for funding priority consistent with what is done in the allocation of highway-rail crossing improvement funds, we propose an alternative criteria and report our results using this criteria as well in Table 6. Our proposed criteria is to use the accident rate that represents the 80th percentile rate in the State of Minnesota for all crossings that have existing train traffic of over 20 trains per day. The use of the 80th percentile value is well established in transportation analysis, being used for such measures as setting speed limits or identifying critical traffic volumes for analysis purposes. The use of the 20 train threshold insures that we are considering only crossings with a significant level of train traffic in establishing the rate. For Minnesota, the 80th percentile rate is 0.0562, which is based on information in the FRA PCAPS database and represents experience from 444 crossings in the State of Minnesota with over 20 trains a day. The last column of the table reports predicted 20 Year accident costs at each crossing assuming that the current level of grade crossing safety protection remained in place.

Table 6 Accident Prediction Summary for Rochester urban area crossings

Crossing	DEIS Rate (Existing/Predicted)	Rochester Re-Analysis Rate (Existing/Predicted)	Sig In MN?	Sig In SD?	Sig In Wyo?	Above MN 80TH Percentile?	20 YR Accident Costs
CR 104	.029 / .042	.010 / .026			X		$250,296
7th St NW	.040 /.055	.025 / .056		X	X	X	$524,501

Crossing	DEIS Rate (Existing/Predicted)	Rochester Re-Analysis Rate (Existing/Predicted)	Sig In MN?	Sig In SD?	Sig In Wyo?	Above MN 80TH Percentile?	20 YR Accident Costs
11th Ave NW	.032 / .045	.018 /.041			X		$382,520
6th Ave NW	.043/ .058	.023 /.049		Y	X		$430,681
4th Ave NW	.029 / .041	.014 / .032			X		$275,088
1st Ave NW	.027 / .038	.010 / .023					$199,171
Broadway Ave	.129 / .154	.111 / .160	X	X	X	X	$1,409,365
2nd Ave NE	.057 / .071	.041 / .069		X	X	X	$611,742
7th Ave NE	.037 / .063	.016 / .055		X	X		$514,449
9th Ave NE	.021 / .032	.011 / .032			X		$303,725
11th Ave NE	.044 / .059	.027 / .059		X	X	X	$554,474
15th Ave NE	.022 / .034	.012 / .033			X		$313,315
East Circle Drive	.004 / .056	.032 / .066		X	X	X	$617,505

Reviewing the results reported in Table 6, one can see that using the criteria identified in the DEIS only one crossing, Broadway Ave (TH 63), would be projected by the DEIS to have a significant increase in accidents as a result of the project. Using the South Dakota criteria, six crossings are found to be significant with current ADT and one additional crossing with projected ADT. Using the Wyoming criteria finds that all the crossings save one (1st Ave NW) are projected to have significant increases in accidents.

Using the proposed 80th percentile value, five crossings are found to have the potential for significant accident increases. The results also identify a 20 year cost associated with predicted accidents of $6.38 million dollars at these 11 crossings. It is my belief that those crossings found to exceed the 80th percentile rate are in fact critical locations which justify further detailed evaluation, an assertion further supported by the fact they also represent the crossings with the highest associated accident costs, and are four of the five highest volume crossings in the city, where traffic accidents, if they occur, will be most disruptive and damaging to traffic flow in the community.

- Comparison of DEIS Analysis with Rochester's Re-Analysis using Corrected Data for Existing Rail Corridor

In re-analyzing the accident data using corrected traffic and train counts we found that the DEIS analysis overstated existing accident levels by approximately 64% and conversely understated projected accident levels by approximately 2%. The following table summarizes our findings in comparing the DEIS analysis to our analysis. This table reports our findings for our primary study area, extending from CR 104 west of Rochester to CSAH 9 east of Rochester:

Table 7 Comparison of DEIS Accident Predication Analysis to Rochester Analysis

	DEIS	Rochester
Existing System-wide Accident Rate	1.049	0.638
Costs Associated with Existing Accidents	$6,570,879	$3,324,229
Predicted System-wide Accident Rate	1.495	1.518
Costs Associated with Predicted Accidents	$15,481,777	$15,719,381

The importance of this information is to highlight that in using an assumption of 12 existing trains per day leads to a significant overstatement of existing conditions and understates the magnitude of change that will occur with the project. Full results of our Highway-Rail Crossing accident analysis are found in Exhibit L

- Comparison of the R-2 and R4 alternative

In order to compare the relative difference between the R-2 and R-4 Alternatives I examined the cumulative Hazard Prediction Index for each alternative. The Hazard Prediction Index is an intermediate outcome of the PCAP's Accident Prediction Model. The PCAP's system, when used to predict accidents probability, utilizes a three part methodology that accounts for, in order:

- Crossing hazard, based on existing geometry and traffic conditions at the crossing;

- Accident History at the crossing, to account for any unique features at the crossing that would contribute to a higher or lower than average rate; and
- A normalizing factor, to insure that the number of accidents the PCAP's system would predict on a nationwide basis is consistent with accident experience nationwide.

Since the R-4 alternative has no accident history, the only valid comparison that can be drawn between Alternative R2 and R4 is the outcome from the first step of the process, the Hazard Prediction Index. The DEIS used the assumption that there are no historic accidents on the bypass (R4) in order to complete the 2nd and 3rd parts of the methodology, but I believe this is an erroneous approach since it is speculative to assume there would be no accidents on the bypass, especially if all crossings were protected only with passive protection devices, as is assumed in the DEIS analysis. Therefore, I believe the only apples to apples comparison that can be drawn between the alternatives is the respective Hazard Prediction values.

The respective Hazard Prediction values we found were:

- For Alternative R-2, a cumulative value of 4.605
- For Alternative R-4, a cumulative value of 0.752

Our analysis was completed using grade crossing protection assumptions consistent with that proposed by the applicant in the community partnership agreements that we have seen, and further assuming grade separation would be constructed at Trunk Highways 14, 52 and 63. The results indicate a much higher index of hazard on the existing corridor, by an order of magnitude of five times.

c) Significant Queuing Impacts

The time associated with the closure of a highway-rail crossing by a train event can create disruption to nearby intersections, particularly those controlled with traffic signals. While individual crossing events with the project will be shorter in duration, the potential exists with an increase to 37 trains that the number of times upstream signalized intersections are disrupted could increase significantly during the course of a single day.

While the DEIS identified and reported average queue lengths at all crossings in Appendix G of the DEIS, it contains no further analysis under the presumption that since any individual queue will be shorter, there will be less impact. Again the DEIS failed to consider that upstream disruption impacts may still exist even with the shorter queues and instead of happening once or twice a day may in fact happen many times during the course of the day with the project.

The following table summarizes our findings in regards to Queuing Impacts if the projected is approved. To conduct this analysis we first determined the available queuing distance from a crossing to the nearest crossing Principal or Minor Arterial Roadway[14]. We then compared actual event by event queue distances calculated as part of our traffic delay analysis to determine how many of the 37 train events would create queue spillback into adjacent intersections with major roadways.

	A	B	C	D	E	F	G	H	I
1	**QUEUE IMPACT ON UPSTREAM INTERSECTIONS**								
2	**ANALYSIS OF UPSTREAM INTERSECTIONS OF PRINCIPAL OR MINOR ARTERIALS > 100 FT FROM CROSSING**								
3									
4						PROJECTED	PROJECTED	% OF	% OF
5					EXISTING	QUEUE	QUEUE	EVENTS	EVENTS
6				DISTANCE	QUEUE	SPILLBACK	SPILLBACK	CREATING	CREATING
7	CORRIDOR CROSSING	TRAVEL	UPSTREAM	FROM	SPILLBACK	(37 EVENTS)	(37 EVENTS)	SPILLBACK	SPILLBACK
8	RAILROAD	DIRECTION	ROADWAY	CROSSING	(3 EVENTS)	*2000 ADT*	*2020 ADT*	*2000 ADT*	*2020 ADT*
9	County Road 104	NB	TH 14	100	2	16	16	43%	43%
10	11th Avenue NW	SB	7th St NW	330	2	9	20	24%	54%
11	6th Ave NW	NB	Civic Center Drive	150	2	5	18	14%	49%
12	4th Ave NW	NB	Civic Center Drive	150	2	11	19	30%	51%
13	Broadway Avenue	NB	2nd St NW	520	2	8	12	22%	32%
14	Broadway Avenue	NB	Civic Center Drive	30	3	32	34	86%	92%
15	2nd Ave NE	NB	Civic Center Drive	265	2	3	10	8%	27%
16	11th Avenue NE	NB	East Center Street	380	2	10	18	27%	49%

Table 8 Summary of Queuing Impacts in Rochester Urban Area

This analysis identifies critical locations including Broadway Avenue, 4th Ave NW and 11th Ave NE where a significant number of spillback events can be expected even with higher speed train traffic. It should be noted that in terms of disruption these events always occur in the busiest traffic hours of the

[14] Principal or Minor Arterials refer to the Functional Classification System employed by the Federal Highway Administration which all state, county and urban jurisdictions are required to use for the purposes of creating a uniform nationwide hierarchy of streets and roadways for reported purposes.

day, occasionally in the morning peak hour but more often in the period from 11:30 AM to 1:30 PM and again from 3:00 PM to 6:30 PM.

2. Results of the Screening Analysis

The second step of the analysis we completed after analyzing the impacts at individual crossings was a screening analysis to determine whether any crossings or corridors warranted further detailed analysis using more rigorous operational and economic techniques. A total of five screening criteria were used to flag crossings where conditions may warrant consideration of grade separation to address the combination of safety, delay and congestion impacts anticipated, to provide for an improved level of system reliability under the strain of higher train traffic, and to insure adequate access across the rail corridor for emergency service and transit services in the community.

The five screens we used to identify potential critical locations were:

- ADT of greater than 15,000
- Exposure Level I (train traffic x ADT) of greater than 300,000
- Exposure Level II of greater than 450,000
- Crossing Closure Index (ADT x No. of Trains x Hours crossings are closed of greater than 13,000
- Minnesota Department of Transportation Rules regarding when grade separation should be considered, found in Chapter 8830, Section 2740 of the Administrative Rules of the State of Minnesota

Each corridor was analyzed under two scenarios, one utilizing current traffic estimates and one utilizing project 2020 traffic volumes. Both scenarios considered 37 trains per day. The complete results of this analysis are contained in Exhibit W. Based on this analysis, we selected only those corridors that met three or more of the screens as candidates to carry forward into our Level of Service and Economic Analysis.

Table 9 Results of Screening Analysis

On the R-2 Route the following corridors met this criteria:

Corridor	Under Base Year Traffic	Under 2020 Traffic
11th Ave NW	Met all 5 Screens	Met all 5 Screens
Broadway Ave	Met all 5 Screens	Met all 5 Screens
2nd Ave NE	Met 3 of the Screens	Met 4 of the Screens
Corridor	Under Base Year Traffic	Under 2020 Traffic
11th Ave NE	Met 3 of the Screens	Met 3 of the Screens
East Circle Drive	Met 3 of the Screens	Met all 5 Screens

On the R-3/R-4 Route the following corridors met this criteria:

Corridor	Under Base Year Traffic	Under 2020 Traffic
U.S. Trunk Highway 14	Met 4 of the Screens	Met all 5 Screens
U.S. Trunk Highway 63	Met all 5 Screens	Met all 5 Screens
U.S. Trunk Highway 52	Met all 5 Screens	Met all 5 Screens

Since the proposed R3/R-4 proposal that has been presented by the City of Rochester included grade separations at these three locations as part of the definition of the alternative, no Level of Service or Economic Analysis was completed for these alternatives. These three locations meet all the screening criteria for grade separation, and the Minnesota Department of Transportation has stated that if the R3/R4 alternative were to be built, grade separation would be a requirement at these locations. The costs for grade separation at these locations is included in the cost estimates prepared for the R3/R4 alternative by the City of Rochester.

3. Results of the Level of Service Analysis

Utilizing an adaptation of the Arterial Street methodology found in Chapter 11 of the HCM, the following Level of Service results were found for the five critical corridors that were identified in the screening analysis:

Table 10 **Results of Level of Service Analysis**

Corridor	Existing Level of Service	LOS @ 37 trains @ Base Traffic	LOS @ 37 trains @ 2020 Traffic	Notes
11th Ave NW	C	D	D	
Broadway Ave	C	D	D	
2nd Ave NE	C	C	C	
11th Ave NE	C	D	E	
East Circle Drive	A	A	B	

To assess the results of this analysis we used the same criteria put forward in the DEIS for consideration of whether Level of Service changes are of enough significance to warrant consideration of grade separation. These criteria were:

- Level of Service drops from a pre-existing condition of C or better to a post-construction condition of D or worse
- The Level of Service is E or F irregardless of the pre-existing conditions.

The results indicate that three of the five critical crossings would warrant consideration for grade separation under the Level of Service thresholds established in the DEIS. This would be true assuming current vehicular traffic levels remain unchanged, with further degradation occurring as future traffic growth is factored in.

Refer to Exhibit M for the detailed input information used for the HCM analysis and the output sheets from each HCM analysis run that was completed at each of the five locations for three scenarios (Base Case / Base + Trains / 2020 Traffic + Trains)

4. Results of the Economic Analysis

To further analyze the five critical crossings identified in the screening analysis, we undertook to complete a Benefit/Cost Analysis to evaluate the economic tradeoffs of grade separation at individual locations as well as groups of three and five grade separations. For purposes of the evaluation the study corridor that was established stretched from CR 104 (milepost 54.20) west of Rochester to CSAH 9 (milepost 45.40) east of Rochester, encompassing fourteen grade crossings and a linear distance of 8.8 miles along the corridor.

To complete the analysis we utilized the Benefit / Cost analysis program developed under the sponsorship by the Federal Railroad Administration entitled GRADEDEC to evaluate each of the following scenarios:

- Each individual location was considered in a separate scenario as the location of a grade separation with no other grade separation constructed in corridor
- A scenario was evaluated that assumed the construction of three grade separations as a package, with Broadway Ave, East Circle Drive and 2nd Ave NE selected as candidate locations
- A final scenario was evaluated that assumed the construction of grade separation at all five locations

Table 11 **Results of Benefit/ Cost Analysis of Grade Separations**

Crossing Analyzed	Results of B/C analysis at 0% traffic Growth	Results of B/C analysis with Projected Traffic Growth
East Circle Drive	0.960	1.539
11th Ave NE	0.685	0.893
2nd Ave NE	1.103	1.107
Broadway Ave	1.628	1.924
11th Ave NW	0.89	1.343
Three Grade Separation Alternative	1.08	1.28
Five Grade Separation Alternative	0.96	1.21

This summary suggests that from an investment standpoint, when considering the range of direct and indirect costs associated with the construction of grade separations, the construction of three separations even with no vehicular traffic growth assumed is a worthwhile consideration in terms of the benefit/ cost tradeoff to society. If future traffic growth is taken into consideration, the combined package of five grade separations meets the test of achieving a Benefit/Cost ratio greater than1.0, although only four of the individual crossings themselves meet the test.

The input and output data from the GRADEDEC analysis is contained in Exhibit N.

5. Results of the Simulation Analysis

In addition to the traffic delay created at highway-rail crossings, which was measured in our first analysis step, there is additional traffic delay created at other intersections in proximity of rail crossings due to the upstream spillback of queues which affects traffic on streets crossings those roadways that intersect with the rail corridor. This traffic spillback will affect operations at both signalized and unsignalized intersections as vehicles in turn bays or turning vehicles in through lanes on side streets are restricted from completing movements onto the roadway crossing the rail corridor.

To measure the additional traffic delay impact that would be created upstream of highway-rail crossings the CORSIM[15] Simulation Software package was utilized to analyze impacts for an area of downtown Rochester stretching three to five blocks on each side of the rail corridor in a north-south direction, and from the Zumbro River on the east to TH 52 on the west.

Exhibit O presents summary information from the CORSIM analysis and computer screen images of the CORSIM animation highlighting key elements of this analysis

To determine the additional delay created by delay at the highway – rail crossings that is occurring at other nearby intersections in the street, we gathered the following information from the CORSIM model:

1. The total amount of traffic delay at a system level that would occur if no trains traveled through the city
2. The total amount of traffic delay created just at the highway-rail crossings;
3. The total amount of traffic delay at a system level that occurred with trains traveling through the city.

By subtracting items #1 and #2 from the total system delay with trains identified in #3, we are left with the additional traffic delay created by the train traffic that occurs at locations other than the highway-rail crossings. Our method has isolated the delay caused by vehicular traffic only in Step 1, and the delay occurring at the rail crossing in Step 2, leaving us with the added system delay due to the train traffic.

[15] See Footnote 13

The analysis was completed for three scenarios and the results are summarized in Table 12. Table 12 reports the delay at the crossings (taken from the analysis of individual crossings) in the 2nd and 3rd column and then reports the added delay at non-crossing locations in the 4th and 5th columns.

Table 12 Results of System Simulation Analysis / Existing Conditions (next page)

Scenario	Hours of Delay (Daily) At Crossings	Cost of Delay (Annual) At Crossings	Hours of Delay (Daily) At Non-Crossings	Cost of Delay (Annual) At Non-Crossings
Existing Conditions	139	$735,665	64	$339,587
1st Year with Full Train Traffic (2008)	370	$1,952,420	136	$717,359
10th Year with Full Train Traffic (2018)	618	$3,261,364	115	$605,720

When grade separations are introduced there is still additional system delay present but the overall level of delay drops significantly due to the importance of grade separation in eliminating traffic delay at rail crossings and along the corridor. The analysis looked at the introduction of 2 grade separations, one at Broadway and one at East Circle Drive, to evaluate the impact of these type of alternatives. The results of this analysis are as follows:

Table 13 Results of System Simulation Analysis / 2 Grade Separations included

Scenario Assuming Two Grade Separations	Hours of Delay (Daily) At Crossings	Cost of Delay (Annual) At Crossings	Hours of Delay (Daily) At Non-Crossings	Cost of Delay (Annual) At Non-Crossings
Existing Conditions	139	$735,665	64	$339,587
1st Year with Full Train Traffic (2008)	237	$1,253,173	27	$144,364
10th Year with Full Train Traffic (2018)	337	$1,778,158	32	$170,250

The analysis demonstrates that the introduction of grade separations on critical corridors significantly improves the performance of the system by reducing system delay and costs by 48% in Analysis Year 2008 and 49% in Analysis Year 2018. Even with grade separations there still remains an 81% increase over existing delay levels, however.

6. Results of Special Factor Analysis

a) Transit and School Bus Impacts

The City of Rochester and the Rochester Independent School District #535 both are frequent users of the highway-rail crossings in the city. To ascertain the potential level of impact that would occur to these services, an analysis was undertaken to determine the probable frequency with which delay to bus services would occur and what corridors in particular this would be happening on.

To complete this analysis the results from the traffic delay analysis were used to quantify the amount of time traffic would be delayed due to closed crossings and subsequent queue clearance during the hours these bus services are on the street. Since the traffic delay was completed on an event basis, traffic delay during service hours could be directly accumulated to determine the % of time vehicles would be interrupted on a corridor. That percentage could then be applied to the total number of times buses were traveling on a given corridor to determine the probably number of bus runs that would be delayed on a daily basis

The technical analysis is contained in Exhibit X. Table 14 summarizes the results of this analysis.

Table 14 **Probable Impact to City Transit Service and School Bus Service**

	Rochester City Lines / Daily Buses Crossing Rail Corridor	Rochester City Lines / Buses Delayed Daily*	Rochester ISD #535 / Daily Buses Crossing Rail Corridor	Rochester ISD #535 / Buses Delayed Daily*
System Totals for Existing Conditions	Northbound: 113 Southbound: 112	Existing Conditions: Northbound: 0.53 Southbound: 0.56 Ave: 1.09 per day 0.5% of Total Best Case: 0 / day Worst Case: 16 / day	Northbound: 50 Southbound: 44	Existing Conditions: Northbound: 0.28 Southbound: 0.14 Ave: 0.42 per day 0.4% of Total Best Case: 0 / day Worst Case: 19 / day

	Rochester City Lines / Daily Buses Crossing Rail Corridor	Rochester City Lines / Buses Delayed Daily*	Rochester ISD #535 / Daily Buses Crossing Rail Corridor	Rochester ISD #535 / Buses Delayed Daily*
System Totals for Projected Conditions	Northbound: 113 Southbound: 112	Projected Conditions Ave # Buses Delayed Northbound: 6.58 Southbound: 6.88 Ave: 13.46 per day 6.0% of Total Best Case: 12 / day Worst Case: 24 / day	Northbound: 50 Southbound: 44	Projected Conditions Ave # Buses Delayed Northbound: 1.67 Southbound: 3.48 Ave: 5.13 per day 5.5% of Total Best Case: 4 / day Worst Case: 20 / day

The results indicate that the average number of buses in the two systems combined currently delayed on a daily basis is 1.5, or 2 buses every three days. With the project, we would estimate that the number of buses delayed would increase to 18.6 per day. In Table 14 we also report a best case / worst case scenario to identify what would happen if the relationship between train events and bus routing on a given day occurred such that the maximum or minimum number of buses were impacted at the same time. . These numbers were developed by rounding fractional analysis values for each individual route to the nearest whole number, since a fractional result indicates that you are likely to have a vehicle delayed only every couple of days rather than each day. To create the best case scenario, we rounded down to the nearest whole number, and for the worst case we rounded up to next highest whole number. The best case given the limited number of trains under existing conditions is 0 delays on a given day, while the worst case would be estimated to have 35 vehicles delayed. With the project, the best case we estimate would be to have 16 vehicles delayed, while the worst case would be to have 44 delayed in a single day. While the worst case does not vary significantly (given the fact that the small fractional delay per route under existing conditions will always run up to one full bus being delayed in our worst case analysis even though the average number of buses delayed on each individual route is only slightly greater than zero), we find that under the best case scenario there will be no buses delayed under existing conditions but a minimum of 16 vehicles delayed under future conditions in even the best of circumstances.

The significant concern with transit system delay is the effect that delay has on being able to maintain adherence to schedules and delivering passengers to transfer locations in order to make connections.

This issue is more thoroughly discussed in the verified statement of Tony Knauer, Transit Coordinator for the City of Rochester.

b) Emergency Response Impacts

Based on information provided by the Gold Cross Ambulance Service, the Rochester Fire Department and the Rochester Police Department, an analysis was conducted to determine the likely number of emergency response calls that would be delayed in a year if train traffic in the City of Rochester increased from 3 to 37 trains per day. We conducted the full analysis of the ambulance data, using data from 1998 as the basis for our case study. For police and fire calls, we were supplied information on the number of emergency calls that required a crossing at-grade on an annual basis, as outlined in the verified statements of Jeff Leland, Rochester Fire Department, and Roger Peterson, Rochester Police Department. From this information we were able to estimate the number of calls on an annual basis that would be delayed.

Our methodology for analyzing the ambulance data was as follows:

- First we identified only those calls where lights and sirens used in responding to the incident (thus eliminating non-emergency calls). This gave us a total of 10,337 ambulance calls.
- Next, we determined the location of vehicle at the time of response and the location of the incident the vehicle was responding to. For Ambulance calls, a system of response zones has been established throughout the Rochester area covering small geographic areas. Each zone is assigned an ID ## and when calls are logged into the Gold Cross database the zone of origination and the zone of the incident are logged in.

- For the Gold Cross ambulance data, a manual process was used comparing zone of origin to zone of destination to determine which calls required a crossing of the rail corridor. For the ambulance service, a total of 2501 vehicles crossing the tracks were identified. It should be noted that some ambulance responses would require two crossings, one in response to the incident and one when transporting an individual to the emergency medical center at one of the area hospitals.
- Having identified the number of calls, we next looked at the distribution of calls across the hours of the day to determine an hourly distribution percentage for the calls. We then distributed the respective calls across a 24 hour period to get hourly totals.

- We next took the traffic delay data developed for each hour from the crossing analysis and identified the percentage of each hour that crossings would be closed due to train traffic. We developed a composite average based on conditions at 11th Ave NW, 6th Ave NW, 4th Ave NW, Broadway and 2nd Ave NE to identify an hourly delay percentage.
- The hourly traffic delay percentage was then applied to the number of calls estimated to cross the tracks each hour to determine, for 1998, how many calls would probably have been delayed by train traffic.

The results of the analysis identified an estimated 267 ambulance calls, or 1 every 32.8 hours, which would have been delayed in 1998 by a train if 37 trains per day had traveled through the City of Rochester at that time. It should be noted that for the period of 1996-1999 there was a steady 4-5% annual growth in the number of calls, which if projected into the future would result in the frequency of delay increasing to 1 every 17.5 hours in 20 years.

The last three steps in our process were also applied to data supplied by the Rochester Fire Department and Police Department regarding the number of calls that crossed the tracks. The Fire Department indicated that for the years 1998-2000, an average of 926 emergency calls per year were required to cross the tracks (See Verified Statement of Jeff Leland, Administrative Services Manager, Rochester Fire Department). An analysis done by the Rochester Police Department estimated the number of emergency responses required to cross the tracks involving Police Department personnel totaled 21,000 calls in 1999. (This information is documented in the verified statement of Roger Peterson, Police Chief of the City of Rochester.)

Using hourly distribution patterns obtained from analyzing the data in the Fire and Police Department databases, we were able to distribute the calls crossing the railroad tracks across a 24 hour period and apply our estimate of hourly crossing delay to determine the number of calls potentially impacted. For the Police Department, this total is 2,159 calls annually, or 1 every 4.1 hours, and for the Fire Department this was 98 calls, or one every 89 hours.

Exhibit P provides our statistical summary worksheets illustrating the results of our analysis.

7. Summary of Findings

Based on the analysis presented in this section, we believe a minimum of three grade separations would be warranted and a 4th deserves serious consideration in order to address the significant impacts that would be created by the addition of up to 34 trains per day through the City of Rochester. We arrive at this conclusion based on the significant increase in the number of motorists who will be impacted daily by train delay along with a 237% increase in expected accidents, and the associated costs to the community of this added delay and safety degradation. As presented in our analysis, while queuing impacts from each individual event will be less severe, they will happen more frequently, and transit, school bus, and emergency services will be interrupted more frequently. As our economic analysis demonstrated, even assuming no vehicular traffic growth in the future there is economic justification for 3 grade separations, and a 4th if one takes into account future traffic growth in the city.

The four locations that I believe would warrant consideration of grade separation include:

- U.S. Highway 63 (Broadway Avenue)
- 2nd Ave NE
- C.S.A.H. 22 (East Circle Drive)
- 11th Ave NW

Table 15 Summary of Candidate Locations for Grade Separation

Criteria	Broadway Ave	2nd Ave NE	CSAH 22	11th Ave NW
2000 Traffic	27,750	10,300	10,000	18,970
2020 Traffic	34,355	14,540	19,930	25,700
% of Rail Crossing Traffic in Urban Area				
Existing ADT	25%	9%	9%	17%
Projected ADT	23%	10%	13%	17%
## of Vehicles Delayed				
Existing ADT	2590	721	686	1841
Projected ADT	3709	1081	1560	2796
Cost of Traffic Delay				
Existing ADT	$279,709	$77,888	$74,186	$162,392
Projected ADT	$400,642	$116,788	$168,566	$246,631
Exceeds 80th Percentile Accident Rate	Yes	Yes	Yes	No

Criteria	Broadway Ave	2nd Ave NE	CSAH 22	11th Ave NW
20 Year Accident Costs				
With Existing ADT	$1,409,365	$611,742	$617,505	$382,520
With Projected ADT	$1,448,761	$637,039	$689,164	$399,938
Level of Service				
With Existing ADT	D	C	A	D
With Projected ADT	D	C	B	D
Benefit Cost Ratio @				
0% Traffic Growth-	1.63	1.10	0.96	0.89
Projected Traffic Growth-	1.92	1.11	1.54	1.34
Transit Importance / Daily Bus Crossings	67	41	63	144
Functional Classification[16]	Principal Arterial	Minor Arterial	Principal Arterial	Minor Arterial
Queuing Disruption	@ 2nd St NW			
Existing ADT	8	3	0	9
Projected ADT	12	10	0	20
Grade Separation Screens Satisfied	5 out of 5	3 Existing ADT 4 Projected ADT	3 Existing ADT 5 Projected ADT	5 out of 5
Estimated Construction Cost	$10,284,462	$4,446,800	$4,713,100	$7,174,498

The City of Rochester's proposed Mitigation Plan for Alternative R-2 includes the costs for grade separation at Broadway Avenue, 2nd Ave NE and East Circle Drive in the mitigation cost estimate included in the verified statement of Bernard H. Ortgies. Broadway and East Circle Drive warrant consideration on balance because of their role as Principal Arterial corridors within the urban area roadway system in addition to the fact that both are locations with high projected accident costs, are important corridors for transit service, and carry high and growing levels of system traffic. Both of these corridors have favorable Benefit / Cost ratios, Broadway under both existing and projected conditions and East Circle Drive in terms of projected conditions particularly. Broadway, because of volumes approaching capacity, has a corridor level of service that meets the thresholds established in the DEIS for grade separation

[16] Functional Classification refers to the system utilized by the Federal Highway Administration for classifying roadways into a hierarchical system reflecting the distinct functions or purposes that different roadways serve, based on the guidance contained in *Highway Functional Classification – Concepts, Criteria and Procedures*, Federal Highway Administration, March 1989.

consideration, and even with shortened queues will still experience disruptive queues on the northbound travel lanes frequently throughout the day.

I further believe that given the level of traffic downtown a second downtown grade separation is warranted and justified to assist in moving the volume of traffic entering and exiting downtown from the north on a daily basis. In looking at the comparative information presented for 11th Ave NW and 2nd Ave NE, it appears from a technical importance standpoint 11th Ave would probably have a higher priority than 2nd Ave NE given its higher ADT counts, poorer Level of Service, and high number of daily transit vehicles. However, the cost of construction and right of way at 11th Ave NW is significantly higher than at 2nd Ave NE. This cost differential affects the Benefit/Cost results that were computed for each structure, which indicate an investment in grade separation at 2nd Ave NE would probably be a better investment. Additionally, the 2nd Ave crossing is located 2 blocks directly south of Fire Station #2, providing the most direct and least congested route to incidents or emergencies occurring in downtown Rochester. Using 1998 records, we found that 48.8% of the vehicles dispatched from Fire Station #2 (650 out of 1332 for the year) were responding to calls requiring crossing of the railroad corridor, primarily to incidents in downtown Rochester or neighborhoods immediately south or southeast of downtown. Given the lower cost, easier implementation of a 2nd Ave NE grade separation (all needed right of way outside the existing street corridor is in public ownership), and its importance to timely emergency service response for downtown areas south of the tracks, the cost of the 2nd Ave NE grade separation was included for purposes of estimating mitigation costs in lieu of 11th Ave NW, which would pose more implementation hurdles to construct.

8. Comparison of R-2 vs R-4 Alternatives

The comparative information presented for Alternatives R-2 and R-4 indicate a significant difference in terms of the number of vehicles that would be delayed on a daily basis, the costs associated with traffic delay, and the potential level of accident hazard on the respective routes. The number of motorists affected by Alternative R-2 is over 1100% higher (10,359 vs. 847), and the percentage of motorists affected is higher (8.2% vs 6.4%) due to the higher level of congestion associated with the system in downtown Rochester. The comparative Hazard Prediction Index for the R-2 Alternative is 4.605, as compared to 0.752 for Alternative R-4.

II Noise and Vibration

Part 1: Summary of Issues and Concerns with the DEIS

In the DEIS the impact of noise and vibration to communities was quantitatively expressed through estimation of the number of structures that are expected to lie within projected 65db and 70db contour lines under wayside and horn noise conditions. The DEIS identifies a minimal level of mitigation to address identified noise and vibration impacts. Measures identified include the installation of rail lubrication systems on curves along the corridor, "consultation" on the implementation of measures to eliminate train horns if future FRA regulations are enacted, and an inspection program to minimize the development of wheel flats. In the area of vibration, the only potential mitigation the DEIS identifies is in the vicinity of the Mayo Medical Center in Rochester, where the document states that future vibration levels shall be maintained at a level not to exceed existing levels.

Others have commented on behalf of Rochester on a number of methodological issues (see verified statements by Philip H. Wheeler and Dr. Edward Walter) in the noise analysis contained in the DEIS. In addition to their comments, I believe the DEIS has failed to address the following issues of significance to the Rochester community:

A) The DEIS, in simply identifying the 65db and 70db contours, fails to quantify at a sufficient level of detail the projected noise levels impacting residents in the City of Rochester for the purpose of identifying where mitigation should be considered. Rochester's noise study (the Kroll Study[17]) identified areas of impact as high as 85db affecting households in close proximity to the rail corridor. The need for consideration of mitigation is much greater at 80 or 85dB than it is at 70db. Using the data in the Kroll Study, we have identified the following number of impacted residences in Rochester at various levels of noise impact:

[17] Rochester Noise Study, William H.O.. Kroll and Associates Inc., September 1998

- Residences at or above 80db: 8 dwelling units
- Residences between 75 and 80db: 88 dwelling units
- Residences between 70 and 75db: 343 dwelling units
- Residences between 65 and 70db: 2263 dwelling units

B) Research reported in the Federal Register[18] as well as in the FRA High Speed Rail Noise and Vibration Handbook[19] indicates that the level of annoyance and the qualitative impact of noise increases exponentially as noise levels exceed 65db level. The following charts indicate the findings of this research:

Figure 1: The Schultz Noise Annoyance Curve

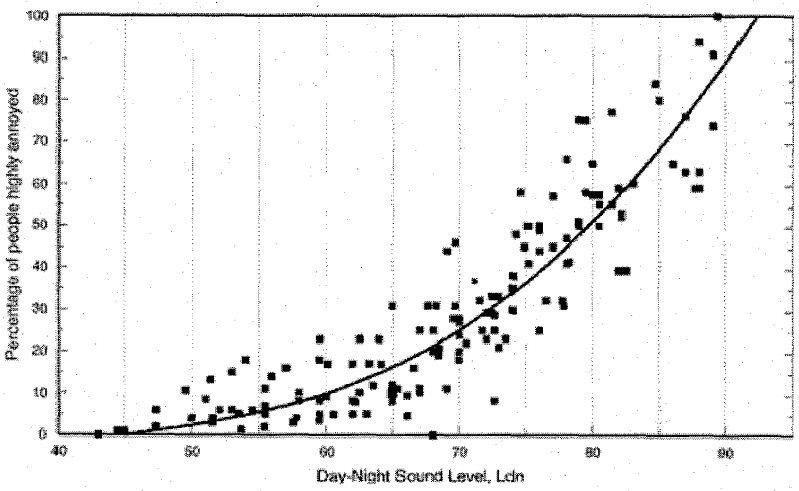


Figure 3. COMMUNITY ANNOYANCE DUE TO NOISE

[18] The Schultz Curve is discussed is the Federal Register, Vol. 65, No. 136, Friday, July 14, 2000, page 43820, as part of a Request for comments on a proposed Aviation Noise Abatement Policy 2000

[19] Transit Noise and Vibration Impact Assessment, Final Report, April 1995, Harris Miller Miller & Hanson Inc, Burlington, MA., for the Office of Planning, Federal Transit Administration, DOT-T-95-16, Chapter 3

Figure 2

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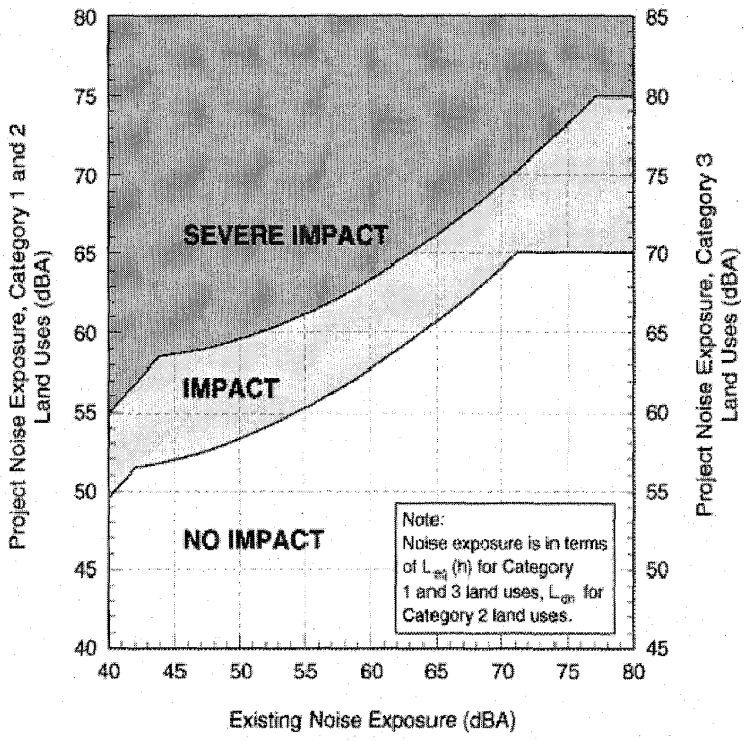


Figure 4. NOISE IMPACT CRITERIA

The projected level of noise increase expected to occur in Rochester when evaluated against the criteria in Figure 1 suggests that there will be a significant number of residents who will be "highly annoyed" by the noise levels created by this project.

The projected level of noise increase expected to occur in Rochester when evaluated against the criteria in Figure 2 indicates that everyone within the 65db or greater area will experience "Severe Impact" based on the information in the graph. This includes all 2702 dwelling units previously referenced who will experience noise in excess of 65db if the projected level of train traffic materializes. The key factor in applying the criteria in Figure 2 is fact that all housing units within the noise impact zone will experience a projected 18-20db increase in noise over existing ambient levels.

The DEIS contains no acknowledgment of the severity of impact that will be experienced in Rochester as a result of the project, but simply reports on the number of dwellings expected to fall within various noise contour zones. The DEIS oversight of this matter is a major omission in the analysis of impact.

C) The DEIS identifies but makes no attempt to quantify the economic impact of noise to the community in its discussion of property value loss. The DEIS suggests that the demand for housing that would be created by the project would offset future declines in property values, if decline in fact happens at all. It should be noted that the length of construction work associated with the project, and the number of permanent jobs associated with the project, are so small as to make it highly unlikely that they will have any effect on the Rochester housing market. Table 3.2.26 on page 3.2-110 of Volume II of the DEIS identifies construction related employment for only 57 individuals in Olmsted County, which would likely occur for only a portion of the construction period. Page 3.2-8 of Volume II states that the long term increase in the number of railroad related jobs at 100MT level of coal traffic would be approximately 210 in Minnesota, far below the number of impacted residential householders in the State of Minnesota.

As reported in the verified statement of Terry Spaeth, Administrative Assistant for the City of Rochester, the total value of all affected property within the noise impact area is $383 million dollars and the estimated property value loss impact for these properties is $53.3 million dollars. A Chaddick Institute report[20] identifies six studies documenting the level of residential property value impact associated with transportation related noise. Taking the average value of these six studies, and applying it to the findings of the Kroll Study, we have calculated a potential residential property value loss of $14.4 million dollars in the City of Rochester. This loss represents an indirect cost of the project imposed on the community for which no mitigation is identified. The impact of this is felt first and foremost by the

[20] Schwieterman, Joseph P. and Baden, Brett, "Alternatives to the Whistle: Economic Perspectives on Public Education and Enforcement in promoting Highway-Rail Grade Safety in Metropolitan Chicago, Chaddick Institute Working Paper 09-00, Chaddick Institute for Metropolitan Development, DePaul University, November 2000

residential property owner, who is directly impacted by the loss of value (and thus personal wealth) that the train traffic would impose. Furthermore, we expect that this household loss will translate over time into a community loss of tax base, as property values adjust, either through appeals of valuation or increases in valuation that occur much slower than the market in general. Examples of successful appeals by property owners are beginning to surface throughout the country in response to transportation noise impact; two recent cases reported in the archives of the Noise Pollution Clearinghouse website (www.nonoise.org) of successful appeals by property owners are included in Exhibit Q of this document.

D) The DEIS fails to identify the full range of potential vibration impacts that could be created by the proposed project. In Appendix F of the DEIS the memorandum by Wilson, Ihrig & Associates identifies three major impacts of concern, including 1) building damage, 2) human response, and 3) industrial, commercial and institutional impacts. Material in that memorandum, supplemented by review of information in Transit Noise and Vibration Assessment[21], suggests screening distances to identify potential sensitive receptors of 100 feet for typical residential structures, 400 feet for historical structures, and 1000 feet for sensitive business processes.

While the DEIS does discuss Mayo Medical Center, PEMSTAR and the Federal Medical Center as potential receptors, it does not identify historic structures on the Federal Register of Historic Places that could be affected. In the City of Rochester these include the Avalon Hotel, located at 301 North Broadway, and the Whiting House, located at 225 1st Ave NW. The location of these historic structures relative to the rail corridor is illustrated in Exhibit Y. What makes the location of these structures particularly critical relative to vibration impact is the location of rail switches in close proximity to the structures (also illustrated in Exhibit Y) which are features that typically will result in greater vibration generation. Furthermore, after identifying a significant (but understated) number of residential receptors, the DEIS contains no discussion or recommendation regarding the need or alternatives for mitigation of impacted residential properties.

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[21] See Footnote 19

E) The DEIS fails to consider the cumulative impact of noise and vibration on residential households within close proximity to the track. The significance of having both noise and vibration present is discussed in the attached papers (See Exhibit R) taken from the Journal of Sound and Vibration, which reports on research conducted in Europe indicating that households experiencing simultaneous noise and vibration perceive the impact of the noise to be approximately 10db greater than its measured value.

This represents another instance where the DEIS has failed to consider the cumulative effect of multiple environmental impacts creating synergies that result in greater harm then impacts in isolation would create.

Part 2: Degradation of the Community and Justification for Mitigation

The City of Rochester has included a proposed Mitigation Plan for Alternative R-2 that includes a five part program designed to address the serious impacts from noise and vibration that would occur if the project proceeds under Alternative R-2. The City of Rochester believes a combination of measures are needed to address the intense noise and vibration impact this project will create on the community, and in particular the impact it will have on Environmental Justice populations located in neighborhoods adjacent to the railroad corridor. The range of stressors associated with noise and vibration include property value devaluation and activity interference[22] including sleep disturbance, conversation disruption, loss of residential amenity and possible health degradation[23]. While we believe the program that has been identified represents a reasonable and feasible mitigation program, we footnote our proposal with the caveat that it will not totally ameliorate the impact of noise on the community, and it represents only a basic vibration mitigation program that needs to supplemented with further

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[22] *Protective Noise Levels (Condensed Version of "LEVELS DOCUMENT")* EPA Office of Noise Abatement and Control, EPA Document Control Number 550/9-79-100, NTIS Publication Number PB82-138827, 1984

[23] Berglund, B. & Lindvall, T. (eds.) *Community Noise,* Archives of the Center for Sensory Research, 1995, 2(1), 1-195

detailed testing and analysis to insure that the necessary measures are identified to maintain vibration at its current level.

The mitigation program recommended is based on the noise contours established in the Kroll Study completed for the City of Rochester in 1998, which has been previously submitted to the SEA as part of previous submittals of the City. The identification of vibration impact zones is based on previously referenced information from the memorandum *Ground Vibration Impacts Associated with Unit Coal Trains on the DM&E Railroad*, by Wilson, Ihrig & Associates, found in Appendix F of the DEIS. While the DEIS has recognized the potential risk from vibration that the project poses for the Mayo Medical Center, it has not addressed potential serious problems associated with the PEMSTAR manufacturing firm and the Federal Medical Center in Rochester, and it has ignored potential vibration impact to residential dwellings in close proximity to the rail corridor.

Exhibit S illustrates the critical distances that were used from the Kroll Study that were used to determine the number of impacted dwellings or structures within various noise contour zones. Critical distances based on the work of Kroll and the vibration references previously noted include:

- Residences within 100 feet are predicted to experience noise levels exceeding 80db and are at high risk for vibration impact, which has the potential to accentuate the noise impact so that noise will be perceived to be the equivalent of 90+db.
- Residences from 100 feet to 220 feet are in a zone where potential noise impact exceeds 75db according to the Kroll Study and the wayside noise level according to the DEIS exceeds 70db
- Residences in the zone from 220 feet to 525 feet are predicted by Kroll to lie within an areas where noise impact will exceed 70db

It should be noted that as discussed in the verified statement of Dr. Edward Walter and Mr. Philip Wheeler that are incorporated as part of the City of Rochester's response to the DIES that the noise contours of Kroll may understate the true noise impact area.

The noise program proposed includes the following elements

- 12-15 foot noise walls in residential neighborhood areas for the purpose of minimizing wayside noise generated by the wheels and wheel/track interaction. The construction of high walls to more effectively buffer all locomotive engine noise and horn noise are considered infeasible due to height of wall that would be needed, which was determined to be a minimum of 25-30 feet. Additionally, the use of walls for horn and locomotive noise was deemed to be ineffective due to the number of breaks for highway-rail crossings found in the city along the corridor.
- A whole house sound insulation package for homes located within the 75+db contour zone, encompassing those dwellings within 220 feet of the track, to effectively provide for 5-8db interior noise reduction in this high impact area.
- A partial house sound insulation package for homes located in the 220 to 525 foot zone, which would involve window and door replacement and insulation on that side of the home facing the rail corridor to provide 3-5db interior noise reduction in the secondary impact area.
- Homes within the 100 foot zone would be targeted for acquisition due to the combined effects of noise and vibration expected and the likely ineffectiveness of the measures to provide the necessary 20db reduction in noise to reduce noise levels to or below 65db
- If rules are promulgated by the FRA to allow creation of whistle free zones, the mitigation cost package includes an incremental cost of $121,000 per crossing above the estimated unit cost of $160,000 to install standard signal and gates, to provide for the installation of necessary protection features such as four-quadrant gate systems and raised medians that will be required to satisfy the whistle free crossing standards.

The vibration program[24] proposed includes the following elements

- Installation of rubber tie plate insulators
- Installation of floating slab or subbase below the ballast

The goal of the noise mitigation program is to reduce high levels of noise impact affecting large number of individuals as cost effectively as possible. The proposed program, which we estimate

[24] DM&E Study – DEIS Review, Technical Memorandum – Vibration Analysis, Wilbur Smith Associates, prepared for the City of Rochester, Minnesota, December, 2000

to cost $12.9 million, works out to an average cost of $4775 per affected unit. At this time no effort has been made, however, to assess the specific effectiveness of the program in order to be able to calculate cost per decibel reduction per unit, which is a standard measure of cost effectiveness used by a number of state departments of transportation for assessing the feasibility of noise mitigation.

In summary, we believe that noise and vibration mitigation is warranted based on the following factors:

- The number of dwelling units impacted, which for Alternative R-2 represent a full 23% of the homes in Minnesota that will be impacted by horn/wayside noise above 65db (as reported in Chapter 3, Volume II, of the DEIS);
- The qualitative "severe impact" expected to affect all dwellings within the noise impact area;
- The presence of significant Environmental Justice populations in the impact area who will disproportionately impacted by the noise impact;
- The significant financial loss in property value expected, totaling an estimated $53.3 million for the community as a whole, including an estimated $14.4 million just for residential homeowners in the impact area;
- The cumulative impact of Noise and Vibration for homes within the close proximity to the rail corridor

Part 3: Detail Description of Noise Mitigation

Table 16 describes the noise mitigation elements of the Rochester proposal.

Table 16 Summary of Noise Mitigation Elements

Item	Estimated Cost	Notes
Property Acquisition	$1,631,400	Estimated to involve 12-15 residential structures located within 100' of rail corridor. Cost estimate includes 150% of assessed value plus relocation expense of $25,000 and acquisition process expenses of $5,000
Complete Structural Sound	$2,410,000	This element would provide a complete sound insulation package for a mix of predominantly single family homes with a small number of 2,3 and 4-6 plex units also treated. Cost

Insulation		were estimated at $25,000 for single family homes, $30,000 for duplex or tri-plexes, and $50,000 for 4or 6 plexes. A total of 92 structures and 116 units would be protected.
Partial Structural Sound Insulation	$4,650,000	This element would provide a partial insulation package for 310 structures with 343 units at a cost averaging $12,500 per dwelling unit.
Noise Wall	$3,210,150	This element would include the construction of an estimated 13,375 of noise wall at a unit cost of $240 per lineal foot. Exhibit T illustrates the location of proposed noise walls, which includes a wall to protect the Federal Medical Center Security System from the noise induced vibration that would compromise the system
Creation of Whistle Free Grade Crossings	$1,089,000	This element includes the necessary funds to upgrade nine at-grade crossings to whistle free status.

III Sidings

In Chapter 1, page 1-27 of the DEIS, the concept of sidings is described and their integral importance to the operation of a single main line track is identified. The 2nd paragraph on page 1-27 states that the initial number and location of sidings would be based on existing train traffic and the addition of 40MT of coal traffic, with additional sidings added or initial sidings lengthened as coal traffic increases. At the 100MT level of coal, it is expected that sidings would be approximately 3 to 7 miles in length at a spacing of 12 to 25 miles. Page 1-28 in Chapter 1 describes in general terms how traffic flow would occur in the vicinity of a siding in the 2nd paragraph on that page. It describes the concept of the empty westbound trains slowing and switching onto the siding, allowing loaded eastbound trains to maintain speed and pass, without either train needing to slow or stop. It notes that trains on the siding could occasionally be required to stop for a short period.

Chapter 2 of the DEIS contains three alternative siding plans, which correspond to the three extension alternatives (B,C and D) retained in the DEIS for evaluation purposes. Alternative C

represents the proposal submitted by the applicant for consideration, while B and D represent alternatives identified by the SEA for further consideration. Exhibit U maps the locations of sidings in Olmsted County, Minnesota and the Rochester area under the different alternatives. These exhibits illustrate that the number of sidings vary from a low of two in Alternative C to a high of five in Alternative B. The alternatives present very different conditions in terms of spacing and length of sidings.

A number of questions are raised in our review of the alternative siding plans. The most obvious is the difference in the number of sidings identified, which vary from a low of 45 in alternative C (Table 2-7) to a high of either 63 in alternative D (Table 2-8) or 68 in alternative B (Table 2-6). We would note an incongruance between the numbers listed in these tables with those given in Table 2-1 on page 2-12, which identify 43 sidings for both alternatives B and C, and a range of sidings from 43 to 55 for the various Alternative D variations.

Given the wide variation in information regarding sidings, we would request further clarification be presented in the FEIS as to the criteria for siding locations and would further request that consideration be given to the establishment of no-build zones in areas where the operation of sidings could have detrimental environmental impacts on communities. While we understand in theory the desire for relatively equal spacing and sidings 3 to 7 miles in length, we do not see evidence of these criteria being used in the establishment of siding placement, particularly east of milepost 100 on the corridor. From analyzing the information in Tables 2-6 through 2-8, many of the sidings in the eastern 100 miles of the corridor are significantly shorter than 3 miles in length, and are located at very divergent spacings.

The concern of Rochester with the proposed siding plans is that the DEIS fails in any manner to address the potential impacts that could be created by siding locations. This is includes detrimental impact due to added vibration, noise, and traffic delay impact depending on the location of sidings.

Expected impacts that can be attributed to sidings include the following:

- Increased noise generated by the simultaneous passage of trains
- Localized areas of increased vibration due to the presence of traffic across switches

- Traffic delay if in fact train speed cannot be maintained, which is highly likely on the shorter siding lengths proposed in the eastern project area and operational questions regarding how switching will be managed without the use of power switches.

The use of each individual siding, based on relatively even traffic flow throughout the system, would average out to be approximately 7-8 passing movements per siding per day. This was calculated by assuming 17 coal train movements in each direction plus 2 manifest movements in one direction and 1 return movement in the opposite direction, resulting in 19 x 18 or 342 passing movements that have to occur on the system each day. If there are 45 sidings, this will result in the indicated 7-8 passings per siding.

Given the probability for above described impacts, to preserve the level of impact at that identified in the DEIS the City of Rochester finds that certain parameters should be established for the location of sidings. These should include:

- To minimize noise and vibration impact no sidings should be established within 1260 feet of any residential area
- Siding locations should be located so as not to impact any crossing with over 1000 ADT
- Sidings located to the east of communities should be located far enough from major streets to allow trains that must stop or slow to under 10 MPH hour enough distance to regain adequate speed (above 35 MPH) before reaching a community in order to minimize traffic delay. Exhibit V illustrates typical distances needed to bring trains back up to speed after slowing or stopping on a siding.
- If a siding must be located in proximity of a community effort should be made for it to be located west of community to avoid problems with slow moving trains in the cities. This means that the entrance to a siding, however, should be at least the length of the train beyond the community.

The attached map (Exhibit Z) illustrates in the vicinity of Rochester where no-build zones should be established.

VERIFICATION

STATE OF MINNESOTA

COUNTY OF OLMSTED

I, Charles N. Reiter, first being duly sworn, depose and say that I have read the foregoing statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

Charles N. Reiter

Subscribed and sworn before me this 28th day of February, 2001

Theresa M. Fogarty
Notary Public

My Commission expires

THERESA M. FOGARTY
Notary Public
Minnesota
My Commission Expires Jan. 31, 2005

EXHIBIT A

REVIEW OF VEHICULAR TRAFFIC DATA INFORMATION

This Exhibit documents Rochester's review of the source and year that traffic counts used in Traffic Delay and Traffic Safety Analysis contained in DEIS were gathered.

The table also contains Rochester's 1998 traffic count estimates that had been previously submitted during the Scoping Phase of the project, and the counts used in the Minnesota Department of Transportation *Southern Minnesota Rail Corridor Study*, dated February 15, 2000.

The table also identifies discrepancies between the count data used in the DEIS for the traffic delay analysis and the traffic safety analysis, which do not always match.

EXHIBIT A: Source of Vehicular Traffic Estimates used in DEIS

	A	B	C	D	F	I	J	K	X	Y	Z	AA
1												
2												
3												
4					ROCHESTER 1998	STB TRAFFIC	STB ACCIDENT	MNDOT REPORT (existing)				
5	FRA ID	Jurisdiction	CROSS STREET	DESIGNATION	ESTIMATE	ANALYSIS	ANALYSIS	Source: Table 4	IDENTIFIED SOURCE OF DATA			
6	193288R	Section 31 Kalmar Twp	TWN 202	TWN 202	120	100	100	120	FRA National Highway-Rail Crossing Inventory / 1989			
7	911209L	BYRON	9TH AVE NW	MUN 9999	360	250	250	360	FRA National Highway-Rail Crossing Inventory			
8	193287J	BYRON	2ND AVE NW	CSAH 5	4,820	4,400	4,400	4,820	MNDOT 1994 State Aid Count			
9	193286C	BYRON	BYRON AVE N	MUN 14	4,710	3,064	3,064	4,710	FRA National Highway-Rail Crossing Inventory / 1993			
10	193236Y	BYRON	10TH AVE NE	MUN 72	475	100	100	475	FRA National Highway-Rail Crossing Inventory / 1988			
11	193285V	Section 34 Kalmar Twp	CSAH 3	CSAH 3	1,010	750	750	1,010	MNDOT 1994 State Aid Count			
12	193235S	Sec36 Kalmar / 31 Cascade	COUNTY 104	COUNTY 104	3,560	2,250	2,250	3,560	MNDOT 1994 State Aid Count			
13	193232W	ROCHESTER	7TH ST NW	MSAS 124	7,500	6,900	6,900	7,500	MNDOT 1994 State Aid Count			
14	193282A	ROCHESTER	11TH AVE NW	MSAS 113	13,125	12,400	12,400	13,125	MNDOT 1994 State Aid Count			
15	193281T	ROCHESTER	6TH AVE NE	MSAS 116	3800	3,800	3,800	3,800	MNDOT 1994 State Aid Count			
16	193280L	ROCHESTER	4TH AVE NW	MSAS 107	7,950	7,200	7,200	7,950	MNDOT 1994 State Aid Count			
17	193278K	ROCHESTER	1ST AVE NW	MUN 470	1,750	4,726	4,726	1,750	Minnesota Highway-Rail Crossing Inventory / 1988			
18	193277D	ROCHESTER	BROADWAY	USTH 63	25,020	19,200	19,200	18,000	MNDOT 1994 State Aid Count			
19	193276W	ROCHESTER	2ND AVE NE	MSAS 109	10,900	8,850	8,850	10,900	MNDOT 1994 State Aid Count			
20	193275P	ROCHESTER	7TH AVE NE	MUN 481	436	436	870	436	(436) Rochester Planning Dept 1998 (870) Unidentified			
21	193274H	ROCHESTER	9TH AVE NE	MUN 482	780	820	820	780	FRA PCAPS Accident History Database (Year Unknown)			
22	193273B	ROCHESTER	11TH AVE NE	MSAS 110	10,080	10,800	10,800	10,080	MNDOT 1994 State Aid Count			
23	193272U	ROCHESTER	15TH AVE NE	MUN 274	870	955	955	870	Source of data unidentified			
24	911202N	ROCHESTER	E. CIRCLE DRIVE	CSAH 22	7,820	7,500	7,500	7,820	MNDOT 1994 State Aid Count			
25	193270F	Sec 4 Marion Twp	COLLEGEVIEW ROAD	CSAH 9	3,330	3,200	3,200	3,330	MNDOT 1994 State Aid Count			
26	193269L	Sections 3/4 Marion Twp	50TH AVE SE	CSAH 11	1,250	1,200	1,200	1,250	MNDOT 1994 State Aid Count			
27	193267X	SEC 11 TWP 106 RGE 13	60TH AVE SE	TWN 211	90	86	86	90	FRA PCAPS Accident History Database (Year Unknown)			
28	193266R	CHESTER	CHESTER AVE	COUNTY 119	460	440	440	460	MNDOT 1994 State Aid Count			
29	193220C	SEC 08 TWP 106 RGE 12	3 MI W. OF EYOTA	COUNTY 102	100	100	100	100	Rochester-Olmsted Planning Dept (1998)			
30	193219H	SEC 09 TWP 194 RGE 12	COUNTY 102	COUNTY 102	30	50	30	30	(50) Unidentified Source			
31	193216M	SEC 10 TWP 106 RGE 12	TWN 1123	TWN 112	50	2,600	50	50	MNDOT 1994 State Aid Count (2,600)			
32	193264C	EYOTA	CSAH 7	CSAH7	3,160	2,300	2,600	3,160	MNDOT 1994 State Aid Count (2600)			
33	193263V	EYOTA	CENTER ST	CSAH 7	2,520	3,515	2,300	2,520	MNDOT 1994 State Aid Count (2300)			
34	193262N	SEC 18 TWP 106 RGE 11	TWN 90	TWN 90	50	1,500	50	50	FRA PCAPS Accident History Database (Year Unknown)			
35	193261G	SEC 17 TWP 106 RGE 11	CSAH 32	CSAH 32	250	155	200	250	Source of data unidentified			
36	193260A	DOVER	CHATFIELD ST	CSAH 10	1,380	55	1,300	1,380	MNDOT 1994 State Aid Count (1,300)			
37	193195W	SEC 23 TWP 106 RGE 11	TWN 667	TWN 667	35	365	25	35	FRA PCAPS Accident History Database (Year Unknown)			
38	193259F	SEC 23 TWP 106 RGE 11	TWN 591	TWN 591	25	4,700	25	25	FRA PCAPS Accident History Database (Year Unknown)			
39	193258Y	SEC 24 TWP 106 RGE 11	TWN 668	TWN 668	25	80	25	25	FRA PCAPS Accident History Database (Year Unknown)			

B

EXHIBIT B

CALCULATION OF DAILY TRAIN NUMBERS

The DEIS Traffic Safety Analysis consider two lengths of train, one of 6400' and one of 7400'. For each length the analysis assumes the same number of daily trains would be needed to ship comparable levels of coal. This exhibit demonstrates that train counts will be higher than used in the DEIS if 6400' trains are assumed.

	A	B	C	D	E	F
1	**VERIFICATION OF NUMBER OF TRAINS NEEDED TO SHIP 100,000,000 TONS ANNUALLY**					
2						
3	TOTAL ANNUAL TONNAGE		**Estimate of Number of Trains / 6400'**		**Verification of Length**	
4	100,000,000		286,000	lbs per loaded gondola	115	6106.5
5			43,000	lbs per empty gondola	CAR	
6			243,000	lbs coal per gondola	TRAINS	
7	TOTAL DAILY TONNAGE		122	tons coal per gondola	(53.1 ft long)	
8	273,972.60		13,973	tons/115 gondola train	3	219.6
9			20	loaded coal trains needed	Locomotives	
10			40	total coal trains	(73.2 ft long)	
11			43	total trains with manifest		6326.1
12						Total length
13						
14	TOTAL ANNUAL TONNAGE		**Estimate of Number of Trains / 7400'**			
15	100,000,000		286,000	lbs per loaded gondola	135	7168.5
16			43,000	lbs per empty gondola	CAR	
17			243,000	lbs coal per gondola	TRAINS	
18	TOTAL DAILY TONNAGE		122	tons coal per gondola	(53.1 ft long)	
19	273,972.60		16,403	tons/135 gondola train	4	292.8
20			17	loaded coal trains needed	Locomotives	
21			34	total coal trains	(73.2 ft long)	
22			37	total trains with manifest		7461.3
23						Total length
24	**VERIFICATION OF NUMBER OF TRAINS NEEDED TO SHIP 50,000,000 TONS ANNUALLY**					
25						
26	TOTAL ANNUAL TONNAGE		**Estimate of Number of Trains / 6400'**			
27	50,000,000		286,000	lbs per loaded gondola		
28			43,000	lbs per empty gondola		
29			243,000	lbs coal per gondola		
30	TOTAL DAILY TONNAGE		122	tons coal per gondola		
31	136,986.30		13,973	tons/115 gondola train		
32			10	loaded coal trains needed		
33			20	total coal trains		
34			23	total trains with manifest		
35						
36						
37	TOTAL ANNUAL TONNAGE		**Estimate of Number of Trains / 7400'**			
38	50,000,000		286,000	lbs per loaded gondola		
39			43,000	lbs per empty gondola		
40			243,000	lbs coal per gondola		
41	TOTAL DAILY TONNAGE		122	tons coal per gondola		
42	136,986.30		16,403	tons/135 gondola train		
43			9	loaded coal trains needed		
44			18	total coal trains		
45			21	total trains with manifest		

	A	B	C	D	E	F
46						
47	**VERIFICATION OF NUMBER OF TRAINS NEEDED TO SHIP 20,000,000 TONS ANNUALLY**					
48						
49	TOTAL ANNUAL TONNAGE		**Estimate of Number of Trains / 6400'**			
50	20,000,000		286,000	lbs per loaded gondola		
51			43,000	lbs per empty gondola		
52			243,000	lbs coal per gondola		
53	TOTAL DAILY TONNAGE		122	tons coal per gondola		
54	54,794.52		13,973	tons/115 gondola train		
55			4	loaded coal trains needed		
56			8	total coal trains		
57			11	total trains with manifest		
58						
59						
60	TOTAL ANNUAL TONNAGE		**Estimate of Number of Trains / 7400'**			
61	20,000,000		286,000	lbs per loaded gondola		
62			43,000	lbs per empty gondola		
63			243,000	lbs coal per gondola		
64	TOTAL DAILY TONNAGE		122	tons coal per gondola		
65	54,794.52		16,403	tons/135 gondola train		
66			4	loaded coal trains needed		
67			8	total coal trains		
68			11	total trains with manifest		

C

EXHIBIT C

APPLICANT'S GRADE CROSSING PROTECTION CRITERIA

This exhibit illustrates the grade crossing protection criteria that the applicant presented to Olmsted County in its proposed Community Partnership Agreement.

Grade Crossing Traffic Control Criteria

Grade Crossing Traffic Control Classifications

Various forms of grade crossing traffic control are used, such as crossbucks, flashing warning lights, or flashing lights with gates. DM&E has categorized 6 (six) different traffic control devices as follows:

Level of Traffic Control	Description
A	No Protection
B	Crossbucks
C	Crossbucks with Stop Signs
D	Flashing Red Lights
E	Flashing Red Lights with Gates
F	"Whistle Free," which includes flashing lights with gates plus additional protection options such as two additional gates to provide four quadrant protection or center highway medians to prevent "drive arounds" by motorists.

Olmsted County, MN

DM&E

Baseline Formula

A formula was developed to establish a "baseline" for traffic control devices. This "baseline" can be enhanced but will not be reduced. The first step in determining the appropriate baseline level of traffic control to be utilized at a crossing is calculating the Exposure Index. The Exposure Index is defined as the number achieved when multiplying the number of daily trains by the Average Daily Traffic (i.e. number of cars per day crossing the track)

Exposure Index = Daily Train Traffic X Average Daily Traffic (vehicles)

Nationwide it is common to use an Exposure Index of 5,000 as a threshold. For an exposure index below 5,000 DM&E will install Level B. Stop signs can be added upgrading the proposed traffic control device to Level C. For an Exposure Index of 5,000 or more DM&E will install Level D. If the Average Daily Traffic count is 2,000 or more DM&E will install Level E. Level F is a noise issue, unrelated to the formula, providing whistle free technology.

Calculating Service Start Up and Future Level of Service

DM&E projects service start up to provide 20 net million tons (20 NMT) of coal traffic annually. This is estimated to be approximately 4 loaded coal trains, 4 returning empty trains plus 3 non-coal trains daily for a total of 11 trains per day. For start up service, therefore, 11 daily trains are used in calculating the Exposure Index.

If in the future coal train traffic increases DM&E will recalculate the Exposure Index using the revised daily train traffic and make appropriate upgrades to the crossing control devices.

For both service start up and all future calculations DM&E will use the Average Daily Traffic as presented in this Agreement.

Olmsted County, MN

DM&E

D

EXHIBIT D

MNDOT GRADE CROSSING PROTECTION CRITERIA

This exhibit illustrates the criteria of the Minnesota Department of Transportation for grade crossing protection.

Office of Freight, Railroads and Waterways
Minnesota Department of Transportation

Guidelines for Signals at Railroad - Highway Grade Crossings

After an engineering study has been conducted and it has been determined that the crossing cannot be closed, **signals should be considered under any of the following conditions**:

1. The "exposure" (average daily traffic times the number of daily trains), is greater than 5,000. There should be a minimum average of 0.5 trains per day and 250 vehicles per day.

2. Required sight distances for a moving vehicle cannot reasonably be achieved and the Average Daily Traffic exceeds 750 (see sight quadrants chart).

3. The angle of the crossing is skewed to the extent that the average driver must turn their head an unreasonable amount and the crossing alignment cannot be improved with reasonable measures.

4. There have been three or more crashes at the crossing in the last five years. Crashes involving suicides and acts of gross driver disregard for warning devices are not counted.

5. A combination of visibility, exposure and/or crash concerns, as recommended by a Mn/DOT railroad crossing technical review team.

These are general guidelines and the decision to install or not to install signals may be impacted by other extenuating circumstances.

If signals are recommended, cantilevers should be added when any of the following apply:

1. The signal mast will be more than 14 feet from the edge of the driving lane.

2. There are two or more lanes of traffic (including truck stopping lanes) in the same direction and it is possible for a vehicle in the outside lane to block the view of the signal for those in the inner lanes.

3. The Mn/DOT railroad crossing technical review team determines that a particular sight problem exists which can be improved with the use of cantilever arms.

If signals are recommended, gates should be added when any of the following apply:

1. Multiple main line railroad tracks.

2. Multiple tracks at or in the vicinity of the crossing which may be occupied by a train or locomotive so as to obscure the movement of another train approaching the crossing.

3. High speed train operation (40 MPH or over) at either single or multiple track crossings.

4. A combination of high vehicular speeds (40 MPH or over) and high vehicular volumes (current ADT of 2,000 or more).

5. There are substantial numbers of school busses or trucks carrying hazardous materials.

6. It would make the signal system consistent with neighboring installed systems.

7. The Mn/DOT railroad crossing technical review team recommends them because of one or any combination of the following conditions; high volumes of vehicular or train traffic, high speeds of either vehicles or trains, high "people factor", unusually restricted sight distances and continuing accident occurrences.

   "People Factor" is a measure of the number of individuals that may be exposed to the dangers at a grade crossing. Many vehicles carry large numbers of people and statistics such as ADT do not reflect this factor. Examples of vehicles and trains which contribute to a high "people factor" are school buses and passenger trains.

For more information, contact the Office of Freight, Railroads and Waterways at (651) 296-0359.

Office of Railroads and Waterways
Minnesota Department of Transportation

Stop Signs at Railroad Crossings

The STOP signs installed at railroad grade crossings on public roadways must be authorized by the Commissioner of the Minnesota Department of Transportation before they are installed.

STOP signs are primarily installed at grade crossings when there are less than 700 cars a day and the train speed is greater than 40 miles per hour and there are more than 5 trains a day.

The Minnesota Statute regarding STOP signs is found in Chapter 219.20: "STOP SIGNS." Subdivision 1. **When installation is required; procedure.** At each grade crossing where, because of the dangers attendant upon its use, the reasonable protection of life and property makes it necessary for persons approaching the crossing to stop before crossing the railroad tracks, stop signs must be installed. When the government entity responsible for a road that crosses a railroad track deems it necessary to install stop signs at that crossing, it shall petition the commissioner to order the installation of the stop signs. The commissioner shall respond to the petition by investigating the conditions at the crossing to determine whether stop signs should be installed at the crossing. On determining, after an investigation following a petition from a governmental agency or subdivision or on the commissioner's own motion, that stop signs should be installed at a crossing, the commissioner shall designate the crossing as a stop crossing and shall notify the railway company operating the railroad at the crossing of this designation. Within 30 days after notification, the railway company shall erect the uniform stop crossing signs in accordance with the commissioner's order."

Under Minnesota's Signing and Pavement Marking Program, 36" STOP signs were installed. When an authorized STOP sign is installed at a public grade crossing, the railroad should install a 36" STOP sign made of wide-angle, prismatic retroreflective sheeting material or the equivalent.



The Minnesota Manual on Traffic Control Devices (1/94) says the following regarding STOP signs at grade crossings {section 8B-9}:

"STOP or YIELD signs may be used at highway-rail grade crossings, at the discretion of the State, for crossings that have two or more trains per day and are without automatic traffic control devices. This is in accordance with State Statute 219.20..." as underlined above.

8B-9 continued ... "For other crossings with passive protection, STOP or YIELD signs may be used after need is established by a traffic engineering study. The study should take into consideration such factors as: volume and character of highway and train traffic, adequacy of stopping sight distance, crossing accident history, and need for active control device.

For all highway-rail grade crossings where STOP or YIELD signs are installed, the placement shall conform to the requirements of MN MUTCD section 2B-9, Location of Stop Sign and Yield Sign. STOP AHEAD or YIELD AHEAD Advance Warning signs shall also be installed."

The Office of Freight, Railroads and Waterways uses the following criteria when reviewing grade crossings for potential STOP sign installation:

The use of the STOP signs at railroad-highway grade crossings shall be limited to those grade crossings

selected after need is established by a detailed traffic engineering study. Such crossings should have the following characteristics:

1. Highway should be secondary in character with low traffic counts (below 700 A.D.T..)

2. Train traffic should be substantial.

3. Line of sight to an approaching train is restricted by physical features such that approaching traffic is required to reduce speed to 10 miles per hour or less in order to stop safely.

4. At the stop bar, there must be sufficient sign distance down the track to afford ample time for a vehicle to cross the track before the arrival of the train.

The engineering study may determine other compelling reasons for the need to install a STOP sign, however, this should only be an interim measure until active traffic control signals can be installed. STOP signs shall not be used on primary through highways or at grade crossings with active traffic control devices. Whenever a STOP sign is installed at a grade crossing, a STOP AHEAD sign shall be installed in advance of the STOP sign.

There are numerous details that need to be reviewed before STOP signs can be authorized. The site quadrants are reviewed for any obstacles such as trees or buildings. The number of train movements per day and the Annual Average Daily Traffic (AADT) count are also reviewed. If there are more than 700 cars travelling over a crossing a day, we do not recommend STOP signs to be placed at the crossing. If there are over 700 cars a day and poor sight distances, other safety improvements should be explored such as signals or removal of obstacles.

NOTE: If a situation is encountered where no room is available to install STOP AHEAD signs, the local road authority MUST document why no STOP AHEAD signs are installed.

The following detail illustrates the proper installation of a crossbuck assembly with a STOP sign:

HOW TO REQUEST A REVIEW FOR A STOP SIGN:

1. Send a request for a review of a specific site to:

Minnesota Department of Transportation
Office of Freight, Railroads and Waterways
Attn: Robert G. Swanson
Mail Stop 470
395 John Ireland Boulevard
St. Paul, MN 55155

2. The Office of Freight, Railroads and Waterways (OFRW) will have a technical review completed.

3a. **If the review reveals that STOP signs can be authorized:**
   a. OFRW will write an Order for the Commissioner's signature authorizing STOP signs be installed.
   b. Commissioner signs the Order.
   c. OFRW informs the railroad that STOP signs must be installed within 30 days.
   d. OFRW will inform the local road authority that STOP signs were authorized and the railroad will be installing the signs within 30 days.
   e. Local Road Authority will install STOP AHEAD sign.

3b. **If the review reveals that STOP signs should not be authorized:**
   a. OFRW informs the requestor of the results of the technical review.

EXHIBIT E

GRADE CROSSING PROTECTION ASSUMPTIONS FOR ROCHESTER'S ANALYSIS OF ALTERNATIVE R-4

The DEIS assumes that that all grade crossing protection on Alternative R-4 would be of a passive (i.e., crossbucks/stop signs). The City of Rochester feels this assumption is flawed, as the State Department of Transportation would be unlikely to agree to that level of protection under any circumstances. Rochester suggests that the criteria contained in the applicant's proposed Community Partnership Agreements, illustrated in Exhibit C, should have been used as a minimum required grade crossing protection in Alternative R-4. The following table illustrates the crossing protection that would have been used under these criteria.

This table also identifies where incorrect highway surface type was used in the traffic safety analysis for Alternative R-4.

DM&E RAILROAD - POWDER RIVER BASIN PROJECT

***COMPARISON OF DEIS GRADE CROSSING PROTECTION & APPLICANT CRITERIA**

***COMPARISON OF DEIS ROAD SURFACE ASSUMPTION & ACTUAL SURFACE**

		OLMSTED COUNTY TRAFFIC ESTIMATES		DEIS CROSSING PROTECTION ASSUMED	CROSSING PROTECTION With APPLICANT CRITERIA	DEIS HIGHWAY SURFACE ASSUMED	ACTUAL HIGHWAY SURFACE
Crossing	**Highway**	***1998***	***2008***				
1	North Frontage Road / TH 14	2340	3190	Passive	Lights & Gates	Gravel	Paved
2	TH 14	11870	13700	Grade Separation	Lights & Gates	Grade Separation	
3	19th Ave NW	170	200	Passive	Flashing Red Lights	Gravel	Gravel
4	Frontier Rd	85	100	Passive	Passive	Gravel	Gravel
5	10th St SW	100	125	Passive	Passive	Gravel	Gravel
6	15th St SW	25	30	Passive	Passive	Gravel	Gravel
7	CSAH 25	385	545	Passive	Flashing Red Lights	Gravel	Paved
8	CSAH 17	365	475	Passive	Flashing Red Lights	Gravel	Paved
9	60th St SW	50	55	Passive	Passive	Gravel	Gravel
10	CSAH 26	360	550	Passive	Flashing Red Lights	Gravel	Paved
11	80th St	65	75	Passive	Passive	Gravel	Gravel
12	110th Ave SW	45	50	Passive	Passive	Gravel	Gravel
13	CSAH 3	630	760	Passive	Flashing Red Lights	Gravel	Paved
14	90th Ave SW	55	65	Passive	Passive	Gravel	Gravel
15	80th Ave SW	75	100	Passive	Passive	Gravel	Gravel
16	CSAH 15	250	300	Passive	Flashing Red Lights	Gravel	Paved
17	60th Ave SW	110	160	Passive	Passive	Gravel	Gravel
18	CSAH 8	1780	2610	Passive	Flashing Red Lights	Gravel	Paved
19	MN 30	1740	2140	Passive	Flashing Red Lights	Gravel	Paved
20	31st Ave SW	10	10	Passive	Passive	Gravel	Gravel
21	TH 63	18900	23740	Grade Separation	Lights & Gates	Grade Separation	
22	2nd Ave SE	1	1	Passive	Passive	Gravel	Gravel
23	80th St SE	0	0	Passive	Passive	Gravel	Gravel
24	CSAH 20	700	740	Passive	Flashing Red Lights	Gravel	Paved
25	20th Ave SE / 60th St SE	40	50	Passive	Passive	Gravel	Gravel
26	CSAH 1	1885	2895	Passive	Flashing Red Lights	Gravel	Paved
27	60th St SE east of CSAH 1	5	5	Passive	Passive	Gravel	Gravel
28	55th St SE	20	25	Passive	Passive	Gravel	Gravel
29	TH 52	18300	24400	Grade Separation	Passive	Grade Separation	
30	CR 123 (Old Marion Rd)	680	1000	Passive	Flashing Red Lights	Gravel	Paved
31	CR 123 (North of Grove's End)	240	270	Passive	Flashing Red Lights	Gravel	Gravel
32	70th Ave SE	1	1	Passive	Passive	Gravel	Gravel
33	77th Ave SE	0	0	Passive	Passive	Gravel	Gravel
34	CSAH 19	210	255	Passive	Flashing Red Lights	Gravel	Paved
35	CSAH 23	310	385	Passive	Flashing Red Lights	Gravel	Paved
36	CR 102	50	60	Passive	Passive	Gravel	Gravel
37	30th St SE	80	85	Passive	Passive	Gravel	Gravel
38	110th Ave SE	70	75	Passive	Passive	Gravel	Gravel
39	19th St SE	60	70	Passive	Passive	Gravel	Gravel

F

EXHIBIT F

ERRORS IN BASE DATA USED IN TRAFFIC SAFETY ANALYSIS

A number of instances were identified in the Traffic Safety Analysis where incorrect information was used in describing the characteristics of specific crossings. These errors were found in three types of data, including a) the number of highway lanes identified for a crossing, b) the functional classification of a roadway, and c) the number of main rail tracks at a crossing. The following table illustrates the correct information for those crossings where base data is in error.

DM&E POWDER RIVER BASIN EXPANSION PROJECT
BASELINE ASSUMPTIONS FOR ACCIDENT AND TRAFFIC ANALYSIS

				NUMBER OF LANES			FUNCTIONAL CLASSIFICATION		NUMBER MAIN TRACKS	
CROSSING	*MILEPOST*	*HIGHWAY*	*STREET*	*DEIS/TRAFF*	*DEIS/ACC*	*ACTUAL*	*URB/RURAL (FRA)*	*ACTUAL*	*DEIS/ACC*	*ACTUAL*
193288R	006030	TWP 202	COUNTY LINE RD	2	2		RURAL LOCAL		1	
911209L		MUN999	9TH AVE NW	2	2			RURAL LOCAL	1	
193287J	005890	CSAH 5	SECOND AVE. N.W.	4	4	2	RURAL MAJOR COLLECTOR		1	
193286C	005870	M-14	BYRON AVE. N.	4	4	2	RURAL LOCAL		1	
193236Y	005780	TWP 224	10TH AVE NE	2	2		RURAL LOCAL		1	
193285V	005680	CSAH 3		2	2		RURAL MAJOR COLLECTOR		1	
193235S	005420	CR 104		2	2		URBAN LOCAL	URBAN COLLECTOR	1	
193232W	005130	MSAS104	7TH ST. N.W.	2	2		URBAN LOCAL	URBAN MINOR ARTERIAL	1	
193282A	005000	MSAS113	11TH AVE. N.W.	4	4		URBAN MINOR ARTERIAL		2	1
193281T	004960	MSAS116	6TH AVE. N.W.	4	4	2	URBAN COLLECTOR		1	
193280L	004940	MSAS107	4TH AVE. N.W.	4	4	3	URBAN COLLECTOR	URBAN MINOR ARTERIAL	2	1
193278K	004920	M-470	1ST AVE N.W.	4	4	2	URBAN LOCAL		2	1
193277D	004910	U.S. 63	BROADWAY NO.	4	4		PRINCIPAL ARTERIAL		1	
193276W	004900	MSAS109	2ND AVE NE	4	2	4	URBAN MINOR ARTERIAL		2	1
193275P	004870		7TH AVE. N.E.	2	2		URBAN LOCAL		1	--
193274H	004980	M-482	9TH AVE NE	2	2		URBAN LOCAL		1	
193273B	004850	MSAS110	11TH AVE N.E.	2	2		URBAN MINOR ARTERIAL		1	
193272U	004820	CSAH 22	15TH AVE. N.E.	2	2		URBAN LOCAL		1	
911202N	004710	CSAH 22		2	2	4	PRINCIPAL ARTERIAL		1	
193270F	004540	CSAH 9	COLLEGE VIEW RD E	2	2		RURAL MAJOR COLLECTOR		1	
193269L	004450	CSAH 11	50TH AV. S.E.	2	2		RURAL MINOR COLLECTOR	RURAL MAJOR COLLECTOR	1	
193267X	004340	TWP RD.		2	2		RURAL LOCAL		1	
193266R	004270	OLCO119	CHESTER AVE SE	2	2		RURAL LOCAL		1	
193220C	004030	CORD102		2	2		RURAL MINOR COLLECTOR	RURAL LOCAL	1	
193219H	003940	CORD102		2	2		RURAL LOCAL		2	1
193216M	003860	TWNSPRD		2	2		RURAL LOCAL		2	-- 1
193264C	003740	CSAH 7		4	2	2	RURAL MAJOR COLLECTOR		1	
193263V	003680	CSAH 7		2	4	2	RURAL LOCAL		3	1
193262N	003530	TWP. RD		2	2		RURAL LOCAL		1	
193261G	003420	CSAH 32		2	2		RURAL LOCAL		1	

DM&E POWDER RIVER BASIN EXPANSION PROJECT
BASELINE ASSUMPTIONS FOR ACCIDENT AND TRAFFIC ANALYSIS

				NUMBER OF LANES			FUNCTIONAL CLASSIFICATION		NUMBER MAIN TRACKS	
CROSSING	*MILEPOST*	*HIGHWAY*	*STREET*	*DEIS/TRAFF*	*DEIS/ACC*	*ACTUAL*	*URB/RURAL (FRA)*	*ACTUAL*	*DEIS/ACC*	*ACTUAL*
193260A	003220	CSAH 10		2	2		RURAL MINOR COLLECTOR	RURAL MAJOR COLLECTOR	1	
193195W	003090	TWP. RD		2	1		RURAL LOCAL		1	
193259F	003040	TWP RD		4	2	2	RURAL LOCAL		1	
193258Y	003010	TWP. RD		2	2		RURAL LOCAL		1	

EXHIBIT G

RE-CALCULATION OF TRAFFIC SAFETY SIGNIFICANCE FOR CROSSINGS ON ROCHESTER ALTERNATIVE R-2

The following tables contain the results of Rochester's re-analysis of the accident prediction findings contained in the DEIS. The tables contain a comparison of the findings for all crossings in Alternative R-2 using the South Dakota and Wyoming Criteria of Significance compared to the Minnesota criteria.

The table also contains (in columns AP and AQ) the difference in predicated accident rates Rochester found when using corrected baseline information, such as changing the number of existing trains from 12 to 3 and using more up-to-date vehicular traffic counts. In these columns percentages greater than 100 indicate instances where the DEIS calculations overstated accident likelihood due to the use of incorrect base data. This usually occurs when comparing the existing conditions the DEIS reported to the existing conditions Rochester found using the correct train and crossing data. Percentages less than 100 indicate instances where the DEIS understates the accident prediction values, which typically occurs when evaluating future accident levels with 37 trains, primarily due to the DEIS using out-of-date vehicular traffic data.

	A	K	S	AI	AJ	AK	AL	AM	AN	AO	AP	AQ
1	**GRADE CROSSING**			DETERMINATION OF CLASS AND SIGNIFICANCE							Comparison	Comparison
2	**TWP 202 / COUNTY LINE ROAD**	PRED		**MINN**	**SDAK**	**WYO**	**MINN**	**SDAK**	**WYO**	Crossing	of Predicted	of
3	SCENARIO	ACCIDENTS		**CLASS**	**CLASS**	**CLASS**	**SIG**	**SIG**	**SIG**	Comparison	Accidents	Accident Costs
4											to DEIS	to DEIS
5	PCAPS DATABASE	0.01104		B	B	B				DEIS/PCAPS	115%	116%
6	DEIS											
7	DEIS PRECON BASE	0.01265		B	B	B						
8	DEIS 100 MT ALT C	0.02356		B	B	B	NO	NO	NO			
9	REVISED											
10	BASE CONDITIONS	0.00670		B	B	B				DEIS/ROCOG	189%	202%
11	6400' TRAINS											
12	100MT / BASE TRAFFIC	0.02669		B	B	A	NO	NO	YES	DIES/ALT	88%	87%
13	100 MT / 2008 TRAFFIC	0.02795		B	B	A	NO	NO	YES		84%	84%
14	100MT / 2018 TRAFFIC	0.03011		B	B	A	NO	NO	YES		78%	78%
15	7400' TRAINS											
16	100MT / BASE TRAFFIC	0.02492		B	B	A	NO	NO	YES		95%	95%
17	100 MT / 2008 TRAFFIC	0.02612		B	B	A	NO	NO	YES		90%	90%
18	100MT / 2018 TRAFFIC	0.02816		B	B	A	NO	NO	YES		84%	84%
19												
20	**GRADE CROSSING**											
21	**9TH AVE NW - BYRON**	PRED										
22	SCENARIO	ACCIDENTS										
23												
24	PCAPS DATABASE			B	B	B				DEIS/PCAPS	No PCAPS data available	
25	DEIS											
26	DEIS PRECON BASE	0.01411		B	B	B						
27	DEIS 100 MT ALT C	0.02281		B	B	B	NO	NO	NO			
28	REVISED											
29	BASE CONDITIONS	0.00848		B	B	B				DEIS/ROCOG	166%	166%
30	6400' TRAINS											
31	100MT / BASE TRAFFIC	0.02718		B	B	A	NO	NO	YES	DIES/ALT	84%	84%
32	100 MT / 2008 TRAFFIC	0.02945		B	B	A	NO	NO	YES		77%	77%
33	100MT / 2018 TRAFFIC	0.03162		B	B	A	NO	NO	YES		72%	72%
34	7400' TRAINS											
35	100MT / BASE TRAFFIC	0.02560		B	B	A	NO	NO	YES		89%	89%
36	100 MT / 2008 TRAFFIC	0.02778		B	B	A	NO	NO	YES		82%	82%
37	100MT / 2018 TRAFFIC	0.02988		B	B	A	NO	NO	YES		76%	76%
38												
39	**GRADE CROSSING**											
40	**CSAH 5 - BYRON**	PRED										
41	SCENARIO	ACCIDENTS										
42												
43	PCAPS DATABASE	0.03956		B	B	A				DEIS/PCAPS	112%	113%
44	DEIS											
45	DEIS PRECON BASE	0.04428		B	B	A						
46	DEIS 100 MT ALT C	0.05951		B	A	A	NO	YES	YES			
47	REVISED											
48	BASE CONDITIONS	0.02136		B	B	B				DEIS/ROCOG	207%	296%
49	6400' TRAINS											
50	100MT / BASE TRAFFIC	0.05298		B	A	A	NO	YES	YES	DIES/ALT	112%	116%
51	100 MT / 2008 TRAFFIC	0.05501		B	A	A	NO	YES	YES		108%	112%
52	100MT / 2018 TRAFFIC	0.05790		B	A	A	NO	YES	YES		103%	106%
53	7400' TRAINS											
54	100MT / BASE TRAFFIC	0.05088		B	A	A	NO	YES	YES		117%	122%
55	100 MT / 2008 TRAFFIC	0.05291		B	A	A	NO	YES	YES		112%	117%
56	100MT / 2018 TRAFFIC	0.05581		B	A	A	NO	YES	YES		107%	111%
57												

	A	K	S	AI	AJ	AK	AL	AM	AN	AO	AP	AQ
58	**GRADE CROSSING**											
59	**BYRON AVE - BYRON**	PRED										
60	SCENARIO	ACCIDENTS										
61												
62	PCAPS DATABASE	0.03681		B	B	A				DEIS/PCAPS	110%	120%
63	DEIS											
64	DEIS PRECON BASE	0.04051		B	B	A						
65	DEIS 100 MT ALT C	0.05561		B	A	A	NO	YES	YES			
66	REVISED											
67	BASE CONDITIONS	0.02327		B	B	B				DEIS/ROCOG	174%	258%
68	6400' TRAINS											
69	100MT / BASE TRAFFIC	0.05298		B	A	A	NO	YES	YES	DIES/ALT	105%	113%
70	100 MT / 2008 TRAFFIC	0.05429		B	A	A	NO	YES	YES		102%	110%
71	100MT / 2018 TRAFFIC	0.05484		B	A	A	NO	YES	YES		101%	109%
72	7400' TRAINS											
73	100MT / BASE TRAFFIC	0.05092		B	A	A	NO	YES	YES		109%	119%
74	100 MT / 2008 TRAFFIC	0.05184		B	A	A	NO	YES	YES		107%	116%
75	100MT / 2018 TRAFFIC	0.05278		B	A	A	NO	YES	YES		105%	114%
76												
77	**GRADE CROSSING**											
78	**10TH AVE NE - BYRON**	PRED										
79	SCENARIO	ACCIDENTS										
80												
81	PCAPS DATABASE	0.01215		B	B	B				DEIS/PCAPS	58%	61%
82	DEIS											
83	DEIS PRECON BASE	0.00705		B	B	B						
84	DEIS 100 MT ALT C	0.01127		B	B	B	NO	NO	NO			
85	REVISED											
86	BASE CONDITIONS	0.00594		B	B	B				DEIS/ROCOG	119%	127%
87	6400' TRAINS											
88	100MT / BASE TRAFFIC	0.01775		B	B	B	NO	NO	NO	DIES/ALT	64%	63%
89	100 MT / 2008 TRAFFIC	0.02285		B	B	B	NO	NO	NO		49%	49%
90	100MT / 2018 TRAFFIC	0.02617		B	B	A	NO	NO	YES		43%	43%
91	7400' TRAINS											
92	100MT / BASE TRAFFIC	0.01672		B	B	B	NO	NO	NO		67%	67%
93	100 MT / 2008 TRAFFIC	0.02160		B	B	B	NO	NO	NO		52%	52%
94	100MT / 2018 TRAFFIC	0.02480		B	B	A	NO	NO	YES		45%	45%
95												
96	**GRADE CROSSING**											
97	**CSAH 3**	PRED										
98	SCENARIO	ACCIDENTS										
99												
100	PCAPS DATABASE	0.01279		B	B	B				DEIS/PCAPS	161%	170%
101	DEIS											
102	DEIS PRECON BASE	0.02058		B	B	B						
103	DEIS 100 MT ALT C	0.03189		B	B	A	NO	NO	YES			
104	REVISED											
105	BASE CONDITIONS	0.01243		B	B	B				DEIS/ROCOG	166%	177%
106	6400' TRAINS											
107	100MT / BASE TRAFFIC	0.03656		B	B	A	NO	NO	YES	DIES/ALT	87%	86%
108	100 MT / 2008 TRAFFIC	0.03827		B	B	A	NO	NO	YES		83%	83%
109	100MT / 2018 TRAFFIC	0.04005		B	B	A	NO	NO	YES		80%	79%
110	7400' TRAINS											
111	100MT / BASE TRAFFIC	0.03468		B	B	A	NO	NO	YES		92%	92%
112	100 MT / 2008 TRAFFIC	0.03635		B	B	A	NO	NO	YES		88%	88%
113	100MT / 2018 TRAFFIC	0.03808		B	B	A	NO	NO	YES		84%	84%
114												

	A	K	S	AI	AJ	AK	AL	AM	AN	AO	AP	AQ
115	**GRADE CROSSING**											
116	**CR 104**	PRED										
117	SCENARIO	ACCIDENTS										
118												
119	PCAPS DATABASE	0.03648		B	B	A				DEIS/PCAPS	80%	81%
120	DEIS											
121	DEIS PRECON BASE	0.02909		B	B	A						
122	DEIS 100 MT ALT C	0.04273		B	B	A	NO	NO	YES			
123	REVISED											
124	BASE CONDITIONS	0.01024		B	B	B				DEIS/ROCOG	284%	304%
125	6400' TRAINS											
126	100MT / BASE TRAFFIC	0.02801		B	B	A	NO	NO	YES	DIES/ALT	153%	151%
127	100 MT / 2008 TRAFFIC	0.02990		B	B	A	NO	NO	YES		143%	142%
128	100MT / 2018 TRAFFIC	0.03185		B	B	A	NO	NO	YES		134%	133%
129	7400' TRAINS											
130	100MT / BASE TRAFFIC	0.02658		B	B	A	NO	NO	YES		161%	161%
131	100 MT / 2008 TRAFFIC	0.02841		B	B	A	NO	NO	YES		150%	150%
132	100MT / 2018 TRAFFIC	0.03030		B	B	A	NO	NO	YES		141%	141%
133												
134	**GRADE CROSSING**											
135	**7TH ST NW - ROCHESTER**	PRED										
136	SCENARIO	ACCIDENTS										
137												
138	PCAPS DATABASE	0.03390		B	B	A				DEIS/PCAPS	117%	175%
139	DEIS											
140	DEIS PRECON BASE	0.03971		B	B	A						
141	DEIS 100 MT ALT C	0.05477		B	A	A	NO	YES	YES			
142	REVISED											
143	BASE CONDITIONS	0.02462		B	B	A				DEIS/ROCOG	161%	255%
144	6400' TRAINS											
145	100MT / BASE TRAFFIC	0.05777		B	A	A	NO	YES	YES	DIES/ALT	95%	94%
146	100 MT / 2008 TRAFFIC	0.06037		B	A	A	NO	YES	YES		91%	90%
147	100MT / 2018 TRAFFIC	0.06226		B	A	A	NO	YES	YES		88%	87%
148	7400' TRAINS											
149	100MT / BASE TRAFFIC	0.05568		B	A	A	NO	YES	YES		98%	98%
150	100 MT / 2008 TRAFFIC	0.05859		B	A	A	NO	YES	YES		93%	94%
151	100MT / 2018 TRAFFIC	0.06020		B	A	A	NO	YES	YES		91%	91%
152												
153	**GRADE CROSSING**											
154	**11TH AVE NW - ROCHESTER**	PRED										
155	SCENARIO	ACCIDENTS										
156												
157	PCAPS DATABASE	0.02576		B	B	A				DEIS/PCAPS	126%	141%
158	DEIS											
159	DEIS PRECON BASE	0.03247		B	B	A						
160	DEIS 100 MT ALT C	0.04450		B	B	A	NO	NO	YES			
161	REVISED											
162	BASE CONDITIONS	0.01818		B	B	B				DEIS/ROCOG	179%	190%
163	6400' TRAINS											
164	100MT / BASE TRAFFIC	0.04300		B	B	A	NO	NO	YES	DIES/ALT	104%	103%
165	100 MT / 2008 TRAFFIC	0.04395		B	B	A	NO	NO	YES		101%	100%
166	100MT / 2018 TRAFFIC	0.04491		B	B	A	NO	NO	YES		99%	98%
167	7400' TRAINS											
168	100MT / BASE TRAFFIC	0.04125		B	B	A	NO	NO	YES		108%	108%
169	100 MT / 2008 TRAFFIC	0.04219		B	B	A	NO	NO	YES		105%	105%
170	100MT / 2018 TRAFFIC	0.04314		B	B	A	NO	NO	YES		103%	103%
171												

	A	K	S	AI	AJ	AK	AL	AM	AN	AO	AP	AQ
172	**GRADE CROSSING**											
173	**6TH AVE NW - ROCHESTER**	PRED										
174	SCENARIO	ACCIDENTS										
175												
176	PCAPS DATABASE	0.04333		B	B	A				DEIS/PCAPS	99%	106%
177	DEIS											
178	DEIS PRECON BASE	0.04274		B	B	A						
179	DEIS 100 MT ALT C	0.05794		B	A	A	NO	YES	YES			
180	REVISED											
181	BASE CONDITIONS	0.02333		B	B	B				DEIS/ROCOG	183%	199%
182	6400' TRAINS											
183	100MT / BASE TRAFFIC	0.05090		B	A	A	NO	YES	YES	DIES/ALT	114%	119%
184	100 MT / 2008 TRAFFIC	0.05236		B	A	A	NO	YES	YES		111%	115%
185	100MT / 2018 TRAFFIC	0.05381		B	A	A	NO	YES	YES		108%	112%
186	7400' TRAINS											
187	100MT / BASE TRAFFIC	0.04887		B	B	A	NO	NO	YES		119%	125%
188	100 MT / 2008 TRAFFIC	0.05034		B	B	A	NO	NO	YES		115%	121%
189	100MT / 2018 TRAFFIC	0.05178		B	A	A	NO	YES	YES		112%	118%
190												
191	**GRADE CROSSING**											
192	**4TH AVE NW - ROCHESTER**	PRED										
193	SCENARIO	ACCIDENTS										
194												
195	PCAPS DATABASE	0.02421		B	B	B				DEIS/PCAPS	120%	140%
196	DEIS											
197	DEIS PRECON BASE	0.02909		B	B	A						
198	DEIS 100 MT ALT C	0.04064		B	B	A	NO	NO	YES			
199	REVISED											
200	BASE CONDITIONS	0.01437		B	B	B				DEIS/ROCOG	202%	491%
201	6400' TRAINS											
202	100MT / BASE TRAFFIC	0.03327		B	B	A	NO	NO	YES	DIES/ALT	122%	63%
203	100 MT / 2008 TRAFFIC	0.03410		B	B	A	NO	NO	YES		119%	62%
204	100MT / 2018 TRAFFIC	0.03492		B	B	A	NO	NO	YES		116%	60%
205	7400' TRAINS											
206	100MT / BASE TRAFFIC	0.03174		B	B	A	NO	NO	YES		128%	67%
207	100 MT / 2008 TRAFFIC	0.03254		B	B	A	NO	NO	YES		125%	65%
208	100MT / 2018 TRAFFIC	0.03335		B	B	A	NO	NO	YES		122%	64%
209												
210	**GRADE CROSSING**											
211	**1ST AVE NW - ROCHESTER**	PRED										
212	SCENARIO	ACCIDENTS										
213												
214	PCAPS DATABASE	0.01561		B	B	B				DEIS/PCAPS	171%	202%
215	DEIS											
216	DEIS PRECON BASE	0.02662		B	B	A						
217	DEIS 100 MT ALT C	0.03772		B	B	A	NO	NO	YES			
218	REVISED											
219	BASE CONDITIONS	0.00972		B	B	B				DEIS/ROCOG	274%	294%
220	6400' TRAINS											
221	100MT / BASE TRAFFIC	0.02426		B	B	B	NO	NO	NO	DIES/ALT	155%	158%
222	100 MT / 2008 TRAFFIC	0.02432		B	B	B	NO	NO	NO		155%	157%
223	100MT / 2018 TRAFFIC	0.02438		B	B	B	NO	NO	NO		155%	157%
224	7400' TRAINS											
225	100MT / BASE TRAFFIC	0.02300		B	B	B	NO	NO	NO		164%	168%
226	100 MT / 2008 TRAFFIC	0.02306		B	B	B	NO	NO	NO		164%	167%
227	100MT / 2018 TRAFFIC	0.02312		B	B	B	NO	NO	NO		163%	167%
228												

	A	K	S	AI	AJ	AK	AL	AM	AN	AO	AP	AQ
229	**GRADE CROSSING**											
230	**TH 63 - ROCHESTER**	PRED										
231	SCENARIO	ACCIDENTS										
232												
233	PCAPS DATABASE	0.01212		B	B	B				DEIS/PCAPS	1068%	118%
234	DEIS											
235	DEIS PRECON BASE	0.12946		A	A	A						
236	DEIS 100 MT ALT C	0.15485		A	A	A	YES	YES	YES			
237	REVISED											
238	BASE CONDITIONS	0.11052		B	A	A				DEIS/ROCOG	117%	113%
239	6400' TRAINS											
240	100MT / BASE TRAFFIC	0.16275		A	A	A	YES	YES	YES	DIES/ALT	95%	98%
241	100 MT / 2008 TRAFFIC	0.16463		A	A	A	YES	YES	YES		94%	97%
242	100MT / 2018 TRAFFIC	0.16706		A	A	A	YES	YES	YES		93%	95%
243	7400' TRAINS											
244	100MT / BASE TRAFFIC	0.15991		A	A	A	YES	YES	YES		97%	100%
245	100 MT / 2008 TRAFFIC	0.16186		A	A	A	YES	YES	YES		96%	99%
246	100MT / 2018 TRAFFIC	0.16439		A	A	A	YES	YES	YES		94%	98%
247												
248	**GRADE CROSSING**											
249	**2ND AVE NE - ROCHESTER**	PRED										
250	SCENARIO	ACCIDENTS										
251												
252	PCAPS DATABASE	0.04859		B	B	A				DEIS/PCAPS	117%	116%
253	DEIS											
254	DEIS PRECON BASE	0.05686		B	A	A						
255	DEIS 100 MT ALT C	0.07140		B	A	A	NO	YES	YES			
256	REVISED											
257	BASE CONDITIONS	0.04083		B	B	A				DEIS/ROCOG	139%	134%
258	6400' TRAINS											
259	100MT / BASE TRAFFIC	0.07122		B	A	A	NO	YES	YES	DIES/ALT	100%	103%
260	100 MT / 2008 TRAFFIC	0.07243		B	A	A	NO	YES	YES		99%	101%
261	100MT / 2018 TRAFFIC	0.07401		B	A	A	NO	YES	YES		96%	99%
262	7400' TRAINS											
263	100MT / BASE TRAFFIC	0.06941		B	A	A	NO	YES	YES		103%	107%
264	100 MT / 2008 TRAFFIC	0.07066		B	A	A	NO	YES	YES		101%	105%
265	100MT / 2018 TRAFFIC	0.07228		B	A	A	NO	YES	YES		99%	102%
266												
267	**GRADE CROSSING**											
268	**: 7TH AVE NE - ROCHESTER**	PRED										
269	SCENARIO	ACCIDENTS										
270												
271	PCAPS DATABASE	0.01070		B	B	B				DEIS/PCAPS	346%	364%
272	DEIS											
273	DEIS PRECON BASE	0.03704		B	B	A						
274	DEIS 100 MT ALT C	0.06347		B	A	A	NO	YES	YES			
275	REVISED											
276	BASE CONDITIONS	0.01625		B	B	B				DEIS/ROCOG	228%	242%
277	6400' TRAINS											
278	100MT / BASE TRAFFIC	0.05748		B	A	A	NO	YES	YES	DIES/ALT	110%	109%
279	100 MT / 2008 TRAFFIC	0.05816		B	A	A	NO	YES	YES		109%	108%
280	100MT / 2018 TRAFFIC	0.05897		B	A	A	NO	YES	YES		108%	107%
281	7400' TRAINS											
282	100MT / BASE TRAFFIC	0.05462		B	A	A	NO	YES	YES		116%	116%
283	100 MT / 2008 TRAFFIC	0.05529		B	A	A	NO	YES	YES		115%	115%
284	100MT / 2018 TRAFFIC	0.05609		B	A	A	NO	YES	YES		113%	122%
285												

	A	K	S	AI	AJ	AK	AL	AM	AN	AO	AP	AQ
286	**GRADE CROSSING**											
287	**9TH AVE NE - ROCHESTER**	PRED										
288	SCENARIO	ACCIDENTS										
289												
290	PCAPS DATABASE	0.01914		B	B	B				DEIS/PCAPS	111%	112%
291	DEIS											
292	DEIS PRECON BASE	0.02120		B	B	B						
293	DEIS 100 MT ALT C	0.03271		B	B	A	NO	NO	YES			
294	REVISED											
295	BASE CONDITIONS	0.01131		B	B	B				DEIS/ROCOG	187%	284%
296	6400' TRAINS											
297	100MT / BASE TRAFFIC	0.03406		B	B	A	NO	NO	YES	DIES/ALT	96%	95%
298	100 MT / 2008 TRAFFIC	0.03418		B	B	A	NO	NO	YES		96%	95%
299	100MT / 2018 TRAFFIC	0.03430		B	B	A	NO	NO	YES		95%	95%
300	7400' TRAINS											
301	100MT / BASE TRAFFIC	0.03225		B	B	A	NO	NO	YES		101%	101%
302	100 MT / 2008 TRAFFIC	0.03237		B	B	A	NO	NO	YES		101%	101%
303	100MT / 2018 TRAFFIC	0.03248		B	B	A	NO	NO	YES		101%	101%
304												
305	**GRADE CROSSING**											
306	**11TH AVE NE - ROCHESTER**	PRED										
307	SCENARIO	ACCIDENTS										
308												
309	PCAPS DATABASE	0.04076		B	B	A				DEIS/PCAPS	109%	110%
310	DEIS											
311	DEIS PRECON BASE	0.04437		B	B	A						
312	DEIS 100 MT ALT C	0.05961		B	A	A	NO	YES	YES			
313	REVISED											
314	BASE CONDITIONS	0.02756		B	B	A				DEIS/ROCOG	161%	170%
315	6400' TRAINS											
316	100MT / BASE TRAFFIC	0.06167		B	A	A	NO	YES	YES	DIES/ALT	97%	96%
317	100 MT / 2008 TRAFFIC	0.06174		B	A	A	NO	YES	YES		97%	96%
318	100MT / 2018 TRAFFIC	0.06253		B	A	A	NO	YES	YES		95%	94%
319	7400' TRAINS											
320	100MT / BASE TRAFFIC	0.05887		B	A	A	NO	YES	YES		101%	101%
321	100 MT / 2008 TRAFFIC	0.05967		B	A	A	NO	YES	YES		100%	100%
322	100MT / 2018 TRAFFIC	0.06048		B	A	A	NO	YES	YES		99%	99%
323												
324	**GRADE CROSSING**											
325	**15TH AVE NE - ROCHESTER**	PRED										
326	SCENARIO	ACCIDENTS										
327												
328	PCAPS DATABASE	0.01770		B	B	B				DEIS/PCAPS	126%	127%
329	DEIS											
330	DEIS PRECON BASE	0.02228		B	B	B						
331	DEIS 100 MT ALT C	0.03414		B	B	A	NO	NO	YES			
332	REVISED											
333	BASE CONDITIONS	0.01177		B	B	B				DEIS/ROCOG	189%	201%
334	6400' TRAINS											
335	100MT / BASE TRAFFIC	0.03511		B	B	A	NO	NO	YES	DIES/ALT	97%	96%
336	100 MT / 2008 TRAFFIC	0.03522		B	B	A	NO	NO	YES		97%	96%
337	100MT / 2018 TRAFFIC	0.03533		B	B	A	NO	NO	YES		97%	96%
338	7400' TRAINS											
339	100MT / BASE TRAFFIC	0.03326		B	B	A	NO	NO	YES		103%	103%
340	100 MT / 2008 TRAFFIC	0.03337		B	B	A	NO	NO	YES		102%	102%
341	100MT / 2018 TRAFFIC	0.03348		B	B	A	NO	NO	YES		102%	102%
342												

	A	K	S	AI	AJ	AK	AL	AM	AN	AO	AP	AQ
343	**GRADE CROSSING**											
344	**CSAH 22 - ROCHESTER**	PRED										
345	SCENARIO	ACCIDENTS										
346												
347	PCAPS DATABASE	0.00945		B	B	B				DEIS/PCAPS	429%	467%
348	DEIS											
349	DEIS PRECON BASE	0.04057		B	B	A						
350	DEIS 100 MT ALT C	0.05568		B	A	A	NO	YES	YES			
351	REVISED											
352	BASE CONDITIONS	0.03256		B	B	A				DEIS/ROCOG	125%	133%
353	6400' TRAINS											
354	100MT / BASE TRAFFIC	0.06752		B	A	A	NO	YES	YES	DIES/ALT	82%	82%
355	100 MT / 2008 TRAFFIC	0.07133		B	A	A	NO	YES	YES		78%	77%
356	100MT / 2018 TRAFFIC	0.07493		B	A	A	NO	YES	YES		74%	74%
357	7400' TRAINS											
358	100MT / BASE TRAFFIC	0.06555		B	A	A	NO	YES	YES		85%	85%
359	100 MT / 2008 TRAFFIC	0.06945		B	A	A	NO	YES	YES		80%	69%
360	100MT / 2018 TRAFFIC	0.07316		B	A	A	NO	YES	YES		76%	76%
361												
362	**GRADE CROSSING**											
363	**CSAH 9 - ROCHESTER**	PRED										
364	SCENARIO	ACCIDENTS										
365												
366	PCAPS DATABASE	0.02783		B	B	A				DEIS/PCAPS	116%	125%
367	DEIS											
368	DEIS PRECON BASE	0.03224		B	B	A						
369	DEIS 100 MT ALT C	0.04646		B	B	A	NO	NO	YES			
370	REVISED											
371	BASE CONDITIONS	0.01888		B	B	B				DEIS/ROCOG	171%	183%
372	6400' TRAINS											
373	100MT / BASE TRAFFIC	0.04897		B	B	A	NO	NO	YES	DIES/ALT	95%	94%
374	100 MT / 2008 TRAFFIC	0.05082		B	A	A	NO	YES	YES		91%	91%
375	100MT / 2018 TRAFFIC	0.05266		B	A	A	NO	YES	YES		88%	87%
376	7400' TRAINS											
377	100MT / BASE TRAFFIC	0.04688		B	B	A	NO	NO	YES		99%	99%
378	100 MT / 2008 TRAFFIC	0.04872		B	B	A	NO	NO	YES		95%	95%
379	100MT / 2018 TRAFFIC	0.05056		B	A	A	NO	YES	YES		92%	92%
380												
381	**GRADE CROSSING**											
382	**CSAH 11**	PRED										
383	SCENARIO	ACCIDENTS										
384												
385	PCAPS DATABASE	0.00808		B	B	B				DEIS/PCAPS	168%	178%
386	DEIS											
387	DEIS PRECON BASE	0.01360		B	B	B						
388	DEIS 100 MT ALT C	0.02084		B	B	B	NO	NO	NO			
389	REVISED											
390	BASE CONDITIONS	0.00774		B	B	B				DEIS/ROCOG	176%	188%
391	6400' TRAINS											
392	100MT / BASE TRAFFIC	0.02227		B	B	B	NO	NO	NO	DIES/ALT	94%	93%
393	100 MT / 2008 TRAFFIC	0.02334		B	B	B	NO	NO	NO		89%	89%
394	100MT / 2018 TRAFFIC	0.02443		B	B	B	NO	NO	NO		85%	85%
395	7400' TRAINS											
396	100MT / BASE TRAFFIC	0.02104		B	B	B	NO	NO	NO		99%	99%
397	100 MT / 2008 TRAFFIC	0.02208		B	B	B	NO	NO	NO		94%	94%
398	100MT / 2018 TRAFFIC	0.02312		B	B	B	NO	NO	NO		90%	90%
399												

	A	K	S	AI	AJ	AK	AL	AM	AN	AO	AP	AQ
400	**GRADE CROSSING**											
401	**60TH AVE SE**	PRED										
402	SCENARIO	ACCIDENTS										
403												
404	PCAPS DATABASE	0.00660		B	B	B				DEIS/PCAPS	310%	328%
405	DEIS											
406	DEIS PRECON BASE	0.02043		B	B	B						
407	DEIS 100 MT ALT C	0.03619		B	B	A	NO	NO	YES			
408	REVISED											
409	BASE CONDITIONS	0.01063		B	B	B				DEIS/ROCOG	192%	206%
410	6400' TRAINS											
411	100MT / BASE TRAFFIC	0.03898		B	B	A	NO	NO	YES	DIES/ALT	93%	92%
412	100 MT / 2008 TRAFFIC	0.04010		B	B	A	NO	NO	YES		90%	89%
413	100MT / 2018 TRAFFIC	0.04112		B	B	A	NO	NO	YES		88%	87%
414	7400' TRAINS											
415	100MT / BASE TRAFFIC	0.03665		B	B	A	NO	NO	YES		99%	99%
416	100 MT / 2008 TRAFFIC	0.03772		B	B	A	NO	NO	YES		96%	96%
417	100MT / 2018 TRAFFIC	0.03871		B	B	A	NO	NO	YES		93%	94%
418												
419	**GRADE CROSSING**											
420	**COUNTY RD 119 - CHESTER**	PRED										
421	SCENARIO	ACCIDENTS										
422												
423	PCAPS DATABASE	0.02311		B	B	B				DEIS/PCAPS	145%	153%
424	DEIS											
425	DEIS PRECON BASE	0.03341		B	B	A						
426	DEIS 100 MT ALT C	0.05473		B	A	A	NO	YES	YES			
427	REVISED											
428	BASE CONDITIONS	0.01831		B	B	B				DEIS/ROCOG	183%	196%
429	6400' TRAINS											
430	100MT / BASE TRAFFIC	0.05816		B	A	A	NO	YES	YES	DIES/ALT	94%	93%
431	100 MT / 2008 TRAFFIC	0.05897		B	A	A	NO	YES	YES		93%	92%
432	100MT / 2018 TRAFFIC	0.05949		B	A	A	NO	YES	YES		92%	91%
433	7400' TRAINS											
434	100MT / BASE TRAFFIC	0.05529		B	A	A	NO	YES	YES		99%	99%
435	100 MT / 2008 TRAFFIC	0.05609		B	A	A	NO	YES	YES		98%	98%
436	100MT / 2018 TRAFFIC	0.05659		B	A	A	NO	YES	YES		97%	97%
437												
438	**GRADE CROSSING**											
439	**COUNTY ROAD 102W**	PRED										
440	SCENARIO	ACCIDENTS										
441												
442	PCAPS DATABASE	0.00437		B	B	B				DEIS/PCAPS	279%	11%
443	DEIS											
444	DEIS PRECON BASE	0.01221		B	B	B						
445	DEIS 100 MT ALT C	0.02356		B	B	B	NO	NO	NO			
446	REVISED											
447	BASE CONDITIONS	0.00606		B	B	B				DEIS/ROCOG	202%	215%
448	6400' TRAINS											
449	100MT / BASE TRAFFIC	0.02526		B	B	A	NO	NO	YES	DIES/ALT	93%	92%
450	100 MT / 2008 TRAFFIC	0.02600		B	B	A	NO	NO	YES		91%	90%
451	100MT / 2018 TRAFFIC	0.02669		B	B	A	NO	NO	YES		88%	87%
452	7400' TRAINS											
453	100MT / BASE TRAFFIC	0.02636		B	B	A	NO	NO	YES		89%	100%
454	100 MT / 2008 TRAFFIC	0.02426		B	B	B	NO	NO	NO		97%	97%
455	100MT / 2018 TRAFFIC	0.02492		B	B	A	NO	NO	YES		95%	95%
456												

	A	K	S	AI	AJ	AK	AL	AM	AN	AO	AP	AQ
457	**GRADE CROSSING**											
458	**COUNTY ROAD 102E**	PRED										
459	SCENARIO	ACCIDENTS										
460												
461	PCAPS DATABASE	0.00490		B	B	B				DEIS/PCAPS	165%	176%
462	DEIS											
463	DEIS PRECON BASE	0.00807		B	B	B						
464	DEIS 100 MT ALT C	0.01604		B	B	B	NO	NO	NO			
465	REVISED											
466	BASE CONDITIONS	0.00394		B	B	B				DEIS/ROCOG	205%	218%
467	6400' TRAINS											
468	100MT / BASE TRAFFIC	0.01728		B	B	B	NO	NO	NO	DIES/ALT	93%	92%
469	100 MT / 2008 TRAFFIC	0.01896		B	B	B	NO	NO	NO		85%	84%
470	100MT / 2018 TRAFFIC	0.02036		B	B	B	NO	NO	NO		79%	78%
471	7400' TRAINS											
472	100MT / BASE TRAFFIC	0.01604		B	B	B	NO	NO	NO		100%	100%
473	100 MT / 2008 TRAFFIC	0.01762		B	B	B	NO	NO	NO		91%	91%
474	100MT / 2018 TRAFFIC	0.01894		B	B	B	NO	NO	NO		85%	85%
475												
476	**GRADE CROSSING**											
477	**11OTH AV SE / TWP RD 112**	PRED										
478	SCENARIO	ACCIDENTS										
479												
480	PCAPS DATABASE	0.00748		B	B	B				DEIS/PCAPS	129%	132%
481	DEIS											
482	DEIS PRECON BASE	0.00963		B	B	B						
483	DEIS 100 MT ALT C	0.01894		B	B	B	NO	NO	NO			
484	REVISED											
485	BASE CONDITIONS	0.00473		B	B	B				DEIS/ROCOG	204%	218%
486	6400' TRAINS											
487	100MT / BASE TRAFFIC	0.02036		B	B	B	NO	NO	NO	DIES/ALT	93%	92%
488	100 MT / 2008 TRAFFIC	0.02157		B	B	B	NO	NO	NO		88%	87%
489	100MT / 2018 TRAFFIC	0.02263		B	B	B	NO	NO	NO		84%	83%
490	7400' TRAINS											
491	100MT / BASE TRAFFIC	0.01894		B	B	B	NO	NO	NO		100%	100%
492	100 MT / 2008 TRAFFIC	0.02007		B	B	B	NO	NO	NO		94%	94%
493	100MT / 2018 TRAFFIC	0.02108		B	B	B	NO	NO	NO		90%	90%
494												
495	**GRADE CROSSING**											
496	**CSAH 7 WEST**	PRED										
497	SCENARIO	ACCIDENTS										
498												
499	PCAPS DATABASE	0.01639		B	B	B				DEIS/PCAPS	185%	196%
500	DEIS											
501	DEIS PRECON BASE	0.03036		B	B	A						
502	DEIS 100 MT ALT C	0.04425		B	B	A	NO	NO	YES			
503	REVISED											
504	BASE CONDITIONS	0.01855		B	B	B				DEIS/ROCOG	164%	175%
505	6400' TRAINS											
506	100MT / BASE TRAFFIC	0.04841		B	B	A	NO	NO	YES	DIES/ALT	91%	91%
507	100 MT / 2008 TRAFFIC	0.05169		B	A	A	NO	YES	YES		86%	85%
508	100MT / 2018 TRAFFIC	0.05424		B	A	A	NO	YES	YES		82%	81%
509	7400' TRAINS											
510	100MT / BASE TRAFFIC	0.04632		B	B	A	NO	NO	YES		96%	96%
511	100 MT / 2008 TRAFFIC	0.04959		B	B	A	NO	NO	YES		89%	89%
512	100MT / 2018 TRAFFIC	0.05213		B	A	A	NO	YES	YES		85%	85%
513												

	A	K	S	AI	AJ	AK	AL	AM	AN	AO	AP	AQ
514	**GRADE CROSSING**											
515	**CSAH 7 EAST**	PRED										
516	SCENARIO	ACCIDENTS										
517												
518	PCAPS DATABASE	0.07118		B	A	A				DEIS/PCAPS	118%	120%
519	DEIS											
520	DEIS PRECON BASE	0.08426		B	A	A						
521	DEIS 100 MT ALT C	0.09783		B	A	A	NO	YES	YES			
522	REVISED											
523	BASE CONDITIONS	0.04212		B	B	A				DEIS/ROCOG	200%	289%
524	6400' TRAINS											
525	100MT / BASE TRAFFIC	0.08288		B	A	A	NO	YES	YES	DIES/ALT	118%	157%
526	100 MT / 2008 TRAFFIC	0.08428		B	A	A	NO	YES	YES		116%	154%
527	100MT / 2018 TRAFFIC	0.08504		B	A	A	NO	YES	YES		115%	153%
528	7400' TRAINS											
529	100MT / BASE TRAFFIC	0.08070		B	A	A	NO	YES	YES		121%	162%
530	100 MT / 2008 TRAFFIC	0.08213		B	A	A	NO	YES	YES		119%	159%
531	100MT / 2018 TRAFFIC	0.08292		B	A	A	NO	YES	YES		118%	158%
532												
533	**GRADE CROSSING**											
534	**140TH ST SE - TWP RD 90**	PRED										
535	SCENARIO	ACCIDENTS										
536												
537	PCAPS DATABASE	0.00544		B	B	B				DEIS/PCAPS	183%	194%
538	DEIS											
539	DEIS PRECON BASE	0.00999		B	B	B						
540	DEIS 100 MT ALT C	0.01894		B	B	B	NO	NO	NO			
541	REVISED											
542	BASE CONDITIONS	0.00502		B	B	B				DEIS/ROCOG	199%	200%
543	6400' TRAINS											
544	100MT / BASE TRAFFIC	0.02036		B	B	B	NO	NO	NO	DIES/ALT	93%	92%
545	100 MT / 2008 TRAFFIC	0.02157		B	B	B	NO	NO	NO		88%	87%
546	100MT / 2018 TRAFFIC	0.02263		B	B	B	NO	NO	NO		84%	83%
547	7400' TRAINS											
548	100MT / BASE TRAFFIC	0.01894		B	B	B	NO	NO	NO		100%	100%
549	100 MT / 2008 TRAFFIC	0.02007		B	B	B	NO	NO	NO		94%	94%
550	100MT / 2018 TRAFFIC	0.02108		B	B	B	NO	NO	NO		90%	90%
551												
552	**GRADE CROSSING**											
553	**CSAH 32**	PRED										
554	SCENARIO	ACCIDENTS										
555												
556	PCAPS DATABASE	0.01557		B	B	B				DEIS/PCAPS	102%	108%
557	DEIS											
558	DEIS PRECON BASE	0.01593		B	B	B						
559	DEIS 100 MT ALT C	0.02905		B	B	A	NO	NO	YES			
560	REVISED											
561	BASE CONDITIONS	0.01500		B	B	B				DEIS/ROCOG	106%	114%
562	6400' TRAINS											
563	100MT / BASE TRAFFIC	0.05057		B	A	A	NO	YES	YES	DIES/ALT	57%	57%
564	100 MT / 2008 TRAFFIC	0.05150		B	A	A	NO	YES	YES		56%	56%
565	100MT / 2018 TRAFFIC	0.05195		B	A	A	NO	YES	YES		56%	55%
566	7400' TRAINS											
567	100MT / BASE TRAFFIC	0.04786		B	B	A	NO	NO	YES		61%	61%
568	100 MT / 2008 TRAFFIC	0.04877		B	B	A	NO	NO	YES		60%	60%
569	100MT / 2018 TRAFFIC	0.04920		B	B	A	NO	NO	YES		59%	59%
570												

	A	K	S	AI	AJ	AK	AL	AM	AN	AO	AP	AQ
571	**GRADE CROSSING**											
572	**CSAH 10**	PRED										
573	SCENARIO	ACCIDENTS										
574												
575	PCAPS DATABASE	0.04755		B	B	A				DEIS/PCAPS	138%	145%
576	DEIS											
577	DEIS PRECON BASE	0.06543		B	A	A						
578	DEIS 100 MT ALT C	0.08801		B	A	A	NO	YES	YES			
579	REVISED											
580	BASE CONDITIONS	0.04620		B	B	A				DEIS/ROCOG	142%	152%
581	6400' TRAINS											
582	100MT / BASE TRAFFIC	0.09260		B	A	A	NO	YES	YES	DIES/ALT	95%	94%
583	100 MT / 2008 TRAFFIC	0.09498		B	A	A	NO	YES	YES		93%	92%
584	100MT / 2018 TRAFFIC	0.09732		B	A	A	YES	YES	YES		90%	90%
585	7400' TRAINS											
586	100MT / BASE TRAFFIC	0.08908		B	A	A	NO	YES	YES		99%	99%
587	100 MT / 2008 TRAFFIC	0.09141		B	A	A	NO	YES	YES		96%	96%
588	100MT / 2018 TRAFFIC	0.09371		B	A	A	NO	YES	YES		94%	94%
589												
590	**GRADE CROSSING**											
591	**TWP RD 667**	PRED										
592	SCENARIO	ACCIDENTS										
593												
594	PCAPS DATABASE	0.00586		B	B	B				DEIS/PCAPS	129%	132%
595	DEIS											
596	DEIS PRECON BASE	0.00757		B	B	B						
597	DEIS 100 MT ALT C	0.01511		B	B	B	NO	NO	NO			
598	REVISED											
599	BASE CONDITIONS	0.00417		B	B	B				DEIS/ROCOG	182%	194%
600	6400' TRAINS											
601	100MT / BASE TRAFFIC	0.01816		B	B	B	NO	NO	NO	DIES/ALT	83%	82%
602	100 MT / 2008 TRAFFIC	0.01896		B	B	B	NO	NO	NO		80%	79%
603	100MT / 2018 TRAFFIC	0.01969		B	B	B	NO	NO	NO		77%	76%
604	7400' TRAINS											
605	100MT / BASE TRAFFIC	0.01687		B	B	B	NO	NO	NO		90%	90%
606	100 MT / 2008 TRAFFIC	0.01762		B	B	B	NO	NO	NO		86%	86%
607	100MT / 2018 TRAFFIC	0.01831		B	B	B	NO	NO	NO		83%	83%
608												
609	**GRADE CROSSING**											
610	**19TH AVE SE - TWP RD 591**	PRED										
611	SCENARIO	ACCIDENTS										
612												
613	PCAPS DATABASE	0.00425		B	B	B				DEIS/PCAPS	185%	195%
614	DEIS											
615	DEIS PRECON BASE	0.00785		B	B	B						
616	DEIS 100 MT ALT C	0.01511		B	B	B	NO	NO	NO			
617	REVISED											
618	BASE CONDITIONS	0.00383		B	B	B				DEIS/ROCOG	205%	219%
619	6400' TRAINS											
620	100MT / BASE TRAFFIC	0.01628		B	B	B	NO	NO	NO	DIES/ALT	93%	92%
621	100 MT / 2008 TRAFFIC	0.01728		B	B	B	NO	NO	NO		87%	87%
622	100MT / 2018 TRAFFIC	0.01816		B	B	B	NO	NO	NO		83%	82%
623	7400' TRAINS											
624	100MT / BASE TRAFFIC	0.01511		B	B	B	NO	NO	NO		100%	100%
625	100 MT / 2008 TRAFFIC	0.01604		B	B	B	NO	NO	NO		94%	94%
626	100MT / 2018 TRAFFIC	0.01687		B	B	B	NO	NO	NO		90%	90%
627												

	A	K	S	AI	AJ	AK	AL	AM	AN	AO	AP	AQ
628	**GRADE CROSSING**											
629	**TWP RD 668**	PRED										
630	SCENARIO	ACCIDENTS										
631												
632	PCAPS DATABASE	0.00425		B	B	B				DEIS/PCAPS	185%	195%
633	DEIS											
634	DEIS PRECON BASE	0.00785		B	B	B						
635	DEIS 100 MT ALT C	0.01511		B	B	B	NO	NO	NO			
636	REVISED											
637	BASE CONDITIONS	0.00383		B	B	B				DEIS/ROCOG	205%	219%
638	6400' TRAINS											
639	100MT / BASE TRAFFIC	0.01628		B	B	B	NO	NO	NO	DIES/ALT	93%	92%
640	100 MT / 2008 TRAFFIC	0.01728		B	B	B	NO	NO	NO		87%	87%
641	100MT / 2018 TRAFFIC	0.01816		B	B	B	NO	NO	NO		83%	82%
642	7400' TRAINS											
643	100MT / BASE TRAFFIC	0.01511		B	B	B	NO	NO	NO		100%	100%
644	100 MT / 2008 TRAFFIC	0.01604		B	B	B	NO	NO	NO		94%	94%
645	100MT / 2018 TRAFFIC	0.01687		B	B	B	NO	NO	NO		90%	90%

EXHIBIT H

EVALUATION OF GROUP A CROSSINGS IN EACH STATE

Exhibit H provides the results of Rochester's analysis of grade crossing accident rates in each state affected by the project and what percentage of crossings in each state are Group A crossings. Since the 50th highest accident rate is used to establish the cutoff between Group A and B, a much higher percentage (10.1%) of crossings in Wyoming, for example, are placed in Group A than in Minnesota (0.95%).

ANALYSIS OF WYOMING HIGHWAY-RAIL CROSSINGS

Accident Rate Range		Accident Frequency		# of Crossings	% of All Crossings		
0	0.0005	>	2,000	89	17.2%		
0.0005	0.0010	2,000	1,000	1	0.2%		
0.0010	0.0020	1,000	500	12	2.3%		
0.0020	0.0050	500	200	118	22.9%		
0.0050	0.0100	200	100	114	22.1%		
0.0100	0.0200	100	50	109	21.1%		
0.0200	0.0250	50	40	21	4.1%	89.9%	Above Wyo Threshold
0.0250	0.0500	40	20	44	8.5%	8.5%	10.08%
0.0500	0.0667	20	15	4	0.8%		Above SD Threshold
0.0667	0.1250	15	8	4	0.8%	1.6%	1.55%
0.1250	0.2000	8	5	0	0.0%		Above MN Threshold
0.2000	0.3333	5	3	0	0.0%		0.00%
0.3333		<	3	0	0.0%	0.0%	

516 Total Crossings

ANALYSIS OF SOUTH DAKOTA HIGHWAY-RAIL CROSSINGS

Accident Rate Range		Accident Frequency		# of Crossings	% of All Crossings		
0	0.0005	>	2,000	917	42.9%		
0.0005	0.0010	2,000	1,000	63	2.9%		
0.0010	0.0020	1,000	500	140	6.6%		
0.0020	0.0050	500	200	456	21.3%		
0.0050	0.0100	200	100	219	10.2%		
0.0100	0.0200	100	50	151	7.1%		
0.0200	0.0250	50	40	34	1.6%	92.7%	Above Wyo Threshold
0.0250	0.0500	40	20	105	4.9%	4.9%	7.35%
0.0500	0.0667	20	15	25	1.2%		Above SD Threshold
0.0667	0.1250	15	8	18	0.8%	2.0%	2.43%
0.1250	0.2000	8	5	8	0.4%		Above MN Threshold
0.2000	0.3333	5	3	1	0.0%		0.42%
0.3333		<	3	0	0.0%	0.4%	

2137 Total Crossings

ANALYSIS OF MINNESOTA HIGHWAY-RAIL CROSSINGS

Accident Rate Range		Accident Frequency		# of Crossings	% of All Crossings		
0	0.0005	>	2,000	854	16.6%		
0.0005	0.0010	2,000	1,000	62	1.2%		
0.0010	0.0020	1,000	500	42	0.8%		
0.0020	0.0050	500	200	702	13.6%		
0.0050	0.0100	200	100	1209	23.5%		
0.0100	0.0200	100	50	1171	22.8%		
0.0200	0.0250	50	40	254	4.9%	83.4%	Above Wyo Threshold
0.0250	0.0500	40	20	499	9.7%	9.7%	16.57%
0.0500	0.0667	20	15	154	3.0%		Above SD Threshold
0.0667	0.1250	15	8	151	2.9%	5.9%	6.88%
0.1250	0.2000	8	5	39	0.8%		Above MN Threshold
0.2000	0.3333	5	3	10	0.2%		0.95%
0.3333		<	3	0	0.0%	1.0%	

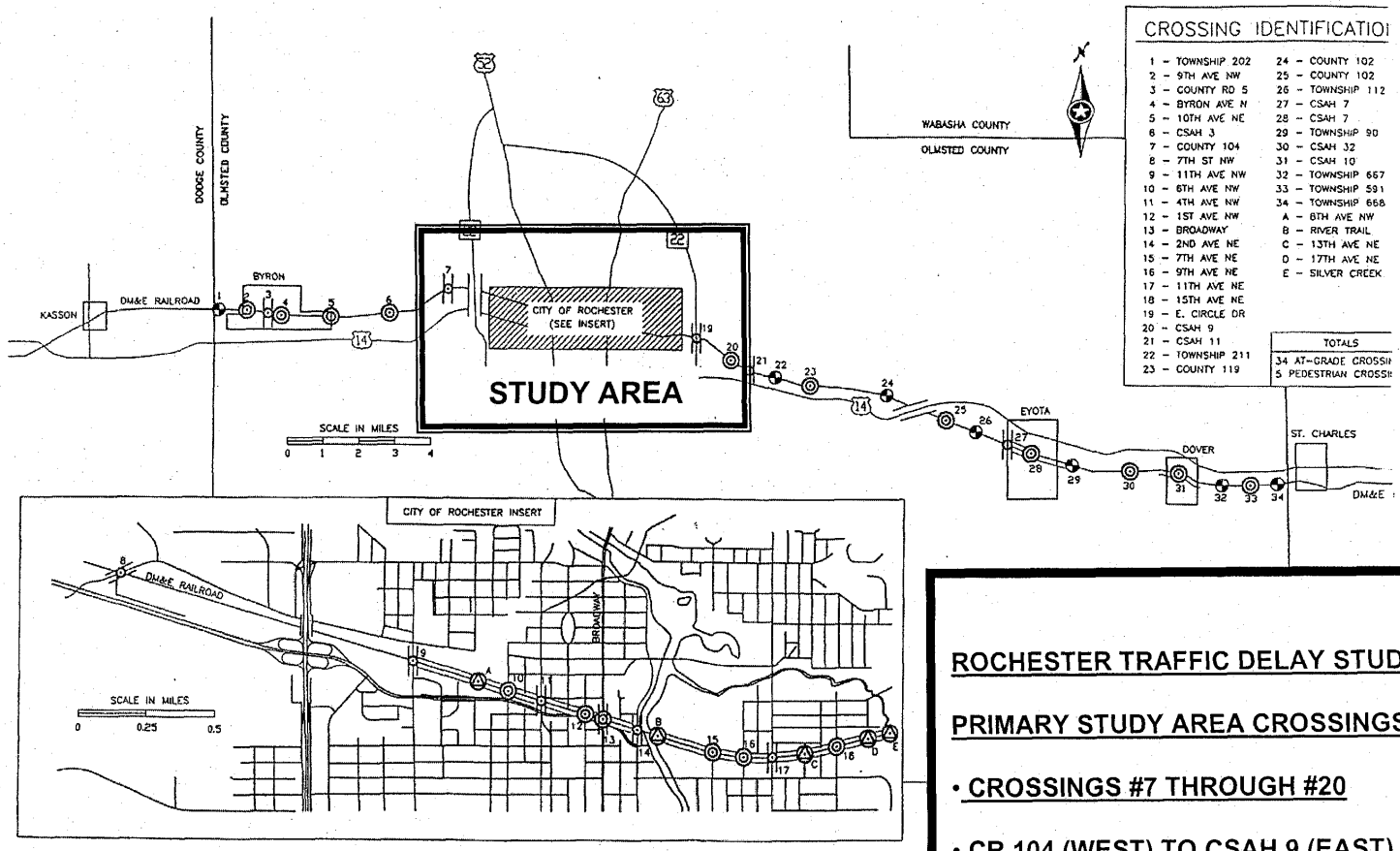
5147 Total Crossings

EXHIBIT I

ILLUSTRATION OF CROSSINGS CONSIDERED AS PART OF ROCHESTER'S TRANSPORTATION SYSTEM ASSESSMENT FOR ALTERNATIVE R-2

This exhibit contains a map of the corridor in Olmsted County. While individual crossing delay and accident analysis was conducted for all crossings on both Alternatives R-2 and R-4, the crossings in the primary study area illustrated on this map were the focus of the in-depth traffic analysis the City of Rochester conducted.

PUBLIC CROSSINGS OF THE DM&E RAILROAD
OLMSTED COUNTY, MINNESOTA



ROCHESTER TRAFFIC DELAY STUDY

PRIMARY STUDY AREA CROSSINGS

- **CROSSINGS #7 THROUGH #20**
- **CR 104 (WEST) TO CSAH 9 (EAST)**

EXHIBIT I

EXHIBIT J

SUMMARY TABLES FOR ROCHESTER'S TRAFFIC DELAY ANALYSIS FOR ALTERNATIVE R-2 IN THE PRIMARY STUDY AREA

This exhibit contains, for each crossing in the primary study area illustrated in Exhibit I (CR 104 to CSAH 9), a comparison of the results between the DEIS traffic delay analysis and Rochester's re-analysis of the crossings using the methodology found in TRB Special Report 165. The first page of the exhibit describes the equations from SR165 that were used in the re-analysis; the first table following this page is a summary for the entire corridor, followed by individual summaries for each crossing.

The tables report various factors including:

- **existing and projected ADT (column C);**
- **vehicles queued (column D);**
- **vehicles affected (Column F), which was not calculated as part of the DEIS but which has been included by Rochester to illustrate the increased number of cars that are impacted during the period of queue dissipation;**
- **vehicle minutes of delay (Column I)**
- **annual cost of delay (Column J)**

The DEIS data is included on rows 5 through 11 while the Rochester analysis results are contained on rows 13 through 20.

Columns L, M and N also report accident rate comparisons that were developed for each crossing as well as projected accident costs. This information was developed using the FRA PCAPS Accident Prediction Software (Ver 2.1) and information from the report *Summary of the DOT Rail-Highway Crossing Resource Allocation Procedure* – FRA Office of Safety Analysis, June 1987

METHODOLOGY FROM TRB SPECIAL REPORT 165 USED FOR CALCULATING DELAY, QUEUE LENGTH, VEHICLES AFFECTED AND VEHICLES MINUTES OF DELAY IN CITY OF ROCHESTER RESPONSE

FROM SECTION 8.6.1 – PAGE 166

bottleneck may be considered the server, and vehicles waiting to be served (i.e., to pass the bottleneck) is the observed behavior. This topic is discussed in section 8.6.1. Another application of queueing techniques is describing uninterrupted vehicular flow. In models of this type vehicles are assumed to be operating on a roadway at some desired speed until they overtake a slower vehicle, join a queue behind it, and await an opportunity to pass. Models of this type are discussed in section 8.6.2.

8.6.1 Queue Behavior at Bottlenecks

May [31] applied the technique of continuous flow to the problem of the temporary bottleneck (i.e., a roadway blocked by a rail crossing or a single lane blocked by an accident). The problem may be represented by the behavior of a queue during one cycle of a traffic signal (Figure 8.17), where the duration of the delay or blockade is equivalent to the length of the red interval r and the time for the queue to dissipate after removal of the blockade is the same as the time t_o in Figure 8.17.

The following notation, similar to that used in section 8.5.4, is used for May's roadway model. Let

q = average arrival rate of traffic (vehicle/min) upstream of the bottleneck;
s = saturation flow rate or capacity (vehicles/min) of uninterrupted flow;
s_r = flow rate (vehicles/min) at bottlenecks during blockade ($s_r < q < s$);
r = duration of blockade (min);
t_o = time (min) for queue to dissipate after blockade is removed;
t_q = total elapsed time (minutes from start of blockade until free flow resumes) $= r + t_o$.

The value of s_r may be zero when the roadway is completely blocked, as for an at-grade railroad crossing, or some value ($s_r < q$) when the roadway is partially blocked by a disabled vehicle. May developed the following set of relationships:

$$\text{Duration of queue, } t_q = r\left(\frac{s - s_r}{s - q}\right)$$

Number of vehicles affected, $N = qt_q$

Maximum number of vehicles in queue, $Q_m = r(q - s_r)$

Average number of vehicles in queue, $\bar{Q} = Q_m/2$

Total vehicle-minutes of delay, $D = \frac{r(q - s_r)t_q}{2}$

Average minutes vehicle is delayed, $d = \frac{r}{2}(1 - s_r/q)$

Maximum minutes of individual delay, $d_m = r(1 - s_r/q)$.

May and Keller [50] have applied a similar technique to analyze the behavior of queueing vehicles during rush-hour traffic. For this problem, it is assumed that although the capacity flow of the roadway s remains constant, the demand q varies from some value less than s, to equals s, and then to a maximum rate $q_2 > s$. The authors consider two cases for the shape of the demand curve: (a) trapezoidal (i.e., demand increases at constant rate to maximum q_2, remains at q_2 for some fixed time, and then decreases at a constant rate to constant post-peak demand) and (b) triangular (i.e., demand increases at constant rate to q_2 and then immediately decreases at constant rate to constant post-peak demand).

By an analysis similar to that used for bottlenecks, it is possible to calculate values of delay, queue length, and duration of queue.

McNeil [51] has considered the bottleneck problem by treating the bottleneck as the M/G/1 queueing situation (i.e., random arrivals, general service function, and one queue). The service time for the first vehicle in the queue b_1 is the delay time s_1 plus the time a_1 for its effective length (front bumper to front bumper of following vehicle) to clear the block point. The time s_1 could vary from a few seconds in the event of a short delay to several minutes in the event of a vehicle breakdown.

Each subsequent vehicle in the queue is assumed to have a service time b_i that is made up of the departure period s_i plus the time a_i for each vehicle to clear its own effective length. The departure period s_i ($i = 1, 2, 3, \ldots$) is a sequence of independent, identically distributed variables with a mean value that corresponds to the headway at the maximum flow rate. The value of a_i is constant for all vehicles, including the first, and is the effective length over the mean velocity V. The first and subsequent vehicles are each assumed to instantly resume the speed V after passing the point of blockage.

McNeil notes that if the vehicles are assumed to have zero length (a_i will be zero), then the number of vehicles delayed by the initial blockage of duration s_1 is the number of customers served in the server's busy period

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			TRAFFIC DELAY									ACCIDENTS		
2														
3	**URBAN CORRIDOR SUMMARY**							Ratio of	Vehicle	Annual		ANNUAL	20 YEAR	ACCIDENT
4	CR 104 TO CSAH 9		Total	Vehicles	% of	Vehicles	% of	Queue to	Minutes	Delay		ACCIDENT	ACCIDENT	FREQUENCY
5	**DEIS DATA**		ADT	Queued	ADT	Affected	ADT	Vehicles	of Delay	Cost		RATE	COSTS	(1/yr)
6	Existing Conditions		110,687	910	0.8%	X	X	Affected	1,939	$ 171,036		1.04951	$ 6,570,879	1.0
7	37 Trains / No ADT Growth		110,687	6,810	6.2%	X	X		10,383	$ 915,867		1.49500	$ 15,481,777	0.7
8	37 Trains / ROCOG 2020 ADT		150,082	9,234	6.2%	X	X		14,077	$ 1,241,709				
9														
10	% Change at No ADT Growth		0%	648%					435%	435%		42%	136%	
11	% Change with 2020 ADT		36%	915%					626%	626%				
12														
13	**ROCHESTER DATA**													
14														
15	Existing Conditions		110,687	910	0.8%	1,224	1.1%	134.5%	2,241	$ 197,675		0.63844	$ 3,324,229	1.6
16	37 Trains / No ADT Growth		110,687	6,810	6.2%	9,227	8.3%	135.5%	11,300	$ 996,754		1.51800	$ 15,719,381	0.7
17	37 Trains / ROCOG 2020 ADT		150,082	9,234	6.2%	14,195	9.5%	153.7%	17,383	$ 1,533,325		1.61450	$ 16,747,324	0.6
18														
19	% Change at No ADT Growth		0%	648%		654%			404%	404%		138%	373%	
20	% Change with 2020 ADT		36%	915%		1060%			676%	676%		153%	404%	
21														
22	**DEIS/ROCHESTER COMPARISON**													
23														
24	EXISTING CONDITIONS			100%					87%	87%		164%	198%	
25	37 Trains / No ADT Growth			100%					92%	92%		98%	98%	
26	37 Trains / ROCOG 2020 ADT			100%					81%	81%				
27														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			TRAFFIC DELAY									ACCIDENTS		
2														
28	**CR 104**							Ratio of	Vehicle	Annual		ANNUAL	20 YEAR	ACCIDENT
29			Total	Vehicles	% of	Vehicles	% of	Queue to	Minutes	Delay		ACCIDENT	ACCIDENT	FREQUENCY
30	**DEIS DATA**		ADT	Queued	ADT	Affected	ADT	Vehicles	of Delay	Cost		RATE	COSTS	(1/yr)
31	Existing Conditions		3,560	30	0.8%	X	X	Affected	63	$ 5,566		0.02909	$ 200,541	34.4
32	37 Trains / No ADT Growth		3,560	219	6.2%	X	X		333	$ 29,407		0.04273	$ 402,505	23.4
33	37 Trains / ROCOG 2020 ADT		3,560	219	6.2%	X	X		333	$ 29,407				
34														
35	% Change at No ADT Growth		0%	630%					428%	428%		47%	101%	
36	% Change with 2020 ADT		0%	630%					428%	428%				
37														
38	**ROCHESTER DATA**													
39														
40	Existing Conditions		3,560	30	0.8%	33	0.9%	110.0%	60	$ 5,266		0.01024	$ 66,503	97.7
41	37 Trains / No ADT Growth		3,560	219	6.2%	242	6.8%	110.5%	295	$ 26,021		0.02658	$ 250,296	37.6
42	37 Trains / ROCOG 2020 ADT		3,560	219	6.2%	242	6.8%	110.5%	295	$ 26,021		0.03030	$ 285,517	33.0
43														
44	% Change at No ADT Growth		0%	630%		633%			394%	394%		160%	276%	
45	% Change with 2020 ADT		0%	630%		633%			394%	394%		196%	329%	
46														
47	**DEIS/ROCHESTER COMPARISON**													
48														
49	EXISTING CONDITIONS			100%					106%	106%		284%	302%	
50	37 Trains / No ADT Growth			100%					113%	113%		161%	161%	
51	37 Trains / ROCOG 2020 ADT			100%					113%	113%				
52														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			TRAFFIC DELAY									ACCIDENTS		
2														
53	**7TH ST NW**							Ratio of	Vehicle	Annual		ANNUAL	20 YEAR	ACCIDENT
54			Total	Vehicles	% of	Vehicles	% of	Queue to	Minutes	Delay		ACCIDENT	ACCIDENT	FREQUENCY
55	**DEIS DATA**		ADT	Queued	ADT	Affected	ADT	Vehicles	of Delay	Cost		RATE	COSTS	(1/yr)
56	Existing Conditions		8,178	65	0.8%	X	X	Affected	139	$ 12,226		0.03971	$ 273,857	25.2
57	37 Trains / No ADT Growth		8,178	503	6.2%	X	X		767	$ 67,627		0.05477	$ 515,847	18.3
58	37 Trains / ROCOG 2020 ADT		13,700	842	6.1%	X	X		1,284	$ 113,290				
59														
60	% Change at No ADT Growth		0%	674%					453%	453%		38%	88%	
61	% Change with 2020 ADT		68%	1195%					827%	827%				
62														
63	**ROCHESTER DATA**													
64														
65	Existing Conditions		8,178	65	0.8%	81	1.0%	124.6%	148	$ 13,046		0.02462	$ 107,509	40.6
66	37 Trains / No ADT Growth		8,178	503	6.2%	639	7.8%	127.0%	782	$ 68,979		0.05568	$ 524,501	18.0
67	37 Trains / ROCOG 2020 ADT		13,700	843	6.2%	1,340	9.8%	159.0%	1,641	$ 144,750		0.06020	$ 567,035	16.6
68														
69	% Change at No ADT Growth		0%	674%		689%			429%	429%		126%	388%	
70	% Change with 2020 ADT		68%	1197%		1554%			1010%	1010%		145%	427%	
71														
72	**DEIS/ROCHESTER COMPARISON**													
73														
74	EXISTING CONDITIONS			100%					94%	94%		161%	255%	
75	37 Trains / No ADT Growth			100%					98%	98%		98%	98%	
76	37 Trains / ROCOG 2020 ADT			100%					78%	78%				
77														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			TRAFFIC DELAY									ACCIDENTS		
2														
78	**11TH AVE NW**							Ratio of	Vehicle	Annual		ANNUAL	20 YEAR	ACCIDENT
79			Total	Vehicles	% of	Vehicles	% of	Queue to	Minutes	Delay		ACCIDENT	ACCIDENT	FREQUENCY
80	**DEIS DATA**		ADT	Queued	ADT	Affected	ADT	Vehicles	of Delay	Cost		RATE	COSTS	(1/yr)
81	Existing Conditions		18,967	156	0.8%	X	X	Affected	333	$ 29,365		0.03247	$ 146,448	30.8
82	37 Trains / No ADT Growth		18,967	1,168	6.2%	X	X		1,781	$ 157,073		0.04450	$ 412,623	22.5
83	37 Trains / ROCOG 2020 ADT		25,695	1,582	6.2%	X	X		2,412	$ 212,789				
84														
85	% Change at No ADT Growth		0%	649%					435%	435%		37%	182%	
86	% Change with 2020 ADT		35%	914%					625%	625%				
87														
88	**ROCHESTER DATA**													
89														
90	Existing Conditions		18,967	156	0.8%	200	1.1%	128.2%	365	$ 32,223		0.01818	$ 77,019	55.0
91	37 Trains / No ADT Growth		18,967	1,168	6.2%	1,503	7.9%	128.7%	1,841	$ 162,392		0.04125	$ 382,520	24.2
92	37 Trains / ROCOG 2020 ADT		25,695	1,582	6.2%	2,283	8.9%	144.3%	2,796	$ 246,631		0.04314	$ 399,938	23.2
93														
94	% Change at No ADT Growth		0%	649%		652%			404%	404%		127%	397%	
95	% Change with 2020 ADT		35%	914%		1042%			665%	665%		137%	419%	
96														
97	**DEIS/ROCHESTER COMPARISON**													
98														
99	EXISTING CONDITIONS			100%					91%	91%		179%	190%	
100	37 Trains / No ADT Growth			100%					97%	97%		108%	108%	
101	37 Trains / ROCOG 2020 ADT			100%					86%	86%				
102														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			TRAFFIC DELAY									ACCIDENTS		
2														
103	**6TH AVE NW**							Ratio of	Vehicle	Annual		ANNUAL	20 YEAR	ACCIDENT
104			Total	Vehicles	% of	Vehicles	% of	Queue to	Minutes	Delay		ACCIDENT	ACCIDENT	FREQUENCY
105	**DEIS DATA**		ADT	Queued	ADT	Affected	ADT	Vehicles	of Delay	Cost		RATE	COSTS	(1/yr)
106	Existing Conditions		4,397	33	0.8%	X	X	Affected	71	$ 6,219		0.04274	$ 192,679	23.4
107	37 Trains / No ADT Growth		4,397	270	6.1%	X	X		412	$ 36,349		0.05794	$ 537,180	17.3
108	37 Trains / ROCOG 2020 ADT		5,968	367	6.1%	X	X		559	$ 49,336				
109														
110	% Change at No ADT Growth		0%	718%					485%	485%		36%	179%	
111	% Change with 2020 ADT		36%	1012%					693%	693%				
112														
113	**ROCHESTER DATA**													
114														
115	Existing Conditions		4,397	33	0.8%	41	0.9%	124.2%	75	$ 6,616		0.02333	$ 96,646	42.9
116	37 Trains / No ADT Growth		4,397	270	6.1%	368	8.4%	136.3%	452	$ 39,870		0.04887	$ 430,681	20.5
117	37 Trains / ROCOG 2020 ADT		5,968	367	6.1%	619	10.4%	168.7%	758	$ 66,862		0.05178	$ 456,421	19.3
118														
119	% Change at No ADT Growth		0%	718%		798%			503%	503%		109%	346%	
120	% Change with 2020 ADT		36%	1012%		1410%			911%	911%		122%	372%	
121														
122	**DEIS/ROCHESTER COMPARISON**													
123														
124	EXISTING CONDITIONS			100%					94%	94%		183%	199%	
125	37 Trains / No ADT Growth			100%					91%	91%		119%	125%	
126	37 Trains / ROCOG 2020 ADT			100%					74%	74%				
127														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			TRAFFIC DELAY									ACCIDENTS		
2														
128	**4TH AVE NW**							Ratio of	Vehicle	Annual		ANNUAL	20 YEAR	ACCIDENT
129			Total	Vehicles	% of	Vehicles	% of	Queue to	Minutes	Delay		ACCIDENT	ACCIDENT	FREQUENCY
130	**DEIS DATA**		ADT	Queued	ADT	Affected	ADT	Vehicles Affected	of Delay	Cost		RATE	COSTS	(1/yr)
131	Existing Conditions		7,317	54	0.7%	X	X		114	$ 10,091		0.02909	$ 124,002	34.4
132	37 Trains / No ADT Growth		7,317	450	6.2%	X	X		686	$ 60,495		0.04064	$ 184,366	24.6
133	37 Trains / ROCOG 2020 ADT		9,715	597	6.1%	X	X		911	$ 80,321				
134														
135	% Change at No ADT Growth		0%	733%					499%	499%		40%	49%	
136	% Change with 2020 ADT		33%	1006%					696%	696%				
137														
138	**ROCHESTER DATA**													
139														
140	Existing Conditions		7,317	54	0.7%	64	0.9%	118.5%	117	$ 10,312		0.01437	$ 25,276	69.6
141	37 Trains / No ADT Growth		7,317	450	6.2%	597	8.2%	132.7%	731	$ 64,480		0.03174	$ 275,088	31.5
142	37 Trains / ROCOG 2020 ADT		9,715	597	6.1%	938	9.7%	157.1%	1,148	$ 101,263		0.03335	$ 288,907	30.0
143														
144	% Change at No ADT Growth		0%	733%		833%			525%	525%		121%	988%	
145	% Change with 2020 ADT		33%	1006%		1366%			882%	882%		132%	1043%	
146														
147	**DEIS/ROCHESTER COMPARISON**													
148														
149	EXISTING CONDITIONS			100%					98%	98%		202%	491%	
150	37 Trains / No ADT Growth			100%					94%	94%		128%	67%	
151	37 Trains / ROCOG 2020 ADT			100%					79%	79%				
152														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			TRAFFIC DELAY									ACCIDENTS		
2														
153	**1ST AVE NW**							Ratio of	Vehicle	Annual		ANNUAL	20 YEAR	ACCIDENT
154			Total	Vehicles	% of	Vehicles	% of	Queue to	Minutes	Delay		ACCIDENT	ACCIDENT	FREQUENCY
155	**DEIS DATA**		ADT	Queued	ADT	Affected	ADT	Vehicles	of Delay	Cost		RATE	COSTS	(1/yr)
156	Existing Conditions		1,916	18	0.9%	X	X	Affected	38	$ 3,352		0.02662	$ 50,461	37.6
157	37 Trains / No ADT Growth		1,916	117	6.1%	X	X		180	$ 15,842		0.03772	$ 334,253	26.5
158	37 Trains / ROCOG 2020 ADT		1,960	121	6.2%	X	X		184	$ 16,207				
159														
160	% Change at No ADT Growth		0%	550%					373%	373%		42%	562%	
161	% Change with 2020 ADT		2%	572%					384%	384%				
162														
163	**ROCHESTER DATA**													
164														
165	Existing Conditions		1,916	18	0.9%	20	1.0%	111.1%	36	$ 3,149		0.00972	$ 17,176	102.9
166	37 Trains / No ADT Growth		1,916	117	6.1%	130	6.8%	111.1%	159	$ 14,025		0.02300	$ 199,171	43.5
167	37 Trains / ROCOG 2020 ADT		1,960	121	6.2%	133	6.8%	109.9%	163	$ 14,378		0.02312	$ 200,255	43.3
168														
169	% Change at No ADT Growth		0%	550%		550%			345%	345%		137%	1060%	
170	% Change with 2020 ADT		2%	572%		565%			357%	357%		138%	1066%	
171														
172	**DEIS/ROCHESTER COMPARISON**													
173														
174	EXISTING CONDITIONS			100%					106%	106%		274%	294%	
175	37 Trains / No ADT Growth			100%					113%	113%		164%	168%	
176	37 Trains / ROCOG 2020 ADT			100%					113%	113%				
177														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			TRAFFIC DELAY									ACCIDENTS		
2														
178	**BROADWAY**								Vehicle	Annual		ANNUAL	20 YEAR	ACCIDENT
179			Total	Vehicles	% of	Vehicles	% of		Minutes	Delay		ACCIDENT	ACCIDENT	FREQUENCY
180	**DEIS DATA**		ADT	Queued	ADT	Affected	ADT		of Delay	Cost		RATE	COSTS	(1/yr)
181	Existing Conditions		27,757	227	0.8%	X	X		483	$ 42,605		0.12946	$ 233,229	7.7
182	37 Trains / No ADT Growth		27,757	1,709	6.2%	X	X		2,605	$ 229,778		0.15485	$ 1,413,449	6.5
183	37 Trains / ROCOG 2020 ADT		34,355	2,114	6.2%	X	X		3,224	$ 284,398				
184														
185	% Change at No ADT Growth		0%	653%					439%	439%		20%	506%	
186	% Change with 2020 ADT		24%	831%					568%	568%				
187														
188	**ROCHESTER DATA**													
189														
190	Existing Conditions		27,757	227	0.8%	342	1.2%	150.7%	626	$ 55,227		0.11052	$ 206,500	9.0
191	37 Trains / No ADT Growth		27,757	1,709	6.2%	2,590	9.3%	151.6%	3,171	$ 279,709		0.15991	$ 1,409,365	6.3
192	37 Trains / ROCOG 2020 ADT		34,355	2,114	6.2%	3,709	10.8%	175.4%	4,542	$ 400,642		0.16439	$ 1,448,761	6.1
193														
194	% Change at No ADT Growth		0%	653%		657%			406%	406%		45%	583%	
195	% Change with 2020 ADT		24%	831%		985%			625%	625%		49%	602%	
196														
197	**DEIS/ROCHESTER COMPARISON**													
198														
199	EXISTING CONDITIONS			100%					77%	77%		117%	113%	
200	37 Trains / No ADT Growth			100%					82%	82%		97%	100%	
201	37 Trains / ROCOG 2020 ADT			100%					71%	71%				
202														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			TRAFFIC DELAY									ACCIDENTS		
2														
203	**2ND AVE NE**							Ratio of	Vehicle	Annual		ANNUAL	20 YEAR	ACCIDENT
204			Total	Vehicles	% of	Vehicles	% of	Queue to	Minutes	Delay		ACCIDENT	ACCIDENT	FREQUENCY
205	**DEIS DATA**		ADT	Queued	ADT	Affected	ADT	Vehicles Affected	of Delay	Cost		RATE	COSTS	(1/yr)
206	Existing Conditions		10,300	87	0.8%	X	X		185	$ 16,345		0.05686	$ 102,415	17.6
207	37 Trains / No ADT Growth		10,300	634	6.2%	X	X		966	$ 85,181		0.07140	$ 651,755	14.0
208	37 Trains / ROCOG 2020 ADT		14,540	894	6.1%	X	X		1,363	$ 120,246				
209														
210	% Change at No ADT Growth		0%	629%					421%	421%		26%	536%	
211	% Change with 2020 ADT		41%	928%					636%	636%				
212														
213	**ROCHESTER DATA**													
214														
215	Existing Conditions		10,300	87	0.8%	99	1.0%	113.8%	182	$ 16,027		0.04083	$ 76,156	24.5
216	37 Trains / No ADT Growth		10,300	634	6.2%	721	7.0%	113.7%	883	$ 77,888		0.06941	$ 611,742	14.4
217	37 Trains / ROCOG 2020 ADT		14,540	894	6.1%	1,081	7.4%	120.9%	1,324	$ 116,788		0.07228	$ 637,039	13.8
218														
219	% Change at No ADT Growth		0%	629%		628%			386%	386%		70%	703%	
220	% Change with 2020 ADT		41%	928%		992%			629%	629%		77%	736%	
221														
222	**DEIS/ROCHESTER COMPARISON**													
223														
224	EXISTING CONDITIONS			100%					102%	102%		139%	134%	
225	37 Trains / No ADT Growth			100%					109%	109%		103%	107%	
226	37 Trains / ROCOG 2020 ADT			100%					103%	103%				
227														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			TRAFFIC DELAY									ACCIDENTS		
2														
228	**7TH AVE NE**							Ratio of	Vehicle	Annual		ANNUAL	20 YEAR	ACCIDENT
229			Total	Vehicles	% of	Vehicles	% of	Queue to	Minutes	Delay		ACCIDENT	ACCIDENT	FREQUENCY
230	**DEIS DATA**		ADT	Queued	ADT	Affected	ADT	Vehicles	of Delay	Cost		RATE	COSTS	(1/yr)
231	Existing Conditions		436	4	0.9%	X	X	Affected	8	$ 697		0.03704	$ 172,039	27.0
232	37 Trains / No ADT Growth		436	27	6.2%	X	X		41	$ 3,622		0.06347	$ 597,817	15.8
233	37 Trains / ROCOG 2020 ADT		493	31	6.3%	X	X		46	$ 4,095				
234														
235	% Change at No ADT Growth		0%	575%					420%	420%		71%	247%	
236	% Change with 2020 ADT		13%	675%					488%	488%				
237														
238	**ROCHESTER DATA**													
239														
240	Existing Conditions		436	4	0.9%	4	0.9%	100.0%	7	$ 609		0.01625	$ 71,002	61.5
241	37 Trains / No ADT Growth		436	27	6.2%	28	6.4%	103.7%	34	$ 2,999		0.05462	$ 514,449	18.3
242	37 Trains / ROCOG 2020 ADT		493	31	6.3%	32	6.5%	103.2%	38	$ 3,352		0.05609	$ 488,423	17.8
243														
244	% Change at No ADT Growth		0%	575%		600%			393%	393%		236%	625%	
245	% Change with 2020 ADT		13%	675%		700%			451%	451%		245%	588%	
246														
247	**DEIS/ROCHESTER COMPARISON**													
248														
249	EXISTING CONDITIONS			100%					114%	114%		228%	242%	
250	37 Trains / No ADT Growth			100%					121%	121%		116%	116%	
251	37 Trains / ROCOG 2020 ADT			100%					122%	122%				
252														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			TRAFFIC DELAY									ACCIDENTS		
2														
253	**9TH AVE NE**							Ratio of	Vehicle	Annual		ANNUAL	20 YEAR	ACCIDENT
254			Total	Vehicles	% of	Vehicles	% of	Queue to	Minutes	Delay		ACCIDENT	ACCIDENT	FREQUENCY
255	**DEIS DATA**		ADT	Queued	ADT	Affected	ADT	Vehicles	of Delay	Cost		RATE	COSTS	(1/yr)
256	Existing Conditions		805	7	0.9%	X	X	Affected	15	$ 1,279		0.02120	$ 146,214	47.2
257	37 Trains / No ADT Growth		805	49	6.1%	X	X		76	$ 6,686		0.03271	$ 308,140	30.6
258	37 Trains / ROCOG 2020 ADT		826	51	6.2%	X	X		78	$ 6,861				
259														
260	% Change at No ADT Growth		0%	600%					423%	423%		54%	111%	
261	% Change with 2020 ADT		3%	629%					436%	436%				
262														
263	**ROCHESTER DATA**													
264														
265	Existing Conditions		805	7	0.9%	7	0.9%	100.0%	13	$ 1,156		0.01131	$ 51,497	88.4
266	37 Trains / No ADT Growth		805	49	6.1%	52	6.5%	106.1%	64	$ 5,645		0.03225	$ 303,725	31.0
267	37 Trains / ROCOG 2020 ADT		826	51	6.2%	53	6.4%	103.9%	65	$ 5,734		0.03248	$ 306,004	30.8
268														
269	% Change at No ADT Growth		0%	600%		643%			389%	389%		185%	490%	
270	% Change with 2020 ADT		3%	629%		657%			396%	396%		187%	494%	
271														
272	**DEIS/ROCHESTER COMPARISON**													
273														
274	EXISTING CONDITIONS			100%					111%	111%		187%	284%	
275	37 Trains / No ADT Growth			100%					118%	118%		101%	101%	
276	37 Trains / ROCOG 2020 ADT			100%					120%	120%				
277														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			TRAFFIC DELAY									ACCIDENTS		
2														
278	**11TH AVE NE**							Ratio of	Vehicle	Annual		ANNUAL	20 YEAR	ACCIDENT
279			Total	Vehicles	% of	Vehicles	% of	Queue to	Minutes	Delay		ACCIDENT	ACCIDENT	FREQUENCY
280	**DEIS DATA**		ADT	Queued	ADT	Affected	ADT	Vehicles	of Delay	Cost		RATE	COSTS	(1/yr)
281	Existing Conditions		12,866	111	0.9%	X	X	Affected	236	$ 20,844		0.04437	$ 147,321	22.5
282	37 Trains / No ADT Growth		12,866	792	6.2%	X	X		1,207	$ 106,492		0.05961	$ 561,398	16.8
283	37 Trains / ROCOG 2020 ADT		15,130	931	6.2%	X	X		1,420	$ 125,234				
284														
285	% Change at No ADT Growth		0%	614%					411%	411%		34%	281%	
286	% Change with 2020 ADT		18%	739%					501%	501%				
287														
288	**ROCHESTER DATA**													
289														
290	Existing Conditions		12,866	111	0.9%	201	1.6%	181.1%	369	$ 32,531		0.02756	$ 86,839	36.3
291	37 Trains / No ADT Growth		12,866	792	6.2%	1,387	10.8%	175.1%	1,699	$ 149,866		0.05887	$ 554,474	17.0
292	37 Trains / ROCOG 2020 ADT		15,130	931	6.2%	1,919	12.7%	206.1%	2,350	$ 207,290		0.06048	$ 569,735	16.5
293														
294	% Change at No ADT Growth		0%	614%		590%			361%	361%		114%	539%	
295	% Change with 2020 ADT		18%	739%		855%			537%	537%		119%	556%	
296														
297	**DEIS/ROCHESTER COMPARISON**													
298														
299	EXISTING CONDITIONS			100%					64%	64%		161%	170%	
300	37 Trains / No ADT Growth			100%					71%	71%		101%	101%	
301	37 Trains / ROCOG 2020 ADT			100%					60%	60%				
302														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			TRAFFIC DELAY									ACCIDENTS		
2														
303	**15TH AVE NE**							Ratio of	Vehicle	Annual		ANNUAL	20 YEAR	ACCIDENT
304			Total	Vehicles	% of	Vehicles	% of	Queue to	Minutes	Delay		ACCIDENT	ACCIDENT	FREQUENCY
305	**DEIS DATA**		ADT	Queued	ADT	Affected	ADT	Vehicles	of Delay	Cost		RATE	COSTS	(1/yr)
306	Existing Conditions		856	7	0.8%	X	X	Affected	15	$ 1,297		0.02228	$ 103,420	44.9
307	37 Trains / No ADT Growth		856	53	6.2%	X	X		80	$ 7,095		0.03414	$ 321,649	29.3
308	37 Trains / ROCOG 2020 ADT		876	54	6.2%	X	X		82	$ 7,260				
309														
310	% Change at No ADT Growth		0%	657%					447%	447%		53%	211%	
311	% Change with 2020 ADT		2%	671%					460%	460%				
312														
313	**ROCHESTER DATA**													
314														
315	Existing Conditions		856	7	0.8%	7	0.8%	100.0%	13	$ 1,164		0.01177	$ 51,428	85.0
316	37 Trains / No ADT Growth		856	53	6.2%	55	6.4%	103.8%	68	$ 5,998		0.03326	$ 313,315	30.1
317	37 Trains / ROCOG 2020 ADT		876	54	6.2%	57	6.5%	105.6%	69	$ 6,086		0.03348	$ 315,412	29.9
318														
319	% Change at No ADT Growth		0%	657%		686%			415%	415%		183%	509%	
320	% Change with 2020 ADT		2%	671%		714%			423%	423%		184%	513%	
321														
322	**DEIS/ROCHESTER COMPARISON**													
323														
324	EXISTING CONDITIONS			100%					111%	111%		189%	201%	
325	37 Trains / No ADT Growth			100%					118%	118%		103%	103%	
326	37 Trains / ROCOG 2020 ADT			100%					119%	119%				
327														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			TRAFFIC DELAY									ACCIDENTS		
2														
328	**CSAH 22 / EAST CIRCLE DRIVE**							Ratio of	Vehicle	Annual		ANNUAL	20 YEAR	ACCIDENT
329			Total	Vehicles	% of	Vehicles	% of	Queue to	Minutes	Delay		ACCIDENT	ACCIDENT	FREQUENCY
330	**DEIS DATA**		ADT	Queued	ADT	Affected	ADT	Vehicles	of Delay	Cost		RATE	COSTS	(1/yr)
331	Existing Conditions		10,002	84	0.8%	X	X	Affected	179	$ 15,798		0.04057	$ 279,754	24.6
332	37 Trains / No ADT Growth		10,002	614	6.1%	X	X		937	$ 82,662		0.05568	$ 524,501	18.0
333	37 Trains / ROCOG 2020 ADT		19,934	1,225	6.1%	X	X		1,868	$ 164,746				
334														
335	% Change at No ADT Growth		0%	631%					423%	423%		37%	87%	
336	% Change with 2020 ADT		99%	1358%					943%	943%				
337														
338	**ROCHESTER DATA**													
339														
340	Existing Conditions		10,002	84	0.8%	94	0.9%	111.9%	173	$ 15,242		0.03256	$ 209,840	30.7
341	37 Trains / No ADT Growth		10,002	614	6.1%	686	6.9%	111.7%	841	$ 74,183		0.06555	$ 617,505	15.3
342	37 Trains / ROCOG 2020 ADT		19,934	1,225	6.1%	1,560	7.8%	127.3%	1,911	$ 168,566		0.07316	$ 689,164	13.7
343														
344	% Change at No ADT Growth		0%	631%		630%			387%	387%		101%	194%	
345	% Change with 2020 ADT		99%	1358%		1560%			1006%	1006%		125%	228%	
346														
347	**DEIS/ROCHESTER COMPARISON**													
348														
349	EXISTING CONDITIONS			100%					104%	104%		125%	133%	
350	37 Trains / No ADT Growth			100%					111%	111%		85%	85%	
351	37 Trains / ROCOG 2020 ADT			100%					98%	98%				
352														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			TRAFFIC DELAY									ACCIDENTS		
2														
353	**CSAH 9**							Ratio of	Vehicle	Annual		ANNUAL	20 YEAR	ACCIDENT
354			Total	Vehicles	% of	Vehicles	% of	Queue to	Minutes	Delay		ACCIDENT	ACCIDENT	FREQUENCY
355	**DEIS DATA**		ADT	Queued	ADT	Affected	ADT	Vehicles	of Delay	Cost		RATE	COSTS	(1/yr)
356	Existing Conditions		3,330	29	0.9%	X	X	Affected	61	$ 5,381		0.03224	$ 296,627	31.0
357	37 Trains / No ADT Growth		3,330	205	6.2%	X	X		312	$ 27,549		0.04646	$ 582,360	21.5
358	37 Trains / ROCOG 2020 ADT		3,330	205	6.2%	X	X		312	$ 27,549				
359														
360	% Change at No ADT Growth		0%	607%					412%	412%		44%	96%	
361	% Change with 2020 ADT		0%	607%					412%	412%				
362														
363	**ROCHESTER DATA**													
364														
365	Existing Conditions		3,330	29	0.9%	32	1.0%	110.3%	58	$ 5,090		0.01888	$ 162,213	53.0
366	37 Trains / No ADT Growth		3,330	205	6.2%	229	6.9%	111.7%	281	$ 24,787		0.04688	$ 587,734	21.3
367	37 Trains / ROCOG 2020 ADT		3,330	205	6.2%	229	6.9%	111.7%	281	$ 24,787		0.05056	$ 633,808	19.8
368														
369	% Change at No ADT Growth		0%	607%		616%			387%	387%		148%	262%	
370	% Change with 2020 ADT		0%	607%		616%			387%	387%		168%	291%	
371														
372	**DEIS/ROCHESTER COMPARISON**													
373														
374	EXISTING CONDITIONS			100%					106%	106%		171%	183%	
375	37 Trains / No ADT Growth			100%					111%	111%		99%	99%	
376	37 Trains / ROCOG 2020 ADT			100%					111%	111%				

EXHIBIT K

CALCULATION OF HOURLY COST ASSOCIATED WITH TRAFFIC DELAY

This table illustrates the factors that were used in calculating the hourly cost of $14.50 associated with traffic delay.

DM & E Study
Vehicular Operating Costs

Vehicle Type / Class		Travel Time Components from PARAMS.DAT (1995$)				TTVAL Cost / Hr 1997	TTVAL Cost / Hr 2000
		$ per Person-Hour (CPPH)	Vehicle Cost (VC)	Inventory Cost (IC)	Average Vehicle Occupancy (AVO)		
Small Autos	1	$9.51	$0.11	$0.00	1.20	$12.2074	$13.3394
Medium / Large Autos	2	9.51	0.15	0.00	1.20	12.2518	13.3879
Pickups, SUV's & Vans	3	10.78	0.48	0.00	1.20	14.2320	15.5517
Average (Classes 1, 2, & 3)							$14.0930
Six-Tire Trucks	4	16.50	2.65	0.00	1.05	21.2887	23.2627
3+ Axle Single Unit Trucks	5	16.50	7.16	0.00	1.00	25.4211	27.7783
3-4 Axle Combination Trucks	6	16.50	6.41	0.60	1.12	27.3082	29.8404
5+ Axle Combination Trucks	7	16.50	6.16	0.60	1.12	27.0307	29.5372
Average (Classes 4, 5, 6, & 7)							$27.6047
Composite Average							**$14.50**

Notes:

Data Source - FHWA HERS Technical Report, Appendix H, Table H-7, June 2000

FHWA HERS index values of 1.059, 1.110, and 1.038 convert time, vehicle and inventory cost, respectively, from 1995 dollars to 1997 dollars.

AVO = Factors for Vehicle Classes 1, 2, and 3 provided by Rochester-Olmsted Council of Governments

AVO = Factors for Vehicle Classes 4, 5, 6, and 7 provided by FHWA HERS Report

TTVAL = Value of an Average Hour of Travel Time.

TTVAL 1997 = (AVO x CPPH x PI) + (VC x PI) + (IC x PI)

TTVAL 2000 = (TTVAL 1997) x 1.03 x 1.03 x 1.03 (3% Annual Inflation)

PI = Price Index for Person-Hour, Vehicle Cost, or Inventory Cost.

Composite Average = 97% (Average of Classes 1, 2, & 3) + 3 % (Average of Classes 4, 5, 6, & 7)

EXHIBIT L

RESULTS OF ACCIDENT PREDICTION RE-ANALYSIS AND ESTIMATE OF ACCIDENT COSTS ASSOCIATED WITH ALTERNATIVE R-2

This exhibit contains the results of Rochester's re-analysis of predicted accident rates and the costs associated with predicted accidents. For each crossing, the table begins by reporting the values found in the PCAPS database and the values reported in the DEIS for existing conditions and at 100MT of coal under the Alternative C siding plan.

Following that information, the Rochester analysis calculated revised base condition values using corrected train traffic, crossing geometrics and ADT values. The Rochester analysis then recalculates the predicted accident rates for 6400' and 7400' trains under three levels of vehicular traffic (existing, 2008, 2018) using projected train traffic levels at 100MT.

The comparison of accident rates reported in the DEIS and those found by Rochester are reported in Columns AO-AQ of Exhibit G. Those values are calculated by dividing the DEIS values by the Rochester values to identify where the DEIS overstated or understated predicted accident rates.

	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
1	**GRADE CROSSING**																
2	**TWP 202 / COUNTY LINE ROAD**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
3	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	ACCID	INDEX	INJURY	PDO	*COST*	*COST*
4																	
5	PCAPS DATABASE	35	P	100	5	5	0	1	2	2	0.01104	0.00098	0.05234	0.00442	0.00564	$ 5,023	$ 100,454
6	DEIS																
7	DEIS PRECON BASE	35	P	100	8	4	0	1	2	2	0.01265	0.00114	0.06071	0.00510	0.00642	$ 5,820	$ 116,400
8	DEIS 100 MT ALT C	49	P	100	23	14	0	1	2	2	0.02356	0.00310	0.16203	0.01013	0.01033	$ 14,764	$ 295,278
9	REVISED																
10	BASE CONDITIONS	35	P	120	2	1	0	1	2	2	0.00670	0.00055	0.02953	0.00268	0.00348	$ 2,875	$ 57,493
11	6400' TRAINS																
12	100MT / BASE TRAFFIC	49	P	120	27	16	0	1	2	2	0.02669	0.00355	0.18549	0.01149	0.01165	$ 16,879	$ 337,584
13	100 MT / 2008 TRAFFIC	49	P	140	27	16	0	1	2	2	0.02795	0.00372	0.19425	0.01202	0.01221	$ 17,674	$ 353,471
14	100MT / 2018 TRAFFIC	49	P	180	27	16	0	1	2	2	0.03011	0.00401	0.20920	0.01296	0.01314	$ 19,036	$ 380,713
15	7400' TRAINS																
16	100MT / BASE TRAFFIC	49	P	120	23	14	0	1	2	2	0.02492	0.00328	0.17137	0.01075	0.01090	$ 15,622	$ 312,435
17	100 MT / 2008 TRAFFIC	49	P	140	23	14	0	1	2	2	0.02612	0.00344	0.17959	0.01123	0.01145	$ 16,364	$ 327,283
18	100MT / 2018 TRAFFIC	49	P	180	23	14	0	1	2	2	0.02816	0.00371	0.19365	0.01211	0.01235	$ 17,645	$ 352,900
19																	
20	**GRADE CROSSING**																
21	**9TH AVE NW - BYRON**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
22	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
23																	
24	PCAPS DATABASE	35	F		5	5	0	1	2	1							
25	DEIS																
26	DEIS PRECON BASE	35	F	250	8	4	0	1	2	1	0.01411			0.00000	0.01411	$ 423	$ 8,464
27	DEIS 100 MT ALT C	49	F	250	23	14	0	1	2	1	0.02281			0.00000	0.02281	$ 684	$ 13,683
28	REVISED																
29	BASE CONDITIONS	35	F	360	2	1	0	1	2	1	0.00848			0.00000	0.00848	$ 254	$ 5,089
30	6400' TRAINS																
31	100MT / BASE TRAFFIC	49	F	360	27	16	0	1	2	1	0.02718			0.00000	0.02718	$ 815	$ 16,306
32	100 MT / 2008 TRAFFIC	49	F	470	27	16	0	1	2	1	0.02945			0.00000	0.02945	$ 883	$ 17,667
33	100MT / 2018 TRAFFIC	49	F	600	27	16	0	1	2	1	0.03162			0.00000	0.03162	$ 949	$ 18,974
34	7400' TRAINS																
35	100MT / BASE TRAFFIC	49	F	360	23	14	0	1	2	1	0.02560			0.00000	0.02560	$ 768	$ 15,359
36	100 MT / 2008 TRAFFIC	49	F	470	23	14	0	1	2	1	0.02778			0.00000	0.02778	$ 833	$ 16,669
37	100MT / 2018 TRAFFIC	49	F	600	23	14	0	1	2	1	0.02988			0.00000	0.02988	$ 897	$ 17,931
38																	

	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
39	**GRADE CROSSING**																
40	**CSAH 5 - BYRON**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
41	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
42																	
43	PCAPS DATABASE	35	F	3800	5	5	0	1	4	1	0.03956	0.00350	0.18762	0.01593	0.02013	$ 18,025	$ 360,492
44	DEIS																
45	DEIS PRECON BASE	35	F	4400	8	4	0	1	4	1	0.04428	0.00398	0.21257	0.01780	0.02251	$ 20,368	$ 407,354
46	DEIS 100 MT ALT C	49	F	4400	23	14	0	1	4	1	0.05951	0.00582	0.30886	0.02393	0.02977	$ 29,169	$ 583,385
47	REVISED																
48	BASE CONDITIONS	35	F	4820	2	1	0	1	2	1	0.02136	0.00125	0.06846	0.00711	0.01300	$ 6,878	$ 137,554
49	6400' TRAINS																
50	100MT / BASE TRAFFIC	49	F	4820	27	16	0	1	2	1	0.05298	0.00514	0.27078	0.01907	0.02878	$ 25,181	$ 503,614
51	100 MT / 2008 TRAFFIC	49	F	5810	27	16	0	1	2	1	0.05501	0.00533	0.28115	0.01978	0.02990	$ 26,141	$ 522,822
52	100MT / 2018 TRAFFIC	49	F	7590	27	16	0	1	2	1	0.05790	0.00561	0.29592	0.02083	0.03146	$ 27,516	$ 550,326
53	7400' TRAINS																
54	100MT / BASE TRAFFIC	49	F	4820	23	14	0	1	2	1	0.05088	0.00488	0.25724	0.01831	0.02769	$ 23,964	$ 479,278
55	100 MT / 2008 TRAFFIC	49	F	5810	23	14	0	1	2	1	0.05291	0.00507	0.26749	0.01901	0.02882	$ 24,913	$ 498,265
56	100MT / 2018 TRAFFIC	49	F	7590	23	14	0	1	2	1	0.05581	0.00535	0.28216	0.02006	0.03040	$ 26,280	$ 525,591
57																	
58	**GRADE CROSSING**																
59	**BYRON AVE - BYRON**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
60	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
61																	
62	PCAPS DATABASE	35	F	3064	4	4	2	1	4	1	0.03681	0.00294	0.15885	0.01479	0.01909	$ 15,547	$ 310,934
63	DEIS																
64	DEIS PRECON BASE	35	F	3064	8	4	0	1	4	1	0.04051	0.00364	0.19445	0.01629	0.02058	$ 18,634	$ 372,670
65	DEIS 100 MT ALT C	49	F	3064	23	14	0	1	4	1	0.05561	0.00543	0.28862	0.02236	0.02782	$ 27,258	$ 545,153
66	REVISED																
67	BASE CONDITIONS	35	F	4710	2	1	1	1	2	1	0.02327	0.00129	0.07088	0.00777	0.01421	$ 7,212	$ 144,244
68	6400' TRAINS																
69	100MT / BASE TRAFFIC	49	F	4710	27	16	1	1	2	1	0.05298	0.00486	0.25737	0.01908	0.02904	$ 24,144	$ 482,883
70	100 MT / 2008 TRAFFIC	49	F	5130	27	16	1	1	2	1	0.05429	0.00498	0.26370	0.01953	0.02977	$ 24,733	$ 494,656
71	100MT / 2018 TRAFFIC	49	F	5590	27	16	1	1	2	1	0.05484	0.00503	0.26641	0.01974	0.03007	$ 24,989	$ 499,782
72	7400' TRAINS																
73	100MT / BASE TRAFFIC	49	F	4710	23	14	1	1	2	1	0.05092	0.00462	0.24468	0.01830	0.02800	$ 22,989	$ 459,780
74	100 MT / 2008 TRAFFIC	49	F	5130	23	14	1	1	2	1	0.05184	0.00470	0.24914	0.01864	0.02850	$ 23,409	$ 468,181
75	100MT / 2018 TRAFFIC	49	F	5590	23	14	1	1	2	1	0.05278	0.00479	0.25362	0.01901	0.02898	$ 23,837	$ 476,737
76																	

	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
77	**GRADE CROSSING**																
78	**10TH AVE NE - BYRON**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
79	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
80																	
81	PCAPS DATABASE	35	P	100	2	2	0	1	2	1	0.01215	0.00101	0.05441	0.00487	0.00627	$ 5,281	$ 105,629
82	DEIS																
83	DEIS PRECON BASE	35	G	100	8	4	0	1	2	1	0.00705	0.00063	0.03385	0.00283	0.00358	$ 3,243	$ 64,868
84	DEIS 100 MT ALT C	49	G	100	23	14	0	1	2	1	0.01127	0.00148	0.07752	0.00486	0.00493	$ 7,066	$ 141,317
85	REVISED																
86	BASE CONDITIONS	35	G	475	2	1	0	1	2	1	0.00594	0.00049	0.02617	0.00240	0.00305	$ 2,554	$ 51,072
87	6400' TRAINS																
88	100MT / BASE TRAFFIC	49	G	475	27	16	0	1	2	1	0.01775	0.00236	0.12331	0.00763	0.00776	$ 11,218	$ 224,359
89	100 MT / 2008 TRAFFIC	49	G	1400	27	16	0	1	2	1	0.02285	0.00304	0.15876	0.00985	0.00996	$ 14,450	$ 289,002
90	100MT / 2018 TRAFFIC	49	G	2590	27	16	0	1	2	1	0.02617	0.00348	0.18189	0.01127	0.01143	$ 16,550	$ 331,009
91	7400' TRAINS																
92	100MT / BASE TRAFFIC	49	G	475	23	14	0	1	2	1	0.01672	0.00220	0.11495	0.00720	0.00732	$ 10,477	$ 209,531
93	100 MT / 2008 TRAFFIC	49	G	1400	23	14	0	1	2	1	0.02160	0.00284	0.14854	0.00928	0.00948	$ 13,534	$ 270,675
94	100MT / 2018 TRAFFIC	49	G	2590	23	14	0	1	2	1	0.02480	0.00326	0.17058	0.01070	0.01085	$ 15,550	$ 310,995
95																	
96	**GRADE CROSSING**																
97	**CSAH 3**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
98	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
99																	
100	PCAPS DATABASE	35	F	820	2	2	0	1	2	1	0.01279	0.00106	0.05728	0.00515	0.00658	$ 5,565	$ 111,303
101	DEIS																
102	DEIS PRECON BASE	35	F	750	8	4	0	1	2	1	0.02058	0.00185	0.09882	0.00826	0.01047	$ 9,466	$ 189,327
103	DEIS 100 MT ALT C	49	F	750	23	14	0	1	2	1	0.03189	0.00420	0.21930	0.01374	0.01395	$ 19,989	$ 399,785
104	REVISED																
105	BASE CONDITIONS	35	F	1010	2	1	0	1	2	1	0.01243	0.00102	0.05477	0.00498	0.00643	$ 5,335	$ 106,690
106	6400' TRAINS																
107	100MT / BASE TRAFFIC	49	F	1010	27	16	0	1	2	1	0.03656	0.00486	0.25404	0.01576	0.01594	$ 23,120	$ 462,407
108	100 MT / 2008 TRAFFIC	49	F	1200	27	16	0	1	2	1	0.03827	0.00509	0.26594	0.01648	0.01670	$ 24,200	$ 483,997
109	100MT / 2018 TRAFFIC	49	F	1430	27	16	0	1	2	1	0.04005	0.00533	0.27828	0.01726	0.01746	$ 25,325	$ 506,508
110	7400' TRAINS																
111	100MT / BASE TRAFFIC	49	F	1010	23	14	0	1	2	1	0.03468	0.00456	0.23847	0.01493	0.01519	$ 21,733	$ 434,655
112	100 MT / 2008 TRAFFIC	49	F	1200	23	14	0	1	2	1	0.03635	0.00478	0.24995	0.01563	0.01593	$ 22,776	$ 455,520
113	100MT / 2018 TRAFFIC	49	F	1430	23	14	0	1	2	1	0.03808	0.00501	0.26189	0.01640	0.01667	$ 23,870	$ 477,403
114																	

	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
115	**GRADE CROSSING**																
116	**CR 104**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
117	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
118																	
119	PCAPS DATABASE	35	P	900	5	5	0	1	2	1	0.03648	0.00232	0.12599	0.01216	0.02200	$ 12,453	$ 249,056
120	DEIS																
121	DEIS PRECON BASE	35	F	2250	8	4	0	1	2	1	0.02909	0.00188	0.10172	0.00970	0.01752	$ 10,027	$ 200,541
122	DEIS 100 MT ALT C	49	F	2250	23	14	0	1	2	1	0.04273	0.00410	0.21603	0.01538	0.02325	$ 20,125	$ 402,505
123	REVISED																
124	BASE CONDITIONS	35	G	3560	2	1	0	1	2	1	0.01024	0.00060	0.03283	0.00343	0.00621	$ 3,303	$ 66,053
125	6400' TRAINS																
126	100MT / BASE TRAFFIC	49	G	3560	27	16	0	1	2	1	0.02801	0.00272	0.14316	0.01007	0.01522	$ 13,310	$ 266,204
127	100 MT / 2008 TRAFFIC	49	G	4870	27	16	0	1	2	1	0.02990	0.00290	0.15278	0.01078	0.01622	$ 14,211	$ 284,226
128	100MT / 2018 TRAFFIC	49	G	6660	27	16	0	1	2	1	0.03185	0.00309	0.16275	0.01144	0.01732	$ 15,130	$ 302,593
129	7400' TRAINS																
130	100MT / BASE TRAFFIC	49	G	3560	23	14	0	1	2	1	0.02658	0.00255	0.13439	0.00954	0.01449	$ 12,515	$ 250,296
131	100 MT / 2008 TRAFFIC	49	G	4870	23	14	0	1	2	1	0.02841	0.00272	0.14363	0.01020	0.01549	$ 13,375	$ 267,496
132	100MT / 2018 TRAFFIC	49	G	6660	23	14	0	1	2	1	0.03030	0.00290	0.15322	0.01092	0.01648	$ 14,276	$ 285,517
133																	
134	**GRADE CROSSING**																
135	**7TH ST NW - ROCHESTER**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
136	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
137																	
138	PCAPS DATABASE	20	F	5200	5	5	0	1	2	1	0.03390	0.00127	0.07211	0.00993	0.02270	$ 7,803	$ 156,064
139	DEIS																
140	DEIS PRECON BASE	35	F	6900	8	4	0	1	2	1	0.03971	0.00256	0.13885	0.01326	0.02389	$ 13,693	$ 273,857
141	DEIS 100 MT ALT C	49	F	6900	23	14	0	1	2	1	0.05477	0.00525	0.27693	0.01968	0.02984	$ 25,792	$ 515,847
142	REVISED																
143	BASE CONDITIONS	20	F	7500	2	1	0	1	2	1	0.02462	0.00085	0.04868	0.00718	0.01659	$ 5,375	$ 107,509
144	6400' TRAINS																
145	100MT / BASE TRAFFIC	49	F	7500	27	16	0	1	2	1	0.05777	0.00560	0.29526	0.02077	0.03141	$ 27,451	$ 549,016
146	100 MT / 2008 TRAFFIC	49	F	9260	27	16	0	1	2	1	0.06037	0.00585	0.30855	0.02171	0.03281	$ 28,688	$ 573,752
147	100MT / 2018 TRAFFIC	49	F	11420	27	16	0	1	2	1	0.06226	0.00604	0.31817	0.02241	0.03381	$ 29,588	$ 591,757
148	7400' TRAINS																
149	100MT / BASE TRAFFIC	49	F	7500	23	14	0	1	2	1	0.05568	0.00534	0.28151	0.02004	0.03030	$ 26,225	$ 524,501
150	100 MT / 2008 TRAFFIC	49	F	9260	23	14	0	1	2	1	0.05859	0.00559	0.29475	0.02099	0.03201	$ 27,462	$ 549,241
151	100MT / 2018 TRAFFIC	49	F	11420	23	14	0	1	2	1	0.06020	0.00577	0.30438	0.02165	0.03278	$ 28,352	$ 567,035
152																	

	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
153	**GRADE CROSSING**																
154	**11TH AVE NW - ROCHESTER**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
155	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
156																	
157	PCAPS DATABASE	20	G	12200	4	4	2	1	4	1	0.02576	0.00087	0.04873	0.00634	0.01855	$ 5,209	$ 104,187
158	DEIS																
159	DEIS PRECON BASE	20	G	12400	8	4	0	2	4	1	0.03247	0.00123	0.06916	0.00874	0.02250	$ 7,322	$ 146,448
160	DEIS 100 MT ALT C	49	G	12400	23	14	0	2	4	1	0.04450	0.00427	0.22385	0.01486	0.02538	$ 20,631	$ 412,623
161	REVISED																
162	BASE CONDITIONS	20	G	13125	2	1	2	1	4	1	0.01818	0.00063	0.03552	0.00489	0.01266	$ 3,851	$ 77,019
163	6400' TRAINS																
164	100MT / BASE TRAFFIC	49	G	13125	27	16	2	1	4	1	0.04300	0.00417	0.21862	0.01434	0.02449	$ 20,112	$ 402,231
165	100 MT / 2008 TRAFFIC	49	G	15000	27	16	2	1	4	1	0.04395	0.00426	0.22347	0.01468	0.02501	$ 20,562	$ 411,237
166	100MT / 2018 TRAFFIC	49	G	17140	27	16	2	1	4	1	0.04491	0.00435	0.22833	0.01499	0.02557	$ 21,006	$ 420,124
167	7400' TRAINS																
168	100MT / BASE TRAFFIC	49	G	13125	23	14	2	1	4	1	0.04125	0.00395	0.20749	0.01379	0.02351	$ 19,126	$ 382,520
169	100 MT / 2008 TRAFFIC	49	G	15000	23	14	2	1	4	1	0.04219	0.00404	0.21224	0.01408	0.02407	$ 19,558	$ 391,169
170	100MT / 2018 TRAFFIC	49	G	17140	23	14	2	1	4	1	0.04314	0.00414	0.21701	0.01439	0.02462	$ 19,997	$ 399,938
171																	
172	**GRADE CROSSING**																
173	**6TH AVE NW - ROCHESTER**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
174	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
175																	
176	PCAPS DATABASE	20	F	5800	4	4	2	1	4	1	0.04333	0.00145	0.08293	0.01168	0.03019	$ 9,048	$ 180,965
177	DEIS																
178	DEIS PRECON BASE	20	F	3800	8	4	0	1	4	1	0.04274	0.00162	0.09102	0.01149	0.02962	$ 9,634	$ 192,679
179	DEIS 100 MT ALT C	49	F	3800	23	14	0	1	4	1	0.05794	0.00555	0.29144	0.01934	0.03305	$ 26,859	$ 537,180
180	REVISED																
181	BASE CONDITIONS	20	F	3800	2	1	2	1	2	1	0.02333	0.00073	0.04266	0.00684	0.01576	$ 4,832	$ 96,646
182	6400' TRAINS																
183	100MT / BASE TRAFFIC	49	F	3800	27	16	2	1	2	1	0.05090	0.00452	0.23999	0.01831	0.02806	$ 22,627	$ 452,542
184	100 MT / 2008 TRAFFIC	49	F	4350	27	16	2	1	2	1	0.05236	0.00465	0.24691	0.01886	0.02885	$ 23,284	$ 465,683
185	100MT / 2018 TRAFFIC	49	F	4970	27	16	2	1	2	1	0.05381	0.00478	0.25373	0.01936	0.02966	$ 23,924	$ 478,489
186	7400' TRAINS																
187	100MT / BASE TRAFFIC	49	F	3800	23	14	2	1	2	1	0.04887	0.00429	0.22798	0.01757	0.02701	$ 21,534	$ 430,681
188	100 MT / 2008 TRAFFIC	49	F	4350	23	14	2	1	2	1	0.05034	0.00442	0.23480	0.01812	0.02779	$ 22,184	$ 443,675
189	100MT / 2018 TRAFFIC	49	F	4970	23	14	2	1	2	1	0.05178	0.00455	0.24154	0.01864	0.02859	$ 22,821	$ 456,421
190																	

	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
191	**GRADE CROSSING**																
192	**4TH AVE NW - ROCHESTER**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
193	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
194																	
195	PCAPS DATABASE	5	G	5500	4	2	4	2	4	1	0.02421	0.00076	0.04234	0.00500	0.01844	$ 4,428	$ 88,569
196	DEIS																
197	DEIS PRECON BASE	20	G	7200	8	4	0	2	4	1	0.02909	0.00111	0.06071	0.00657	0.02142	$ 6,200	$ 124,002
198	DEIS 100 MT ALT C	49	G	7200	23	14	0	2	4	1	0.04064	0.00169	0.09192	0.00921	0.02975	$ 9,218	$ 184,366
199	REVISED																
200	BASE CONDITIONS	5	G	7950	2	1	2	1	2	1	0.01437	0.00012	0.00834	0.00266	0.01160	$ 1,264	$ 25,276
201	6400' TRAINS																
202	100MT / BASE TRAFFIC	49	G	7950	27	16	2	1	2	1	0.03327	0.00296	0.15601	0.01112	0.01919	$ 14,548	$ 290,961
203	100 MT / 2008 TRAFFIC	49	G	9020	27	16	2	1	2	1	0.03410	0.00303	0.15987	0.01135	0.01971	$ 14,899	$ 297,983
204	100MT / 2018 TRAFFIC	49	G	10220	27	16	2	1	2	1	0.03492	0.00310	0.16373	0.01164	0.02018	$ 15,261	$ 305,220
205	7400' TRAINS																
206	100MT / BASE TRAFFIC	49	G	7950	23	14	2	1	2	1	0.03174	0.00279	0.14722	0.01061	0.01834	$ 13,754	$ 275,088
207	100 MT / 2008 TRAFFIC	49	G	9020	23	14	2	1	2	1	0.03254	0.00286	0.15095	0.01086	0.01882	$ 14,099	$ 281,983
208	100MT / 2018 TRAFFIC	49	G	10220	23	14	2	1	2	1	0.03335	0.00293	0.15469	0.01112	0.01930	$ 14,445	$ 288,907
209																	
210	**GRADE CROSSING**																
211	**1ST AVE NW - ROCHESTER**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
212	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
213																	
214	PCAPS DATABASE	5	G	1254	5	2	3	1	4	1	0.01561	0.00013	0.00878	0.00241	0.01308	$ 1,251	$ 25,012
215	DEIS																
216	DEIS PRECON BASE	5	G	4726	8	4	0	2	4	1	0.02662	0.00026	0.01774	0.00495	0.02141	$ 2,523	$ 50,461
217	DEIS 100 MT ALT C	49	G	4726	23	14	0	2	4	1	0.03772	0.00362	0.18702	0.00988	0.02422	$ 16,713	$ 334,253
218	REVISED																
219	BASE CONDITIONS	5	G	1750	2	1	2	1	2	1	0.00972	0.00008	0.00564	0.00182	0.00782	$ 859	$ 17,176
220	6400' TRAINS																
221	100MT / BASE TRAFFIC	49	G	1750	27	16	2	1	2	1	0.02426	0.00216	0.11377	0.00808	0.01403	$ 10,602	$ 212,041
222	100 MT / 2008 TRAFFIC	49	G	1770	27	16	2	1	2	1	0.02432	0.00216	0.11406	0.00812	0.01404	$ 10,633	$ 212,666
223	100MT / 2018 TRAFFIC	49	G	1790	27	16	2	1	2	1	0.02438	0.00217	0.11434	0.00816	0.01406	$ 10,664	$ 213,274
224	7400' TRAINS																
225	100MT / BASE TRAFFIC	49	G	1750	23	14	2	1	2	1	0.02300	0.00202	0.10668	0.00765	0.01333	$ 9,959	$ 199,171
226	100 MT / 2008 TRAFFIC	49	G	1770	23	14	2	1	2	1	0.02306	0.00203	0.10695	0.00768	0.01335	$ 9,986	$ 199,722
227	100MT / 2018 TRAFFIC	49	G	1790	23	14	2	1	2	1	0.02312	0.00203	0.10723	0.00771	0.01338	$ 10,013	$ 200,255
228																	

	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
229	**GRADE CROSSING**																
230	**TH 63 - ROCHESTER**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
231	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
232																	
233	PCAPS DATABASE	5	F	18100	4	4	2	1	4	1	0.01212	0.00105	0.07180	0.02055	-0.00947	$ 9,891	$ 197,816
234	DEIS																
235	DEIS PRECON BASE	5	F	19200	8	4	0	1	4	1	0.12946	0.00127	0.08408	0.02195	0.10625	$ 11,661	$ 233,229
236	DEIS 100 MT ALT C	49	F	19200	23	14	0	1	4	1	0.15485	0.01484	0.77501	0.04780	0.09221	$ 70,672	$ 1,413,449
237	REVISED																
238	BASE CONDITIONS	5	F	25020	2	1	2	1	4	1	0.11052	0.00089	0.06617	0.02260	0.08703	$ 10,325	$ 206,500
239	6400' TRAINS																
240	100MT / BASE TRAFFIC	49	F	25020	27	16	2	1	4	1	0.16275	0.01447	0.76741	0.05857	0.08971	$ 72,360	$ 1,447,208
241	100 MT / 2008 TRAFFIC	49	F	28420	27	16	2	1	4	1	0.16463	0.01463	0.77626	0.05925	0.09075	$ 73,195	$ 1,463,897
242	100MT / 2018 TRAFFIC	49	F	33700	27	16	2	1	4	1	0.16706	0.01485	0.78774	0.06009	0.09212	$ 74,272	$ 1,485,430
243	7400' TRAINS																
244	100MT / BASE TRAFFIC	49	F	25020	23	14	2	1	4	1	0.15991	0.01405	0.74593	0.05753	0.08833	$ 70,468	$ 1,409,365
245	100 MT / 2008 TRAFFIC	49	F	28420	23	14	2	1	4	1	0.16186	0.01422	0.75503	0.05825	0.08939	$ 71,329	$ 1,426,586
246	100MT / 2018 TRAFFIC	49	F	33700	23	14	2	1	4	1	0.16439	0.01444	0.76683	0.05912	0.09082	$ 72,438	$ 1,448,761
247																	
248	**GRADE CROSSING**																
249	**2ND AVE NE - ROCHESTER**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
250	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
251																	
252	PCAPS DATABASE	20	F	9500	4	4	2	1	4	1	0.04859	0.00042	0.02960	0.00907	0.03910	$ 4,398	$ 87,969
253	DEIS																
254	DEIS PRECON BASE	5	F	8850	8	4	0	2	4	1	0.05686	0.00056	0.03693	0.00964	0.04667	$ 5,121	$ 102,415
255	DEIS 100 MT ALT C	49	F	8850	23	14	0	2	4	1	0.07140	0.00684	0.35735	0.02205	0.04251	$ 32,588	$ 651,755
256	REVISED																
257	BASE CONDITIONS	5	F	10900	2	1	2	1	4	1	0.04083	0.00033	0.02444	0.00832	0.03218	$ 3,808	$ 76,156
258	6400' TRAINS																
259	100MT / BASE TRAFFIC	49	F	10900	27	16	2	1	4	1	0.07122	0.00633	0.33582	0.02565	0.03924	$ 31,668	$ 633,364
260	100 MT / 2008 TRAFFIC	49	F	12390	27	16	2	1	4	1	0.07243	0.00644	0.34154	0.02608	0.03992	$ 32,208	$ 644,150
261	100MT / 2018 TRAFFIC	49	F	14690	27	16	2	1	4	1	0.07401	0.00658	0.34898	0.02661	0.04082	$ 32,901	$ 658,016
262	7400' TRAINS																
263	100MT / BASE TRAFFIC	49	F	10900	23	14	2	1	4	1	0.06941	0.00610	0.32378	0.02497	0.03834	$ 30,587	$ 611,742
264	100 MT / 2008 TRAFFIC	49	F	12390	23	14	2	1	4	1	0.07066	0.00621	0.32959	0.02540	0.03905	$ 31,131	$ 622,625
265	100MT / 2018 TRAFFIC	49	F	14690	23	14	2	1	4	1	0.07228	0.00635	0.33716	0.02601	0.03992	$ 31,852	$ 637,039
266																	

	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
267	**GRADE CROSSING**																
268	**: 7TH AVE NE - ROCHESTER**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
269	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
270																	
271	PCAPS DATABASE	35	P	94	2	2	0	1	2	1	0.01070	0.00038	0.02149	0.00312	0.00720	$ 2,362	$ 47,238
272	DEIS																
273	DEIS PRECON BASE	20	P	870	8	4	0	1	2	1	0.03704	0.00141	0.07975	0.01085	0.02478	$ 8,602	$ 172,039
274	DEIS 100 MT ALT C	49	P	870	23	14	0	1	2	1	0.06347	0.00608	0.32093	0.02281	0.03458	$ 29,891	$ 597,817
275	REVISED																
276	BASE CONDITIONS	20	P	436	2	1	0	1	2	1	0.01625	0.00056	0.03214	0.00475	0.01095	$ 3,550	$ 71,002
277	6400' TRAINS																
278	100MT / BASE TRAFFIC	49	P	436	27	16	0	1	2	1	0.05748	0.00557	0.29376	0.02068	0.03122	$ 27,316	$ 546,325
279	100 MT / 2008 TRAFFIC	49	P	460	27	16	0	1	2	1	0.05816	0.00564	0.29725	0.02094	0.03158	$ 27,644	$ 552,876
280	100MT / 2018 TRAFFIC	49	P	490	27	16	0	1	2	1	0.05897	0.00572	0.30139	0.02121	0.03205	$ 28,022	$ 560,447
281	7400' TRAINS																
282	100MT / BASE TRAFFIC	49	P	436	23	14	0	1	2	1	0.05462	0.00524	0.27616	0.01964	0.02974	$ 25,722	$ 514,449
283	100 MT / 2008 TRAFFIC	49	P	460	23	14	0	1	2	1	0.05529	0.00530	0.27955	0.01990	0.03009	$ 26,042	$ 520,846
284	100MT / 2018 TRAFFIC	49	P	490	23	14	0	1	2	1	0.05609	0.00557	0.28357	0.01059	0.03992	$ 24,421	$ 488,423
285																	
286	**GRADE CROSSING**																
287	**9TH AVE NE - ROCHESTER**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
288	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
289																	
290	PCAPS DATABASE	35	F	820	5	5	0	1	2	1	0.01914	0.00122	0.06609	0.00641	0.01151	$ 6,539	$ 130,776
291	DEIS																
292	DEIS PRECON BASE	35	F	820	8	4	0	1	2	1	0.02120	0.00137	0.07412	0.00709	0.01274	$ 7,311	$ 146,214
293	DEIS 100 MT ALT C	49	F	820	23	14	0	1	2	1	0.03271	0.00314	0.16539	0.01177	0.01780	$ 15,407	$ 308,140
294	REVISED																
295	BASE CONDITIONS	20	F	780	2	1	0	1	2	1	0.01131	0.00039	0.02273	0.00367	0.00725	$ 2,575	$ 51,497
296	6400' TRAINS																
297	100MT / BASE TRAFFIC	49	F	780	27	16	0	1	2	1	0.03406	0.00330	0.17408	0.01224	0.01853	$ 16,183	$ 323,658
298	100 MT / 2008 TRAFFIC	49	F	790	27	16	0	1	2	1	0.03418	0.00331	0.17470	0.01231	0.01856	$ 16,248	$ 324,955
299	100MT / 2018 TRAFFIC	49	F	800	27	16	0	1	2	1	0.03430	0.00333	0.17531	0.01234	0.01864	$ 16,300	$ 326,008
300	7400' TRAINS																
301	100MT / BASE TRAFFIC	49	F	780	23	14	0	1	2	1	0.03225	0.00309	0.16305	0.01159	0.01757	$ 15,186	$ 303,725
302	100 MT / 2008 TRAFFIC	49	F	790	23	14	0	1	2	1	0.03237	0.00310	0.16364	0.01165	0.01762	$ 15,244	$ 304,884
303	100MT / 2018 TRAFFIC	49	F	800	23	14	0	1	2	1	0.03248	0.00311	0.16423	0.01169	0.01768	$ 15,300	$ 306,004
304																	

	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
305	**GRADE CROSSING**																
306	**11TH AVE NE - ROCHESTER**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
307	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
308																	
309	PCAPS DATABASE	12	F	10400	5	5	0	1	2	1	0.04076	0.00093	0.05609	0.01048	0.02936	$ 6,708	$ 134,153
310	DEIS																
311	DEIS PRECON BASE	12	F	10800	8	4	0	1	2	1	0.04437	0.00103	0.06177	0.01145	0.03190	$ 7,366	$ 147,321
312	DEIS 100 MT ALT C	49	F	10800	23	14	0	1	2	1	0.05961	0.00571	0.30137	0.02143	0.03246	$ 28,070	$ 561,398
313	REVISED																
314	BASE CONDITIONS	20	F	10080	2	1	0	1	2	1	0.02756	0.00058	0.03538	0.00710	0.01988	$ 4,342	$ 86,839
315	6400' TRAINS																
316	100MT / BASE TRAFFIC	49	F	10080	27	16	0	1	2	1	0.06167	0.00598	0.31517	0.02219	0.03350	$ 29,307	$ 586,144
317	100 MT / 2008 TRAFFIC	49	F	10870	27	16	0	1	2	1	0.06174	0.00599	0.31551	0.02220	0.03355	$ 29,336	$ 586,716
318	100MT / 2018 TRAFFIC	49	F	11720	27	16	0	1	2	1	0.06253	0.00606	0.31957	0.02248	0.03399	$ 29,712	$ 594,237
319	7400' TRAINS																
320	100MT / BASE TRAFFIC	49	F	10080	23	14	0	1	2	1	0.05887	0.00564	0.29763	0.02117	0.03205	$ 27,724	$ 554,474
321	100 MT / 2008 TRAFFIC	49	F	10870	23	14	0	1	2	1	0.05967	0.00572	0.30172	0.02148	0.03247	$ 28,109	$ 562,174
322	100MT / 2018 TRAFFIC	49	F	11720	23	14	0	1	2	1	0.06048	0.00580	0.30578	0.02177	0.03291	$ 28,487	$ 569,735
323																	
324	**GRADE CROSSING**																
325	**15TH AVE NE - ROCHESTER**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
326	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
327																	
328	PCAPS DATABASE	20	F	5500	5	5	0	1	2	1	0.01770	0.00066	0.03765	0.00516	0.01188	$ 4,069	$ 81,385
329	DEIS																
330	DEIS PRECON BASE	20	F	955	8	4	0	1	2	1	0.02228	0.00085	0.04797	0.00651	0.01492	$ 5,171	$ 103,420
331	DEIS 100 MT ALT C	49	F	955	23	14	0	1	2	1	0.03414	0.00327	0.17262	0.01229	0.01858	$ 16,082	$ 321,649
332	REVISED																
333	BASE CONDITIONS	20	F	870	2	1	0	1	2	1	0.01177	0.00041	0.02328	0.00344	0.00793	$ 2,571	$ 51,428
334	6400' TRAINS																
335	100MT / BASE TRAFFIC	49	F	870	27	16	0	1	2	1	0.03511	0.00340	0.17942	0.01262	0.01908	$ 16,681	$ 333,623
336	100 MT / 2008 TRAFFIC	49	F	880	27	16	0	1	2	1	0.03522	0.00341	0.17998	0.01269	0.01911	$ 16,740	$ 334,809
337	100MT / 2018 TRAFFIC	49	F	890	27	16	0	1	2	1	0.03533	0.00343	0.18054	0.01271	0.01919	$ 16,788	$ 335,757
338	7400' TRAINS																
339	100MT / BASE TRAFFIC	49	F	870	23	14	0	1	2	1	0.03326	0.00319	0.16818	0.01197	0.01811	$ 15,666	$ 313,315
340	100 MT / 2008 TRAFFIC	49	F	880	23	14	0	1	2	1	0.03337	0.00320	0.16872	0.01202	0.01815	$ 15,719	$ 314,380
341	100MT / 2018 TRAFFIC	49	F	890	23	14	0	1	2	1	0.03348	0.00321	0.16926	0.01206	0.01821	$ 15,771	$ 315,412
342																	

	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
343	**GRADE CROSSING**																
344	**CSAH 22 - ROCHESTER**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
345	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
346																	
347	PCAPS DATABASE	35	F	850	1	1	0	1	2	1	0.00945	0.00054	0.02965	0.00314	0.00577	$ 2,992	$ 59,847
348	DEIS																
349	DEIS PRECON BASE	35	F	7500	8	4	0	1	2	1	0.04057	0.00262	0.14183	0.01355	0.02440	$ 13,988	$ 279,754
350	DEIS 100 MT ALT C	49	F	7500	23	14	0	1	2	1	0.05568	0.00534	0.28151	0.02004	0.03030	$ 26,225	$ 524,501
351	REVISED																
352	BASE CONDITIONS	35	F	7820	2	1	0	1	4	1	0.03256	0.00191	0.10436	0.01087	0.01978	$ 10,492	$ 209,840
353	6400' TRAINS																
354	100MT / BASE TRAFFIC	49	F	7820	27	16	0	1	4	1	0.06752	0.00655	0.34505	0.02430	0.03667	$ 32,087	$ 641,736
355	100 MT / 2008 TRAFFIC	49	F	11540	27	16	0	1	4	1	0.07133	0.00692	0.36455	0.02566	0.03875	$ 33,897	$ 677,943
356	100MT / 2018 TRAFFIC	49	F	17020	27	16	0	1	4	1	0.07493	0.00727	0.38296	0.02698	0.04069	$ 35,613	$ 712,257
357	7400' TRAINS																
358	100MT / BASE TRAFFIC	49	F	7820	23	14	0	1	4	1	0.06555	0.00628	0.33142	0.02360	0.03567	$ 30,875	$ 617,505
359	100 MT / 2008 TRAFFIC	49	F	11540	23	14	0	1	4	1	0.06945	0.00666	0.36945	0.04331	0.01949	$ 37,940	$ 758,796
360	100MT / 2018 TRAFFIC	49	F	17020	23	14	0	1	4	1	0.07316	0.00701	0.36991	0.02632	0.03983	$ 34,458	$ 689,164
361																	
362	**GRADE CROSSING**																
363	**CSAH 9 - ROCHESTER**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
364	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
365																	
366	PCAPS DATABASE	35	F	2800	4	5	1	1	2	1	0.02783	0.00232	0.12386	0.01043	0.01509	$ 11,889	$ 237,774
367	DEIS																
368	DEIS PRECON BASE	35	F	3200	8	4	0	1	2	1	0.03224	0.00289	0.15477	0.01297	0.01638	$ 14,831	$ 296,627
369	DEIS 100 MT ALT C	49	F	3200	23	14	0	1	2	1	0.04646	0.00611	0.31949	0.02000	0.02034	$ 29,118	$ 582,360
370	REVISED																
371	BASE CONDITIONS	35	F	3330	2	1	0	1	2	1	0.01888	0.00154	0.08321	0.00760	0.00974	$ 8,111	$ 162,213
372	6400' TRAINS																
373	100MT / BASE TRAFFIC	49	F	3330	27	16	0	1	2	1	0.04897	0.00652	0.34032	0.02108	0.02138	$ 30,967	$ 619,340
374	100 MT / 2008 TRAFFIC	49	F	3950	27	16	0	1	2	1	0.05082	0.00676	0.35316	0.02188	0.02219	$ 32,135	$ 642,708
375	100MT / 2018 TRAFFIC	49	F	4680	27	16	0	1	2	1	0.05266	0.00701	0.36596	0.02267	0.02299	$ 33,299	$ 665,988
376	7400' TRAINS																
377	100MT / BASE TRAFFIC	49	F	3330	23	14	0	1	2	1	0.04688	0.00617	0.32243	0.02019	0.02052	$ 29,387	$ 587,734
378	100 MT / 2008 TRAFFIC	49	F	3950	23	14	0	1	2	1	0.04872	0.00641	0.33506	0.02097	0.02134	$ 30,536	$ 610,712
379	100MT / 2018 TRAFFIC	49	F	4680	23	14	0	1	2	1	0.05056	0.00665	0.34768	0.02178	0.02212	$ 31,690	$ 633,808
380																	

	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
381	**GRADE CROSSING**																
382	**CSAH 11**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
383	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
384																	
385	PCAPS DATABASE	35	G	1100	2	2	0	1	2	1	0.00808	0.00067	0.03620	0.00327	0.00414	$ 3,521	$ 70,411
386	DEIS																
387	DEIS PRECON BASE	35	G	1200	8	4	0	1	2	1	0.01360	0.00122	0.06528	0.00545	0.00693	$ 6,251	$ 125,018
388	DEIS 100 MT ALT C	49	G	1200	23	14	0	1	2	1	0.02084	0.00274	0.14335	0.00899	0.00911	$ 13,068	$ 261,354
389	REVISED																
390	BASE CONDITIONS	35	G	1250	2	1	0	1	2	1	0.00774	0.00063	0.03411	0.00309	0.00402	$ 3,320	$ 66,392
391	6400' TRAINS																
392	100MT / BASE TRAFFIC	49	G	1250	27	16	0	1	2	1	0.02227	0.00296	0.15474	0.00960	0.00971	$ 14,082	$ 281,648
393	100 MT / 2008 TRAFFIC	49	G	1540	27	16	0	1	2	1	0.02334	0.00311	0.16221	0.01006	0.01018	$ 14,763	$ 295,255
394	100MT / 2018 TRAFFIC	49	G	1890	27	16	0	1	2	1	0.02443	0.00325	0.16978	0.01053	0.01065	$ 15,452	$ 309,033
395	7400' TRAINS																
396	100MT / BASE TRAFFIC	49	G	1250	23	14	0	1	2	1	0.02104	0.00277	0.14471	0.00908	0.00920	$ 13,192	$ 263,842
397	100 MT / 2008 TRAFFIC	49	G	1540	23	14	0	1	2	1	0.02208	0.00290	0.15182	0.00952	0.00965	$ 13,839	$ 276,783
398	100MT / 2018 TRAFFIC	49	G	1890	23	14	0	1	2	1	0.02312	0.00304	0.15903	0.00997	0.01011	$ 14,496	$ 289,928
399																	
400	**GRADE CROSSING**																
401	**60TH AVE SE**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
402	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
403																	
404	PCAPS DATABASE	35	P	86	2	2	0	1	2	2	0.00660	0.00055	0.02954	0.00264	0.00341	$ 2,866	$ 57,314
405	DEIS																
406	DEIS PRECON BASE	35	P	86	8	4	0	1	2	1	0.02043	0.00183	0.09805	0.00824	0.01036	$ 9,400	$ 188,009
407	DEIS 100 MT ALT C	49	P	86	23	14	0	1	2	1	0.03619	0.00476	0.24889	0.01560	0.01583	$ 22,686	$ 453,718
408	REVISED																
409	BASE CONDITIONS	35	P	90	2	1	0	1	2	1	0.01063	0.00087	0.04683	0.00430	0.00547	$ 4,569	$ 91,371
410	6400' TRAINS																
411	100MT / BASE TRAFFIC	49	P	90	27	16	0	1	2	1	0.03898	0.00519	0.27088	0.01677	0.01703	$ 24,647	$ 492,934
412	100 MT / 2008 TRAFFIC	49	P	100	27	16	0	1	2	1	0.04010	0.00533	0.27864	0.01727	0.01749	$ 25,357	$ 507,130
413	100MT / 2018 TRAFFIC	49	P	110	27	16	0	1	2	1	0.04112	0.00547	0.28577	0.01769	0.01797	$ 26,000	$ 519,992
414	7400' TRAINS																
415	100MT / BASE TRAFFIC	49	P	90	23	14	0	1	2	1	0.03665	0.00482	0.25203	0.01580	0.01603	$ 22,973	$ 459,461
416	100 MT / 2008 TRAFFIC	49	P	100	23	14	0	1	2	1	0.03772	0.00496	0.25941	0.01622	0.01654	$ 23,637	$ 472,741
417	100MT / 2018 TRAFFIC	49	P	110	23	14	0	1	2	1	0.03871	0.00509	0.26620	0.01664	0.01697	$ 24,256	$ 485,119
418																	

	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
419	**GRADE CROSSING**																
420	**COUNTY RD 119 - CHESTER**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
421	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
422																	
423	PCAPS DATABASE	35	P	720	2	2	0	1	2	1	0.02311	0.00192	0.10348	0.00930	0.01188	$ 10,055	$ 201,099
424	DEIS																
425	DEIS PRECON BASE	35	P	440	8	4	0	1	2	1	0.03341	0.00300	0.16039	0.01344	0.01697	$ 15,371	$ 307,421
426	DEIS 100 MT ALT C	49	P	440	23	14	0	1	2	1	0.05473	0.00720	0.37640	0.02355	0.02398	$ 34,301	$ 686,024
427	REVISED																
428	BASE CONDITIONS	35	P	460	2	1	0	1	2	1	0.01831	0.00150	0.08066	0.00735	0.00946	$ 7,859	$ 157,189
429	6400' TRAINS																
430	100MT / BASE TRAFFIC	49	P	460	27	16	0	1	2	1	0.05816	0.00774	0.40418	0.02502	0.02541	$ 36,773	$ 735,462
431	100 MT / 2008 TRAFFIC	49	P	490	27	16	0	1	2	1	0.05897	0.00785	0.40980	0.02539	0.02573	$ 37,291	$ 745,821
432	100MT / 2018 TRAFFIC	49	P	510	27	16	0	1	2	1	0.05949	0.00791	0.41337	0.02559	0.02599	$ 37,610	$ 752,196
433	7400' TRAINS																
434	100MT / BASE TRAFFIC	49	P	460	23	14	0	1	2	1	0.05529	0.00727	0.38023	0.02380	0.02421	$ 34,653	$ 693,066
435	100 MT / 2008 TRAFFIC	49	P	490	23	14	0	1	2	1	0.05609	0.00738	0.38570	0.02413	0.02458	$ 35,148	$ 702,970
436	100MT / 2018 TRAFFIC	49	P	510	23	14	0	1	2	1	0.05659	0.00745	0.38918	0.02437	0.02477	$ 35,471	$ 709,419
437																	
438	**GRADE CROSSING**																
439	**COUNTY ROAD 102W**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
440	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
441																	
442	PCAPS DATABASE	30	P	40	2	1	0	1	2	2	0.00437	0.00031	0.16882	0.15363	-0.14957	$ 45,058	$ 901,153
443	DEIS																
444	DEIS PRECON BASE	30	P	100	8	4	0	1	2	2	0.01221	0.00095	0.05140	0.00475	0.00651	$ 5,025	$ 100,493
445	DEIS 100 MT ALT C	49	P	100	23	14	0	1	2	2	0.02356	0.00310	0.16203	0.01013	0.01033	$ 14,764	$ 295,278
446	REVISED																
447	BASE CONDITIONS	30	P	100	2	1	0	1	2	2	0.00606	0.00043	0.02340	0.00238	0.00325	$ 2,334	$ 46,683
448	6400' TRAINS																
449	100MT / BASE TRAFFIC	49	P	100	27	16	0	1	2	2	0.02526	0.00336	0.17553	0.01089	0.01101	$ 15,975	$ 319,496
450	100 MT / 2008 TRAFFIC	49	P	110	27	16	0	1	2	2	0.02600	0.00346	0.18068	0.01119	0.01135	$ 16,441	$ 328,819
451	100MT / 2018 TRAFFIC	49	P	120	27	16	0	1	2	2	0.02669	0.00355	0.18549	0.01149	0.01165	$ 16,879	$ 337,584
452	7400' TRAINS																
453	100MT / BASE TRAFFIC	49	P	100	23	14	0	1	2	2	0.02636	0.00310	0.16203	0.01013	0.01313	$ 14,776	$ 295,530
454	100 MT / 2008 TRAFFIC	49	P	110	23	14	0	1	2	2	0.02426	0.00319	0.16686	0.01045	0.01062	$ 15,208	$ 304,164
455	100MT / 2018 TRAFFIC	49	P	120	23	14	0	1	2	2	0.02492	0.00328	0.17137	0.01075	0.01090	$ 15,622	$ 312,435
456																	

	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
457	**GRADE CROSSING**																
458	**COUNTY ROAD 102E**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
459	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
460																	
461	PCAPS DATABASE	30	P	55	2	1	0	1	2	2	0.00490	0.00035	0.01892	0.00191	0.00264	$ 1,886	$ 37,710
462	DEIS																
463	DEIS PRECON BASE	30	P	30	8	4	0	1	2	2	0.00807	0.00063	0.03397	0.00315	0.00429	$ 3,322	$ 66,443
464	DEIS 100 MT ALT C	49	P	30	23	14	0	2	2	2	0.01604	0.00211	0.10986	0.00647	0.00746	$ 9,929	$ 198,580
465	REVISED																
466	BASE CONDITIONS	30	P	30	2	1	0	1	2	2	0.00394	0.00028	0.01523	0.00156	0.00211	$ 1,521	$ 30,418
467	6400' TRAINS																
468	100MT / BASE TRAFFIC	49	P	30	27	16	0	2	2	2	0.01728	0.00230	0.11956	0.00696	0.00802	$ 10,787	$ 215,738
469	100 MT / 2008 TRAFFIC	49	P	40	27	16	0	2	2	2	0.01896	0.00252	0.13121	0.00763	0.00880	$ 11,837	$ 236,736
470	100MT / 2018 TRAFFIC	49	P	50	27	16	0	2	2	2	0.02036	0.00271	0.14090	0.00820	0.00945	$ 12,712	$ 254,247
471	7400' TRAINS																
472	100MT / BASE TRAFFIC	49	P	30	23	14	0	2	2	2	0.01604	0.00211	0.10986	0.00647	0.00746	$ 9,929	$ 198,580
473	100 MT / 2008 TRAFFIC	49	P	40	23	14	0	2	2	2	0.01762	0.00232	0.12068	0.00710	0.00820	$ 10,905	$ 218,092
474	100MT / 2018 TRAFFIC	49	P	50	23	14	0	2	2	2	0.01894	0.00249	0.12970	0.00764	0.00881	$ 11,720	$ 234,398
475																	
476	**GRADE CROSSING**																
477	**11OTH AV SE / TWP RD 112**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
478	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
479																	
480	PCAPS DATABASE	30	P	50	4	4	0	1	2	2	0.00748	0.00057	0.03066	0.00292	0.00399	$ 3,016	$ 60,323
481	DEIS																
482	DEIS PRECON BASE	30	P	50	8	4	0	1	2	2	0.00963	0.00075	0.04056	0.00376	0.00513	$ 3,966	$ 79,328
483	DEIS 100 MT ALT C	49	P	50	23	14	0	2	2	2	0.01894	0.00249	0.13023	0.00817	0.00828	$ 11,871	$ 237,424
484	REVISED																
485	BASE CONDITIONS	30	P	50	2	1	0	1	2	2	0.00473	0.00034	0.01828	0.00182	0.00258	$ 1,816	$ 36,324
486	6400' TRAINS																
487	100MT / BASE TRAFFIC	49	P	50	27	16	0	2	2	2	0.02036	0.00271	0.14147	0.00878	0.00888	$ 12,875	$ 257,502
488	100 MT / 2008 TRAFFIC	49	P	60	27	16	0	2	2	2	0.02157	0.00287	0.14985	0.00927	0.00943	$ 13,633	$ 272,664
489	100MT / 2018 TRAFFIC	49	P	70	27	16	0	2	2	2	0.02263	0.00301	0.15726	0.00972	0.00990	$ 14,305	$ 286,091
490	7400' TRAINS																
491	100MT / BASE TRAFFIC	49	P	50	23	14	0	2	2	2	0.01894	0.00249	0.13023	0.00817	0.00828	$ 11,871	$ 237,424
492	100 MT / 2008 TRAFFIC	49	P	60	23	14	0	2	2	2	0.02007	0.00264	0.13804	0.00863	0.00880	$ 12,578	$ 251,556
493	100MT / 2018 TRAFFIC	49	P	70	23	14	0	2	2	2	0.02108	0.00277	0.14495	0.00907	0.00923	$ 13,209	$ 264,185
494																	

	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
495	**GRADE CROSSING**																
496	**CSAH 7 WEST**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
497	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
498																	
499	PCAPS DATABASE	35	F	1650	4	4	0	1	2	1	0.01639	0.00136	0.07338	0.00660	0.00843	$ 7,130	$ 142,598
500	DEIS																
501	DEIS PRECON BASE	35	F	2600	8	4	0	1	2	1	0.03036	0.00273	0.14575	0.01223	0.01541	$ 13,970	$ 279,409
502	DEIS 100 MT ALT C	49	F	2600	23	14	0	1	2	1	0.04425	0.00582	0.30430	0.01907	0.01936	$ 27,737	$ 554,733
503	REVISED																
504	BASE CONDITIONS	35	F	3160	2	1	0	1	2	1	0.01855	0.00152	0.08175	0.00746	0.00958	$ 7,968	$ 159,352
505	6400' TRAINS																
506	100MT / BASE TRAFFIC	49	F	3160	27	16	0	1	2	1	0.04841	0.00644	0.33639	0.02083	0.02114	$ 30,607	$ 612,134
507	100 MT / 2008 TRAFFIC	49	F	4280	27	16	0	1	2	1	0.05169	0.00688	0.35922	0.02224	0.02257	$ 32,685	$ 653,693
508	100MT / 2018 TRAFFIC	49	F	5410	27	16	0	1	2	1	0.05424	0.00722	0.37690	0.02337	0.02366	$ 34,300	$ 685,992
509	7400' TRAINS																
510	100MT / BASE TRAFFIC	49	F	3160	23	14	0	1	2	1	0.04632	0.00609	0.31857	0.01996	0.02027	$ 29,037	$ 580,731
511	100 MT / 2008 TRAFFIC	49	F	4280	23	14	0	1	2	1	0.04959	0.00652	0.34103	0.02135	0.02172	$ 31,080	$ 621,608
512	100MT / 2018 TRAFFIC	49	F	5410	23	14	0	1	2	1	0.05213	0.00686	0.35850	0.02246	0.02281	$ 32,676	$ 653,523
513																	
514	**GRADE CROSSING**																
515	**CSAH 7 EAST**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
516	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
517																	
518	PCAPS DATABASE	35	G	2600	5	5	0	1	4	1	0.07118	0.00631	0.33375	0.02480	0.04008	$ 31,331	$ 626,627
519	DEIS																
520	DEIS PRECON BASE	35	G	2300	8	4	0	3	4	1	0.08426	0.00756	0.39996	0.02937	0.04733	$ 37,470	$ 749,394
521	DEIS 100 MT ALT C	49	G	2300	23	14	0	3	4	1	0.09783	0.01287	0.66734	0.03671	0.04825	$ 59,768	$ 1,195,369
522	REVISED																
523	BASE CONDITIONS	35	G	2520	2	1	0	1	2	1	0.04212	0.00247	0.13296	0.01198	0.02768	$ 12,980	$ 259,590
524	6400' TRAINS																
525	100MT / BASE TRAFFIC	49	G	2520	27	16	0	1	2	1	0.08288	0.00804	0.41934	0.02558	0.04927	$ 38,176	$ 763,511
526	100 MT / 2008 TRAFFIC	49	G	2860	27	16	0	1	2	1	0.08428	0.00817	0.42639	0.02601	0.05010	$ 38,817	$ 776,340
527	100MT / 2018 TRAFFIC	49	G	3070	27	16	0	1	2	1	0.08504	0.00825	0.43027	0.02622	0.05058	$ 39,165	$ 783,307
528	7400' TRAINS																
529	100MT / BASE TRAFFIC	49	G	2520	23	14	0	1	2	1	0.08070	0.00773	0.40389	0.02492	0.04805	$ 36,832	$ 736,638
530	100 MT / 2008 TRAFFIC	49	G	2860	23	14	0	1	2	1	0.08213	0.00787	0.41105	0.02532	0.04894	$ 37,476	$ 749,521
531	100MT / 2018 TRAFFIC	49	G	3070	23	14	0	1	2	1	0.08292	0.00795	0.41500	0.02560	0.04937	$ 37,844	$ 756,890
532																	

	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
533	**GRADE CROSSING**																
534	**140TH ST SE - TWP RD 90**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
535	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
536																	
537	PCAPS DATABASE	35	P	50	2	2	0	1	2	2	0.00544	0.00045	0.02437	0.00218	0.00281	$ 2,365	$ 47,308
538	DEIS																
539	DEIS PRECON BASE	35	P	50	8	4	0	1	2	2	0.00999	0.00090	0.04794	0.00403	0.00506	$ 4,597	$ 91,948
540	DEIS 100 MT ALT C	49	P	50	23	14	0	1	2	2	0.01894	0.00249	0.13023	0.00817	0.00828	$ 11,871	$ 237,424
541	REVISED																
542	BASE CONDITIONS	35	P	50	2	1	0	1	2	2	0.00502	0.00044	0.02374	0.00208	0.00250	$ 2,294	$ 45,875
543	6400' TRAINS																
544	100MT / BASE TRAFFIC	49	P	50	27	16	0	1	2	2	0.02036	0.00271	0.14147	0.00878	0.00888	$ 12,875	$ 257,502
545	100 MT / 2008 TRAFFIC	49	P	60	27	16	0	1	2	2	0.02157	0.00287	0.14985	0.00927	0.00943	$ 13,633	$ 272,664
546	100MT / 2018 TRAFFIC	49	P	70	27	16	0	1	2	2	0.02263	0.00301	0.15726	0.00972	0.00990	$ 14,305	$ 286,091
547	7400' TRAINS																
548	100MT / BASE TRAFFIC	49	P	50	23	14	0	1	2	2	0.01894	0.00249	0.13023	0.00817	0.00828	$ 11,871	$ 237,424
549	100 MT / 2008 TRAFFIC	49	P	60	23	14	0	1	2	2	0.02007	0.00264	0.13804	0.00863	0.00880	$ 12,578	$ 251,556
550	100MT / 2018 TRAFFIC	49	P	70	23	14	0	1	2	2	0.02108	0.00277	0.14495	0.00907	0.00923	$ 13,209	$ 264,185
551																	
552	**GRADE CROSSING**																
553	**CSAH 32**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
554	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
555																	
556	PCAPS DATABASE	35	P	210	2	2	0	1	2	1	0.01557	0.00130	0.06972	0.00626	0.00801	$ 6,773	$ 135,466
557	DEIS																
558	DEIS PRECON BASE	35	P	200	8	4	0	1	2	2	0.01593	0.00143	0.07648	0.00641	0.00809	$ 7,330	$ 146,609
559	DEIS 100 MT ALT C	49	P	200	23	14	0	1	2	2	0.02905	0.00382	0.19979	0.01251	0.01272	$ 18,208	$ 364,163
560	REVISED																
561	BASE CONDITIONS	35	P	250	2	1	0	1	2	1	0.01500	0.00123	0.06607	0.00605	0.00772	$ 6,444	$ 128,879
562	6400' TRAINS																
563	100MT / BASE TRAFFIC	49	P	250	27	16	0	1	2	1	0.05057	0.00673	0.35137	0.02175	0.02209	$ 31,969	$ 639,390
564	100 MT / 2008 TRAFFIC	49	P	270	27	16	0	1	2	1	0.05150	0.00685	0.35787	0.02217	0.02248	$ 32,565	$ 651,302
565	100MT / 2018 TRAFFIC	49	P	280	27	16	0	1	2	1	0.05195	0.00691	0.36096	0.02237	0.02266	$ 32,848	$ 656,952
566	7400' TRAINS																
567	100MT / BASE TRAFFIC	49	P	250	23	14	0	1	2	1	0.04786	0.00630	0.32910	0.02060	0.02096	$ 29,993	$ 599,851
568	100 MT / 2008 TRAFFIC	49	P	270	23	14	0	1	2	1	0.04877	0.00642	0.33537	0.02099	0.02136	$ 30,563	$ 611,263
569	100MT / 2018 TRAFFIC	49	P	280	23	14	0	1	2	1	0.04920	0.00647	0.33835	0.02118	0.02155	$ 30,835	$ 616,708
570																	

	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
571	**GRADE CROSSING**																
572	**CSAH 10**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
573	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
574																	
575	PCAPS DATABASE	35	F	1200	2	2	0	1	2	1	0.04755	0.00396	0.21294	0.01914	0.02445	$ 20,690	$ 413,793
576	DEIS																
577	DEIS PRECON BASE	35	F	1300	8	4	0	1	2	1	0.06543	0.00587	0.31409	0.02631	0.03324	$ 30,097	$ 601,949
578	DEIS 100 MT ALT C	49	F	1300	23	14	0	1	2	1	0.08801	0.01158	0.60524	0.03787	0.03856	$ 55,155	$ 1,103,103
579	REVISED																
580	BASE CONDITIONS	35	F	1380	2	1	0	1	2	1	0.04620	0.00378	0.20356	0.01858	0.02384	$ 19,841	$ 396,816
581	6400' TRAINS																
582	100MT / BASE TRAFFIC	49	F	1380	27	16	0	1	2	1	0.09260	0.01232	0.64346	0.03987	0.04041	$ 58,554	$ 1,171,074
583	100 MT / 2008 TRAFFIC	49	F	1570	27	16	0	1	2	1	0.09498	0.01264	0.65999	0.04088	0.04146	$ 60,054	$ 1,201,090
584	100MT / 2018 TRAFFIC	49	F	1780	27	16	0	1	2	1	0.09732	0.01295	0.67628	0.04188	0.04250	$ 61,534	$ 1,230,683
585	7400' TRAINS																
586	100MT / BASE TRAFFIC	49	F	1380	23	14	0	1	2	1	0.08908	0.01172	0.61258	0.03835	0.03901	$ 55,829	$ 1,116,585
587	100 MT / 2008 TRAFFIC	49	F	1570	23	14	0	1	2	1	0.09141	0.01203	0.62862	0.03934	0.04004	$ 57,288	$ 1,145,769
588	100MT / 2018 TRAFFIC	49	F	1780	23	14	0	1	2	1	0.09371	0.01233	0.64444	0.04027	0.04111	$ 58,717	$ 1,174,346
589																	
590	**GRADE CROSSING**																
591	**TWP RD 667**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
592	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
593																	
594	PCAPS DATABASE	30	P	25	4	4	0	1	2	2	0.00586	0.00044	0.02401	0.00230	0.00311	$ 2,365	$ 47,300
595	DEIS																
596	DEIS PRECON BASE	30	P	25	8	4	0	1	2	2	0.00757	0.00059	0.03187	0.00296	0.00402	$ 3,118	$ 62,370
597	DEIS 100 MT ALT C	49	P	25	23	14	0	1	2	2	0.01511	0.00199	0.10388	0.00651	0.00660	$ 9,469	$ 189,388
598	REVISED																
599	BASE CONDITIONS	30	P	35	2	1	0	1	2	2	0.00417	0.00030	0.01609	0.00164	0.00223	$ 1,606	$ 32,121
600	6400' TRAINS																
601	100MT / BASE TRAFFIC	49	P	35	27	16	0	1	2	2	0.01816	0.00242	0.12620	0.00781	0.00793	$ 11,482	$ 229,645
602	100 MT / 2008 TRAFFIC	49	P	40	27	16	0	1	2	2	0.01896	0.00252	0.13174	0.00816	0.00827	$ 11,988	$ 239,768
603	100MT / 2018 TRAFFIC	49	P	45	27	16	0	1	2	2	0.01969	0.00262	0.13680	0.00847	0.00860	$ 12,448	$ 248,955
604	7400' TRAINS																
605	100MT / BASE TRAFFIC	49	P	35	23	14	0	1	2	2	0.01687	0.00222	0.11602	0.00724	0.00741	$ 10,570	$ 211,402
606	100 MT / 2008 TRAFFIC	49	P	40	23	14	0	1	2	2	0.01762	0.00232	0.12118	0.00759	0.00771	$ 11,045	$ 220,907
607	100MT / 2018 TRAFFIC	49	P	45	23	14	0	1	2	2	0.01831	0.00241	0.12588	0.00789	0.00801	$ 11,475	$ 229,496
608																	

	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
609	**GRADE CROSSING**																
610	**19TH AVE SE - TWP RD 591**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
611	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
612																	
613	PCAPS DATABASE	35	P	25	2	2	0	1	2	2	0.00425	0.00035	0.01903	0.00173	0.00216	$ 1,854	$ 37,080
614	DEIS																
615	DEIS PRECON BASE	35	P	25	8	4	0	1	2	2	0.00785	0.00071	0.03769	0.00315	0.00400	$ 3,610	$ 72,198
616	DEIS 100 MT ALT C	49	P	25	23	14	0	1	2	2	0.01511	0.00199	0.10388	0.00651	0.00660	$ 9,469	$ 189,388
617	REVISED																
618	BASE CONDITIONS	35	P	25	2	1	0	1	2	2	0.00383	0.00031	0.01689	0.00155	0.00197	$ 1,648	$ 32,961
619	6400' TRAINS																
620	100MT / BASE TRAFFIC	49	P	25	27	16	0	1	2	2	0.01628	0.00217	0.11311	0.00702	0.00709	$ 10,295	$ 205,900
621	100 MT / 2008 TRAFFIC	49	P	30	27	16	0	1	2	2	0.01728	0.00230	0.12005	0.00744	0.00753	$ 10,925	$ 218,501
622	100MT / 2018 TRAFFIC	49	P	35	27	16	0	1	2	2	0.01816	0.00242	0.12620	0.00781	0.00793	$ 11,482	$ 229,645
623	7400' TRAINS																
624	100MT / BASE TRAFFIC	49	P	25	23	14	0	1	2	2	0.01511	0.00199	0.10388	0.00651	0.00660	$ 9,469	$ 189,388
625	100 MT / 2008 TRAFFIC	49	P	30	23	14	0	1	2	2	0.01604	0.00211	0.11031	0.00692	0.00701	$ 10,057	$ 201,144
626	100MT / 2018 TRAFFIC	49	P	35	23	14	0	1	2	2	0.01687	0.00222	0.11602	0.00724	0.00741	$ 10,570	$ 211,402
627																	
628	**GRADE CROSSING**																
629	**TWP RD 668**	MAX			DAY	NIGHT	SWITCH	# Main	# High	High	PRED	FATAL	CASUALTY			*ANNUAL*	*20 YR*
630	SCENARIO	SPEED	PROT	AADT	TRAINS	TRAINS	TRAINS	Tracks	Lanes	Pvd?	ACCIDENTS	PROB	INDEX	INJURY	PDO	*COST*	*COST*
631																	
632	PCAPS DATABASE	35	P	25	2	2	0	1	2	2	0.00425	0.00035	0.01903	0.00173	0.00216	$ 1,854	$ 37,080
633	DEIS																
634	DEIS PRECON BASE	35	P	25	8	4	0	1	2	2	0.00785	0.00071	0.03769	0.00315	0.00400	$ 3,610	$ 72,198
635	DEIS 100 MT ALT C	49	P	25	23	14	0	1	2	2	0.01511	0.00199	0.10388	0.00651	0.00660	$ 9,469	$ 189,388
636	REVISED																
637	BASE CONDITIONS	35	P	25	2	1	0	1	2	2	0.00383	0.00031	0.01689	0.00155	0.00197	$ 1,648	$ 32,961
638	6400' TRAINS																
639	100MT / BASE TRAFFIC	49	P	25	27	16	0	1	2	2	0.01628	0.00217	0.11311	0.00702	0.00709	$ 10,295	$ 205,900
640	100 MT / 2008 TRAFFIC	49	P	30	27	16	0	1	2	2	0.01728	0.00230	0.12005	0.00744	0.00753	$ 10,925	$ 218,501
641	100MT / 2018 TRAFFIC	49	P	35	27	16	0	1	2	2	0.01816	0.00242	0.12620	0.00781	0.00793	$ 11,482	$ 229,645
642	7400' TRAINS																
643	100MT / BASE TRAFFIC	49	P	25	23	14	0	1	2	2	0.01511	0.00199	0.10388	0.00651	0.00660	$ 9,469	$ 189,388
644	100 MT / 2008 TRAFFIC	49	P	30	23	14	0	1	2	2	0.01604	0.00211	0.11031	0.00692	0.00701	$ 10,057	$ 201,144
645	100MT / 2018 TRAFFIC	49	P	35	23	14	0	1	2	2	0.01687	0.00222	0.11602	0.00724	0.00741	$ 10,570	$ 211,402

M

EXHIBIT M

ROCHESTER'S LEVEL OF SERVICE ANALYSIS

This exhibit reports on Rochester's level of service analysis using the methodology found in *Chapter 11 of the Highway Capacity Manual, Suburban and Arterial Streets.* Page 1 and 2 report the input values that are used in the Planning Methodology contained in Chapter 11, including Average Daily Traffic, directional distribution and peak hour factors, design and geometry of the corridor, operational characteristics of signals and roadway capacity.

The corridors studied with this methodology were the five critical corridors identified in the screening analysis reported in Exhibit W. This adaptation of the Chapter 11 methodology assumes that introduction of train traffic on a recurrent basis throughout the day introduces a fixed amount of red time into the corridor every hour throughout the day, and as a result changes the relationship of move time to stop time that motorists traveling the corridor will experience on a routine basis. To reflect this change in conditions, we calculate an adjustment to the standard signal cycle lengths and ratio of green time that are input into the HCM methodology to reflect the impact of this additional recurrent red time, and recalculate the corridor Level of Service with the adjusted values.

Included in this exhibit are three scenarios for each of the corridors, one reflecting existing conditions, one reflecting existing traffic conditions with the impact of 37 trains accounted for in the cycle lengths and green time, and one reflecting projected future traffic conditions.

HCM ARTERIAL ANALYSIS / INPUT DATA

	BROADWAY	2ND AV NE	ECD	11TH AVE W	11TH AVE E	
ADT/BASE	27750	10900	10002	13125	10080	
ADT/FUTURE	33700	14690	17020	17140	11720	
PEAK HOUR DIRECTIONAL DISTRIBUTION (from 2000 ADT Counts)						
NB	2752	484	326	853	621	
SB	1979	465	660	1058	555	
% NB	58%	51%	33%	45%	53%	
% SB	42%	49%	67%	55%	47%	
PEAK HOUR FACTOR (2000 ADT COUNTS)						
PK ADT	2403	895	1071	1972	1256	
ADT	29326	8821	11022	20245	13856	
% PK HR	8.2%	10.1%	9.7%	9.7%	9.1%	
DESIGN/GEOMETRY						
Lanes	4	4	4	4	2	
Free Flow Speed	30	30	55	30	30	
Arterial Class	4	3	1	4	4	
Section Length(miles)	1	1	2	1	1	
Medians	Y	N	Y	N	N	
Left turn bays	Y	Y	Y	Y	N	
# Signalized Int	6	3	2	5	3	
Arrival Type	3	3	3	3	3	
Signal Control	Pretimed	Pretimed	Pretimed	Pretimed	Pretimed	
Cycle Length	90	90	80	90	70	
Green Ratio	44%	36%	50%	33%	43%	
Green Time	40	32	40	30	30	
Projected Train Time/Event (min)	2.46	2.46	2.46	2.46	2.46	@ 47MPH &
Total Daily Time (min)	91.02	91.02	91.02	91.02	91.02	40 seconds
Hourly Time (min)	3.79	3.79	3.79	3.79	3.79	gate time
current # cycles	40.00	40.00	45.00	40.00	51.43	
current green time	1,600	1,280	1,800	1,200	1,543	
current non-green time	2,000	2,320	1,800	2,400	2,057	
added red time	228	228	228	228	228	
new green time	1,372	1,052	1,572	972	1,315	
% increase in non-green	11.4%	9.8%	12.6%	9.5%	11.1%	
Adjusted cycle ##	44.55	43.92	50.69	43.79	57.12	
Adjusted cycle length	81	82	71	82	63	
Adjusted green percentage	38%	29%	44%	27%	37%	

	A	B	C	D	E	F	G	H
48			**BROADWAY**	**2ND AV NE**	**ECD**	**11TH AVE W**	**11TH AVE E**	
49	ROADWAY CAPACITY CALCULATION							
50		Saturation Flow Rate	1900	1900	1900	1900	1900	
51		no of lanes	2	2	2	2	1	
52		lane width	1.000	1.000	1.000	1.000	1.000	
53		heavy vehicle	0.909	0.909	0.909	0.909	0.953	
54		grade	1.000	1.000	1.000	1.000	1.000	
55		parking lane	0.950	1.000	1.000	1.000	0.850	
56		bus stops	1.000	1.000	1.000	1.000	1.000	
57		area type	0.900	0.900	1.000	0.900	1.000	
58		lane utilization	0.950	0.950	0.950	0.950	1.000	
59		right turns	0.970	1.000	1.000	0.970	0.970	
60		left turns	0.950	0.950	0.950	0.950	0.950	
61		Adj lane group flow rate	2,585	2,806	3,117	2,722	1,418	
62		Adj single lane ave flow rate	1,293	1,403	1,559	1,361	707	

HCS: Urban and Suburban Arterials Release 3.2

PLANNING ANALYSIS

Arterial:	11th Ave Northeast
Direction:	North
File or Case #:	Base Year Conditions
Prepared By:	CNR
Date:	12/08/00

Traffic Characteristics

Annual Average Daily Traffic, AADT	10080	vpd
Planning Analysis Hour Factor, K	0.091	
Directional Distribution Factor, D	0.530	
Peak Hour Factor, PHF	0.920	
Adjusted Saturation Flow Rate	707	pcphgpl
Percent Turns from Exclusive Lanes	50	%

Roadway Characteristics

Number of Through Lanes One Direction, N	1	
Free Flow Speed, FFS	30	mph
Arterial Class	4	
Section Length	1.00	miles
Median	No	
Left Turn Bays	Yes	

Signal Characteristics

Signalized Intersections	3	
Arrival Type, AT	3	
Signal Type (k = 0.5 for Planning)	Pretimed	
Cycle Length, C	70.0	sec
Effective Green Ratio, g/C	0.430	

Results

Annual Average Daily Traffic, AADT	10080	vpd
Two-Way Hourly Volume	917	vph
Hourly Directional Volume	486	vph
Through-Volume 15-min. Flow Rate	264	v
Running Time	120.0	sec
v/c Ratio	0.92	
Through Capacity	288	vph
Progression Factor, PF	1.000	
Uniform Delay	18.8	sec
Filtering/Metering Factor, I	0.279	
Incremental Delay	14.0	sec
Control Delay	32.8	sec/v
Average Travel Speed, S	16.5	mph
Arterial Level of Service, LOS	C	

HCS: Urban and Suburban Arterials Release 3.2

PLANNING ANALYSIS

Arterial:	11th Ave Northeast
Direction:	North
File or Case #:	Adjusted Base Year / 37 Trains
Prepared By:	CNR
Date:	12/08/00

Traffic Characteristics

Annual Average Daily Traffic, AADT	10080	vpd
Planning Analysis Hour Factor, K	0.091	
Directional Distribution Factor, D	0.530	
Peak Hour Factor, PHF	0.920	
Adjusted Saturation Flow Rate	707	pcphgpl
Percent Turns from Exclusive Lanes	50	%

Roadway Characteristics

Number of Through Lanes One Direction, N	1	
Free Flow Speed, FFS	30	mph
Arterial Class	4	
Section Length	1.00	miles
Median	No	
Left Turn Bays	Yes	

Signal Characteristics

Signalized Intersections	3	
Arrival Type, AT	3	
Signal Type (k = 0.5 for Planning)	Pretimed	
Cycle Length, C	63.0	sec
Effective Green Ratio, g/C	0.370	

Results

Annual Average Daily Traffic, AADT	10080	vpd
Two-Way Hourly Volume	917	vph
Hourly Directional Volume	486	vph
Through-Volume 15-min. Flow Rate	264	v
Running Time	120.0	sec
v/c Ratio	1.06	
Through Capacity	248	vph
Progression Factor, PF	1.000	
Uniform Delay	20.6	sec
Filtering/Metering Factor, I	0.090	
Incremental Delay	37.4	sec
Control Delay	58.0	sec/v
Average Travel Speed, S	12.2	mph
Arterial Level of Service, LOS	D	

HCS: Urban and Suburban Arterials Release 3.2

PLANNING ANALYSIS

Arterial:	11th Ave East
Direction:	North
File or Case #:	
Prepared By:	CNR
Date:	12/08/00

Traffic Characteristics

Annual Average Daily Traffic, AADT	11720	vpd
Planning Analysis Hour Factor, K	0.091	
Directional Distribution Factor, D	0.530	
Peak Hour Factor, PHF	0.920	
Adjusted Saturation Flow Rate	707	pcphgpl
Percent Turns from Exclusive Lanes	50	%

Roadway Characteristics

Number of Through Lanes One Direction, N	1	
Free Flow Speed, FFS	30	mph
Arterial Class	4	
Section Length	1.00	miles
Median	No	
Left Turn Bays	Yes	

Signal Characteristics

Signalized Intersections	3	
Arrival Type, AT	3	
Signal Type (k = 0.5 for Planning)	Pretimed	
Cycle Length, C	63.0	sec
Effective Green Ratio, g/C	0.370	

Results

Annual Average Daily Traffic, AADT	11720	vpd
Two-Way Hourly Volume	1066	vph
Hourly Directional Volume	564	vph
Through-Volume 15-min. Flow Rate	306	v
Running Time	120.0	sec
v/c Ratio	1.23	
Through Capacity	248	vph
Progression Factor, PF	1.000	
Uniform Delay	23.0	sec
Filtering/Metering Factor, I	0.090	
Incremental Delay	108.6	sec
Control Delay	131.6	sec/v
Average Travel Speed, S	7.0	mph
Arterial Level of Service, LOS	F	

HCS: Urban and Suburban Arterials Release 3.2

PLANNING ANALYSIS

Arterial:	11th Ave Northwest
Direction:	South
File or Case #:	Existing Conditions
Prepared By:	CNR
Date:	12/8/00

Traffic Characteristics

Annual Average Daily Traffic, AADT	13125	vpd
Planning Analysis Hour Factor, K	0.097	
Directional Distribution Factor, D	0.550	
Peak Hour Factor, PHF	0.920	
Adjusted Saturation Flow Rate	1361	pcphgpl
Percent Turns from Exclusive Lanes	50	%

Roadway Characteristics

Number of Through Lanes One Direction, N	2	
Free Flow Speed, FFS	30	mph
Arterial Class	4	
Section Length	1.00	miles
Median	No	
Left Turn Bays	Yes	

Signal Characteristics

Signalized Intersections	5	
Arrival Type, AT	3	
Signal Type (k = 0.5 for Planning)	Pretimed	
Cycle Length, C	90.0	sec
Effective Green Ratio, g/C	0.330	

Results

Annual Average Daily Traffic, AADT	13125	vpd
Two-Way Hourly Volume	1273	vph
Hourly Directional Volume	700	vph
Through-Volume 15-min. Flow Rate	380	v
Running Time	140.0	sec
v/c Ratio	0.45	
Through Capacity	852	vph
Progression Factor, PF	1.000	
Uniform Delay	23.7	sec
Filtering/Metering Factor, I	0.895	
Incremental Delay	1.5	sec
Control Delay	25.2	sec/v
Average Travel Speed, S	13.5	mph
Arterial Level of Service, LOS	C	

HCS: Urban and Suburban Arterials Release 3.2

PLANNING ANALYSIS

Arterial:	11th Ave West
Direction:	South
File or Case #:	
Prepared By:	CNR
Date:	12/8/00

Traffic Characteristics

Annual Average Daily Traffic, AADT	13125	vpd
Planning Analysis Hour Factor, K	0.097	
Directional Distribution Factor, D	0.550	
Peak Hour Factor, PHF	0.920	
Adjusted Saturation Flow Rate	1361	pcphgpl
Percent Turns from Exclusive Lanes	50	%

Roadway Characteristics

Number of Through Lanes One Direction, N	2	
Free Flow Speed, FFS	30	mph
Arterial Class	4	
Section Length	1.00	miles
Median	No	
Left Turn Bays	Yes	

Signal Characteristics

Signalized Intersections	5	
Arrival Type, AT	3	
Signal Type (k = 0.5 for Planning)	Pretimed	
Cycle Length, C	82.0	sec
Effective Green Ratio, g/C	0.270	

Results

Annual Average Daily Traffic, AADT	13125	vpd
Two-Way Hourly Volume	1273	vph
Hourly Directional Volume	700	vph
Through-Volume 15-min. Flow Rate	380	v
Running Time	140.0	sec
v/c Ratio	0.55	
Through Capacity	697	vph
Progression Factor, PF	1.000	
Uniform Delay	25.6	sec
Filtering/Metering Factor, I	0.821	
Incremental Delay	2.5	sec
Control Delay	28.1	sec/v
Average Travel Speed, S	12.8	mph
Arterial Level of Service, LOS	D	

HCS: Urban and Suburban Arterials Release 3.2

PLANNING ANALYSIS

Arterial:	11th Ave West
Direction:	South
File or Case #:	Projected ADT & 37 Trains
Prepared By:	CNR
Date:	12/8/00

Traffic Characteristics

Annual Average Daily Traffic, AADT	17140	vpd
Planning Analysis Hour Factor, K	0.097	
Directional Distribution Factor, D	0.550	
Peak Hour Factor, PHF	0.920	
Adjusted Saturation Flow Rate	1361	pcphgpl
Percent Turns from Exclusive Lanes	50	%

Roadway Characteristics

Number of Through Lanes One Direction, N	2	
Free Flow Speed, FFS	30	mph
Arterial Class	4	
Section Length	1.00	miles
Median	No	
Left Turn Bays	Yes	

Signal Characteristics

Signalized Intersections	5	
Arrival Type, AT	3	
Signal Type (k = 0.5 for Planning)	Pretimed	
Cycle Length, C	82.0	sec
Effective Green Ratio, g/C	0.270	

Results

Annual Average Daily Traffic, AADT	17140	vpd
Two-Way Hourly Volume	1662	vph
Hourly Directional Volume	914	vph
Through-Volume 15-min. Flow Rate	496	v
Running Time	140.0	sec
v/c Ratio	0.71	
Through Capacity	697	vph
Progression Factor, PF	1.000	
Uniform Delay	27.0	sec
Filtering/Metering Factor, I	0.634	
Incremental Delay	3.9	sec
Control Delay	31.0	sec/v
Average Travel Speed, S	12.2	mph
Arterial Level of Service, LOS	D	

HCS: Urban and Suburban Arterials Release 3.2

PLANNING ANALYSIS

Arterial:	BROADWAY Ave - TH 63
Direction:	North
File or Case #:	Existing Conditions
Prepared By:	CNR
Date:	12/8/00

Traffic Characteristics

Annual Average Daily Traffic, AADT	27750	vpd
Planning Analysis Hour Factor, K	0.082	
Directional Distribution Factor, D	0.580	
Peak Hour Factor, PHF	0.920	
Adjusted Saturation Flow Rate	1293	pcphgpl
Percent Turns from Exclusive Lanes	50	%

Roadway Characteristics

Number of Through Lanes One Direction, N	2	
Free Flow Speed, FFS	30	mph
Arterial Class	4	
Section Length	1.00	miles
Median	Yes	
Left Turn Bays	Yes	

Signal Characteristics

Signalized Intersections	6	
Arrival Type, AT	3	
Signal Type (k = 0.5 for Planning)	Pretimed	
Cycle Length, C	90.0	sec
Effective Green Ratio, g/C	0.440	

Results

Annual Average Daily Traffic, AADT	27750	vpd
Two-Way Hourly Volume	2275	vph
Hourly Directional Volume	1319	vph
Through-Volume 15-min. Flow Rate	716	v
Running Time	146.7	sec
v/c Ratio	0.63	
Through Capacity	1137	vph
Progression Factor, PF	1.000	
Uniform Delay	19.5	sec
Filtering/Metering Factor, I	0.737	
Incremental Delay	2.0	sec
Control Delay	21.5	sec/v
Average Travel Speed, S	13.1	mph
Arterial Level of Service, LOS	C	

HCS: Urban and Suburban Arterials Release 3.2

PLANNING ANALYSIS

Arterial:
Direction: BOTH
File or Case #: Existing Conditons & 37 Trains
Prepared By: CNR
Date: 12/8/00

Traffic Characteristics

Annual Average Daily Traffic, AADT	27750	vpd
Planning Analysis Hour Factor, K	0.082	
Directional Distribution Factor, D	0.580	
Peak Hour Factor, PHF	0.920	
Adjusted Saturation Flow Rate	1293	pcphgpl
Percent Turns from Exclusive Lanes	50	%

Roadway Characteristics

Number of Through Lanes One Direction, N	2	
Free Flow Speed, FFS	30	mph
Arterial Class	4	
Section Length	1.00	miles
Median	Yes	
Left Turn Bays	Yes	

Signal Characteristics

Signalized Intersections	6	
Arrival Type, AT	3	
Signal Type (k = 0.5 for Planning)	Pretimed	
Cycle Length, C	81.0	sec
Effective Green Ratio, g/C	0.380	

Results

Annual Average Daily Traffic, AADT	27750	vpd
Two-Way Hourly Volume	2275	vph
Hourly Directional Volume	1319	vph
Through-Volume 15-min. Flow Rate	716	v
Running Time	146.7	sec
v/c Ratio	0.73	
Through Capacity	982	vph
Progression Factor, PF	1.000	
Uniform Delay	21.5	sec
Filtering/Metering Factor, I	0.610	
Incremental Delay	2.9	sec
Control Delay	24.5	sec/v
Average Travel Speed, S	12.3	mph
Arterial Level of Service, LOS	D	

HCS: Urban and Suburban Arterials Release 3.2

PLANNING ANALYSIS

Arterial:
Direction: BOTH
File or Case #: Projected ADT & 37 Trains
Prepared By: CNR
Date: 12/8/00

Traffic Characteristics

Annual Average Daily Traffic, AADT	33700	vpd
Planning Analysis Hour Factor, K	0.082	
Directional Distribution Factor, D	0.580	
Peak Hour Factor, PHF	0.920	
Adjusted Saturation Flow Rate	1293	pcphgpl
Percent Turns from Exclusive Lanes	50	%

Roadway Characteristics

Number of Through Lanes One Direction, N	2	
Free Flow Speed, FFS	30	mph
Arterial Class	4	
Section Length	1.00	miles
Median	Yes	
Left Turn Bays	Yes	

Signal Characteristics

Signalized Intersections	6	
Arrival Type, AT	3	
Signal Type (k = 0.5 for Planning)	Pretimed	
Cycle Length, C	81.0	sec
Effective Green Ratio, g/C	0.380	

Results

Annual Average Daily Traffic, AADT	33700	vpd
Two-Way Hourly Volume	2763	vph
Hourly Directional Volume	1602	vph
Through-Volume 15-min. Flow Rate	870	v
Running Time	146.7	sec
v/c Ratio	0.89	
Through Capacity	982	vph
Progression Factor, PF	1.000	
Uniform Delay	23.5	sec
Filtering/Metering Factor, I	0.342	
Incremental Delay	4.5	sec
Control Delay	28.0	sec/v
Average Travel Speed, S	11.5	mph
Arterial Level of Service, LOS	D	

HCS: Urban and Suburban Arterials Release 3.2

PLANNING ANALYSIS

Arterial: East Circle Drive - CSAH 22
Direction: South
File or Case #:
Prepared By: CNR
Date: 12/8/00

Traffic Characteristics

Annual Average Daily Traffic, AADT	10002	vpd
Planning Analysis Hour Factor, K	0.097	
Directional Distribution Factor, D	0.670	
Peak Hour Factor, PHF	0.920	
Adjusted Saturation Flow Rate	1559	pcphgpl
Percent Turns from Exclusive Lanes	50	%

Roadway Characteristics

Number of Through Lanes One Direction, N	2	
Free Flow Speed, FFS	50	mph
Arterial Class	1	
Section Length	2.00	miles
Median	Yes	
Left Turn Bays	Yes	

Signal Characteristics

Signalized Intersections	2	
Arrival Type, AT	3	
Signal Type (k = 0.5 for Planning)	Pretimed	
Cycle Length, C	80.0	sec
Effective Green Ratio, g/C	0.500	

Results

Annual Average Daily Traffic, AADT	10002	vpd
Two-Way Hourly Volume	970	vph
Hourly Directional Volume	649	vph
Through-Volume 15-min. Flow Rate	352	v
Running Time	144.0	sec
v/c Ratio	0.23	
Through Capacity	1559	vph
Progression Factor, PF	1.000	
Uniform Delay	11.3	sec
Filtering/Metering Factor, I	0.983	
Incremental Delay	0.3	sec
Control Delay	11.6	sec/v
Average Travel Speed, S	43.1	mph
Arterial Level of Service, LOS	A	

HCS: Urban and Suburban Arterials Release 3.2

PLANNING ANALYSIS

Arterial:	East Circle Drive - CSAH 22
Direction:	South
File or Case #:	
Prepared By:	CNR
Date:	12/8/00

Traffic Characteristics

Annual Average Daily Traffic, AADT	10002	vpd
Planning Analysis Hour Factor, K	0.097	
Directional Distribution Factor, D	0.670	
Peak Hour Factor, PHF	0.920	
Adjusted Saturation Flow Rate	1559	pcphgpl
Percent Turns from Exclusive Lanes	50	%

Roadway Characteristics

Number of Through Lanes One Direction, N	2	
Free Flow Speed, FFS	50	mph
Arterial Class	1	
Section Length	2.00	miles
Median	Yes	
Left Turn Bays	Yes	

Signal Characteristics

Signalized Intersections	2	
Arrival Type, AT	3	
Signal Type (k = 0.5 for Planning)	Pretimed	
Cycle Length, C	71.0	sec
Effective Green Ratio, g/C	0.440	

Results

Annual Average Daily Traffic, AADT	10002	vpd
Two-Way Hourly Volume	970	vph
Hourly Directional Volume	649	vph
Through-Volume 15-min. Flow Rate	352	v
Running Time	144.0	sec
v/c Ratio	0.26	
Through Capacity	1371	vph
Progression Factor, PF	1.000	
Uniform Delay	12.6	sec
Filtering/Metering Factor, I	0.976	
Incremental Delay	0.4	sec
Control Delay	13.0	sec/v
Average Travel Speed, S	42.4	mph
Arterial Level of Service, LOS	A	

HCS: Urban and Suburban Arterials Release 3.2

PLANNING ANALYSIS

Arterial:	East Circle Drive - CSAH 22
Direction:	South
File or Case #:	Projected ADT & 37 Trains
Prepared By:	CNR
Date:	12/8/00

Traffic Characteristics

Annual Average Daily Traffic, AADT	17020	vpd
Planning Analysis Hour Factor, K	0.097	
Directional Distribution Factor, D	0.670	
Peak Hour Factor, PHF	0.920	
Adjusted Saturation Flow Rate	1559	pcphgpl
Percent Turns from Exclusive Lanes	50	%

Roadway Characteristics

Number of Through Lanes One Direction, N	2	
Free Flow Speed, FFS	50	mph
Arterial Class	1	
Section Length	2.00	miles
Median	Yes	
Left Turn Bays	Yes	

Signal Characteristics

Signalized Intersections	2	
Arrival Type, AT	3	
Signal Type (k = 0.5 for Planning)	Pretimed	
Cycle Length, C	71.0	sec
Effective Green Ratio, g/C	0.440	

Results

Annual Average Daily Traffic, AADT	17020	vpd
Two-Way Hourly Volume	1650	vph
Hourly Directional Volume	1105	vph
Through-Volume 15-min. Flow Rate	600	v
Running Time	144.0	sec
v/c Ratio	0.44	
Through Capacity	1371	vph
Progression Factor, PF	1.000	
Uniform Delay	13.8	sec
Filtering/Metering Factor, I	0.901	
Incremental Delay	0.9	sec
Control Delay	14.7	sec/v
Average Travel Speed, S	41.5	mph
Arterial Level of Service, LOS	B	

HCS: Urban and Suburban Arterials Release 3.2

PLANNING ANALYSIS

Arterial:	2nd Ave NE
Direction:	North
File or Case #:	Existing Conditions
Prepared By:	CNR
Date:	12/8/00

Traffic Characteristics

Annual Average Daily Traffic, AADT	10900	vpd
Planning Analysis Hour Factor, K	0.101	
Directional Distribution Factor, D	0.510	
Peak Hour Factor, PHF	0.920	
Adjusted Saturation Flow Rate	1403	pcphgpl
Percent Turns from Exclusive Lanes	50	%

Roadway Characteristics

Number of Through Lanes One Direction, N	2	
Free Flow Speed, FFS	35	mph
Arterial Class	3	
Section Length	1.00	miles
Median	No	
Left Turn Bays	Yes	

Signal Characteristics

Signalized Intersections	3	
Arrival Type, AT	3	
Signal Type (k = 0.5 for Planning)	Pretimed	
Cycle Length, C	90.0	sec
Effective Green Ratio, g/C	0.360	

Results

Annual Average Daily Traffic, AADT	10900	vpd
Two-Way Hourly Volume	1100	vph
Hourly Directional Volume	560	vph
Through-Volume 15-min. Flow Rate	304	v
Running Time	106.7	sec
v/c Ratio	0.32	
Through Capacity	959	vph
Progression Factor, PF	1.000	
Uniform Delay	20.8	sec
Filtering/Metering Factor, I	0.958	
Incremental Delay	0.8	sec
Control Delay	21.6	sec/v
Average Travel Speed, S	21.0	mph
Arterial Level of Service, LOS	C	

HCS: Urban and Suburban Arterials Release 3.2

PLANNING ANALYSIS

Arterial:	2nd Ave NE
Direction:	North
File or Case #:	Existing Conditions & 37 Train
Prepared By:	CNR
Date:	12/8/00

Traffic Characteristics

Annual Average Daily Traffic, AADT	10900	vpd
Planning Analysis Hour Factor, K	0.101	
Directional Distribution Factor, D	0.510	
Peak Hour Factor, PHF	0.920	
Adjusted Saturation Flow Rate	1403	pcphgpl
Percent Turns from Exclusive Lanes	50	%

Roadway Characteristics

Number of Through Lanes One Direction, N	2	
Free Flow Speed, FFS	35	mph
Arterial Class	3	
Section Length	1.00	miles
Median	No	
Left Turn Bays	Yes	

Signal Characteristics

Signalized Intersections	3	
Arrival Type, AT	3	
Signal Type (k = 0.5 for Planning)	Pretimed	
Cycle Length, C	82.0	sec
Effective Green Ratio, g/C	0.290	

Results

Annual Average Daily Traffic, AADT	10900	vpd
Two-Way Hourly Volume	1100	vph
Hourly Directional Volume	560	vph
Through-Volume 15-min. Flow Rate	304	v
Running Time	106.7	sec
v/c Ratio	0.39	
Through Capacity	772	vph
Progression Factor, PF	1.000	
Uniform Delay	23.3	sec
Filtering/Metering Factor, I	0.925	
Incremental Delay	1.4	sec
Control Delay	24.7	sec/v
Average Travel Speed, S	19.9	mph
Arterial Level of Service, LOS	C	

HCS: Urban and Suburban Arterials Release 3.2

PLANNING ANALYSIS

Arterial:	2nd Ave NE
Direction:	North
File or Case #:	
Prepared By:	CNR
Date:	12/8/00

Traffic Characteristics

Annual Average Daily Traffic, AADT	14690	vpd
Planning Analysis Hour Factor, K	0.101	
Directional Distribution Factor, D	0.510	
Peak Hour Factor, PHF	0.920	
Adjusted Saturation Flow Rate	1403	pcphgpl
Percent Turns from Exclusive Lanes	50	%

Roadway Characteristics

Number of Through Lanes One Direction, N	2	
Free Flow Speed, FFS	35	mph
Arterial Class	3	
Section Length	1.00	miles
Median	No	
Left Turn Bays	Yes	

Signal Characteristics

Signalized Intersections	3	
Arrival Type, AT	3	
Signal Type (k = 0.5 for Planning)	Pretimed	
Cycle Length, C	82.0	sec
Effective Green Ratio, g/C	0.290	

Results

Annual Average Daily Traffic, AADT	14690	vpd
Two-Way Hourly Volume	1483	vph
Hourly Directional Volume	756	vph
Through-Volume 15-min. Flow Rate	410	v
Running Time	106.7	sec
v/c Ratio	0.53	
Through Capacity	772	vph
Progression Factor, PF	1.000	
Uniform Delay	24.4	sec
Filtering/Metering Factor, I	0.833	
Incremental Delay	2.2	sec
Control Delay	26.6	sec/v
Average Travel Speed, S	19.3	mph
Arterial Level of Service, LOS	C	

EXHIBIT N

RESULTS OF BENEFIT-COST ANALYSIS USING GRADEDEC

This exhibit contains data from Rochester's evaluation of the benefits and costs of grade separation from an economic standpoint, using the Federal Railroad Administration's GRADEDEC program. The first two pages provide a brief overview of GRADEDEC, while the third page contains the custom profiles that were built for each crossing in the study area corridor, which included 15 crossings and extended from CR 104 west of Rochester to CSAH 11 east of the city. In addition to traffic volumes, actual historic accident rates at individual crossings, current emission and accident cost values, and current fuel costs were inputted to replace the default values provided with the program. Construction cost estimates were completed for each grade separation as illustrated on page 9 of the exhibit. Concept plans and construction cost data for each grade separation evaluated are maintained in our project files for the Powder River Basin project and will be provided upon request.

GradeDec summaries are provided on pages 4 through 8 for each of the five potential locations identified for further study in the screening analysis discussed in Exhibit W. These screens report the results for the scenario where no future vehicular traffic growth was assumed. A second analysis was also conducted where projected 20 year traffic volumes were used in the B/C analysis. The results of these scenarios are discussed in the verified statement. These results show improved B/C results for all five locations, with four out of the five locations having a B/C ratio exceeding 1.0

What is GradeDec?

GradeDec is a decision support tool designed to assist public decision makers in evaluating the benefits and costs of highway-rail grade crossing upgrades, separations, and closures. The model adopts standard benefit-cost techniques which are currently used by the public sector to evaluate highway-rail grade crossing investment alternatives at the corridor level.

The GradeDec model builds on StratBENCOST and RailDec, two models developed by HLB for the National Cooperative Highway Research Program (NCHRP) and the Federal Railroad Administration (FRA), respectively. GradeDec builds upon StratBENCOST to evaluate highway-related costs and benefits and RailDec to evaluate rail-related costs and benefits.

GradeDec forecasts the transportation and non-transportation effects of highway-rail grade crossing investments and estimates the economic value of these effects over the useful life of the project in dollar terms. The estimated rate of return for each project is calculated by comparing the time-stream of expected economic benefits with the time-stream of investment -related costs, after adjusting for the opportunity costs of capital. Known as "discounting", this adjustment enables decision makers to inspect future benefits and costs in terms of their present-day value. This is a standard way of giving due weight to nearer-term versus distant (thus less valued) outcomes.

GradeDec's underlying methodology is consistent with the current benefit-cost methodologies employed by the United States Department of Transportation Agencies (Federal Railroad Administration, Federal Highway Administration, Federal Transit Administration, and the Federal Aviation Administration) and with Executive Order 12866 which governs the principles of federal infrastructure investment. The model is transparent in all of its assumptions and the model inputs are readily accessible to users who may want to adjust model inputs to reflect local circumstances.

GradeDec is designed to minimize the data needs and technical expertise required of the user while at the same time providing credible benefit-cost results. With information about a series of grade crossing improvements along a particular corridor, the range of anticipated accident reductions, train crossing delay improvements, and changes in travel demand generate preliminary benefit-cost results for a given confidence interval. Depending on the user's needs, requirements, and abilities, the user can select either an extensive default data base that will minimize input requirements, or the user can customize the results by inputting project specific localized data. In this way, GradeDec will function as both a high-level preliminary model and a micro-level localized model.

Why Use GradeDec?

Growing requirements for highway-rail grade crossing investments and dwindling fiscal resources point to the need for a new tool for investment analysis. GradeDec determines

the effects rail corridor investments will have on driver safety awareness and highway delay and queuing. Improvements will result in the following economic benefits:

- Improvement in safety and reduced accident costs;
- Reduced travel time costs;
- Improved air quality
- Improved system reliability measured as more predictable travel times;
- Reduced vehicle operating costs; and
- Network benefits.

GradeDec uses risk analysis to evaluate highway-rail grade crossing investments and provides the following:

- A median value for costs (capital and maintenance) and the full range of economic benefits resulting from corridor improvements.
- A probability range for each output listed above. The probability range reflects the range of possible effects and outcomes in light of uncertainty in each component.
- A probability range for the net present value and rate of return for each project in light of the uncertainty in the costs to provide and maintain the highway-rail grade crossing improvement. Any uncertainty in forecasted highway traffic and/or train frequencies will also be reflected in the model results.

- Corridor-level analysis. GradeDec is able to evaluate up to 20 grade crossings simultaneously.

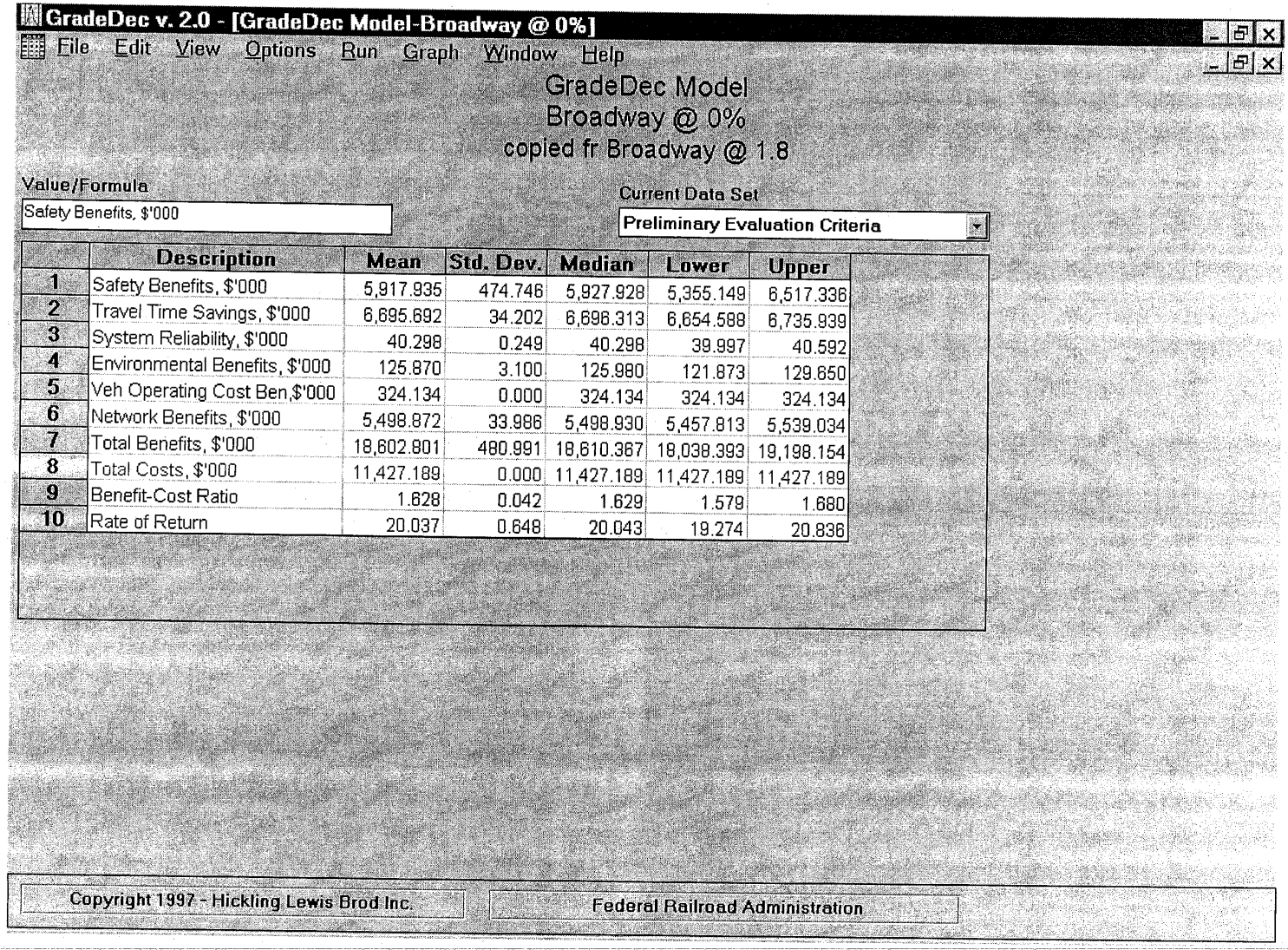
GradeDec conducts comprehensive statistical simulations in order to provide a probability range for the net present value associated with each rail corridor-level investment plan. Rail corridor investment plans can include up to 20 grade crossings. The user can rank a series of corridor-level investment plans. The user can also view the net present value of user-selected criteria by individual grade crossings. For example, the user can view the safety benefits of each grade crossing improvement along the corridor and the probability range associated with those benefits. Likewise, the user can view the highway vehicle operating costs savings or environmental benefits for each grade crossing by selecting these criteria and rerunning the model.

GradeDec thus provides important insight for planners and decision makers in prioritizing corridor investment plans. Two series of investments displaying an equal net present value may not offer equal promise if one exhibits a materially greater down-side risk of a low return. This can occur when train volumes or highway network impacts are uncertain.
In any "portfolio" there is a place for riskier investments; the important thing is to be aware of them and to chose them judiciously. GradeDec provides the management information needed to make such decisions wisely and collectively.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1							Accident Rate (per 100M ADT)				Costs (in $M)				
2	Profile No.	Crossing Type	Highway Facility Type	Lanes	AADT	Train Speed (MPH)	Fatality Rate	Injury Rate	Property Damage Rate	Construction	Annual Capital	Maintenance	Annual Life Cycle	ROUTE	Type of Crossing
3															
4	87	3	5	2	1,400	47	5	17	1,890	0	0	15	0	CSAH 11	At-Grade
5	88	2	5	2	3,640	47	10	15	1,680	0	0	15	0	CSAH 9	At-Grade
6	89	2	1	4	10,002	47	6	7	890	0	0	15	0	CSAH 22	At-Grade
7	90	2	5	2	856	47	11	25	3,445	0	0	15	0	15TH AVE NE	At-Grade
8	91	2	5	2	12,866	47	3	4	560	0	0	15	0	11TH AVE NE	At-Grade
9	92	1	5	2	805	47	40	55	7,400	0	0	15	0	9TH AVE NE	At-Grade
10	93	1	5	2	436	47	60	90	12,250	0	0	15	0	7TH AVE NE	At-Grade
11	94	2	3	4	10,300	47	4	5	735	0	0	15	0	2ND AVE NE	At-Grade
12	95	2	3	4	27,757	47	12	6	865	0	0	15	0	BROADWAY	At-Grade
13	96	3	5	2	1,916	47	5	13	2,440	0	0	15	0	1ST AVE NW	At-Grade
14	97	3	5	2	7,317	47	2	4	635	0	0	15	0	4TH AVE NW	At-Grade
15	98	2	5	2	4,397	47	4	6	845	0	0	15	0	6TH AVE NW	At-Grade
16	99	3	3	4	18,967	47	1	2	340	0	0	15	0	11TH AVE NW	At-Grade
17	100	2	5	2	8,178	47	6	8	1,080	0	0	15	0	7TH ST NW	At-Grade
18	101	3	5	2	2,025	47	3	9	1,210	0	0	15	0	CR 104	At-Grade
19	102	5	5	2	1,400	47	0	0	0	3,000	0	100	0	CSAH 11	Grade Sep
20	103	5	5	2	3,640	47	0	0	0	4,000	0	100	0	CSAH 9	Grade Sep
21	104	5	1	4	10,002	47	0	0	0	5,094	0	100	0	CSAH 22	Grade Sep
22	105	5	5	2	856	47	0	0	0	5,000	0	100	0	15TH AVE NE	Grade Sep
23	106	5	5	2	12,866	47	0	0	0	7,062	0	100	0	11TH AVE NE	Grade Sep
24	107	5	5	2	805	47	0	0	0	5,000	0	100	0	9TH AVE NE	Grade Sep
25	108	5	5	2	436	47	0	0	0	3,000	0	100	0	7TH AVE NE	Grade Sep
26	109	5	3	4	10,300	47	0	0	0	4,776	0	100	0	2ND AVE NE	Grade Sep
27	110	5	3	4	27,757	47	0	0	0	10,128	0	100	0	BROADWAY	Grade Sep
28	111	5	5	2	1,916	47	0	0	0	15,000	0	100	0	1ST AVE NW	Grade Sep
29	112	5	5	2	7,317	47	0	0	0	12,000	0	100	0	4TH AVE NW	Grade Sep
30	113	5	5	2	4,397	47	0	0	0	15,000	0	100	0	6TH AVE NW	Grade Sep
31	114	5	3	4	18,967	47	0	0	0	6,695	0	100	0	11TH AVE NW	Grade Sep
32	115	5	5	2	8,178	47	0	0	0	5,000	0	100	0	7TH ST NW	Grade Sep
33	116	5	5	2	2,025	47	0	0	0	12,000	0	100	0	CR 104	Grade Sep

EXHIBIT N

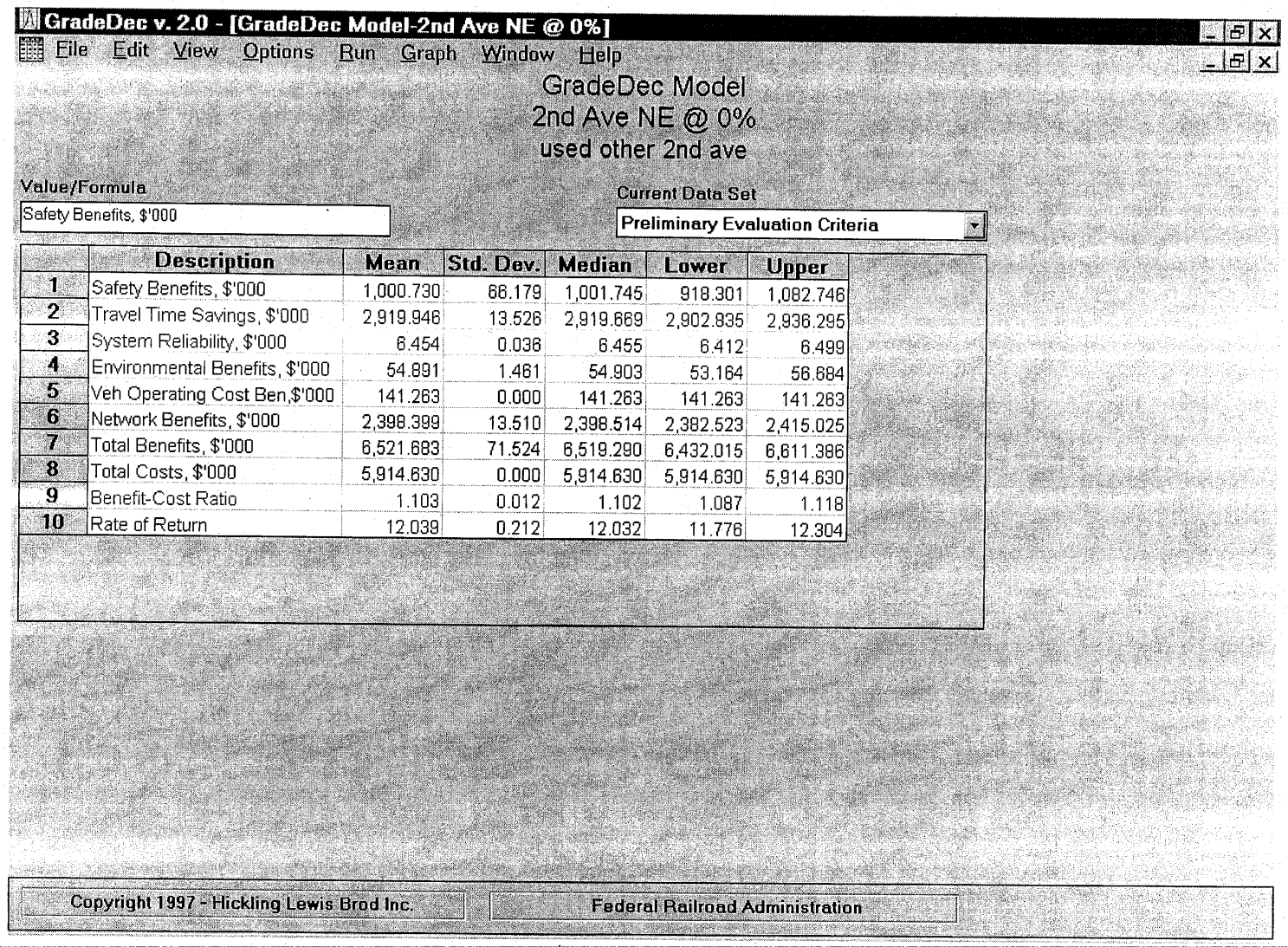
PAGE 4



	Description	Mean	Std. Dev.	Median	Lower	Upper
1	Safety Benefits, $'000	5,917.935	474.746	5,927.928	5,355.149	6,517.336
2	Travel Time Savings, $'000	6,695.692	34.202	6,696.313	6,654.588	6,735.939
3	System Reliability, $'000	40.298	0.249	40.298	39.997	40.592
4	Environmental Benefits, $'000	125.870	3.100	125.980	121.873	129.650
5	Veh Operating Cost Ben,$'000	324.134	0.000	324.134	324.134	324.134
6	Network Benefits, $'000	5,498.872	33.986	5,498.930	5,457.813	5,539.034
7	Total Benefits, $'000	18,602.801	480.991	18,610.367	18,038.393	19,198.154
8	Total Costs, $'000	11,427.189	0.000	11,427.189	11,427.189	11,427.189
9	Benefit-Cost Ratio	1.628	0.042	1.629	1.579	1.680
10	Rate of Return	20.037	0.648	20.043	19.274	20.836

EXHIBIT N

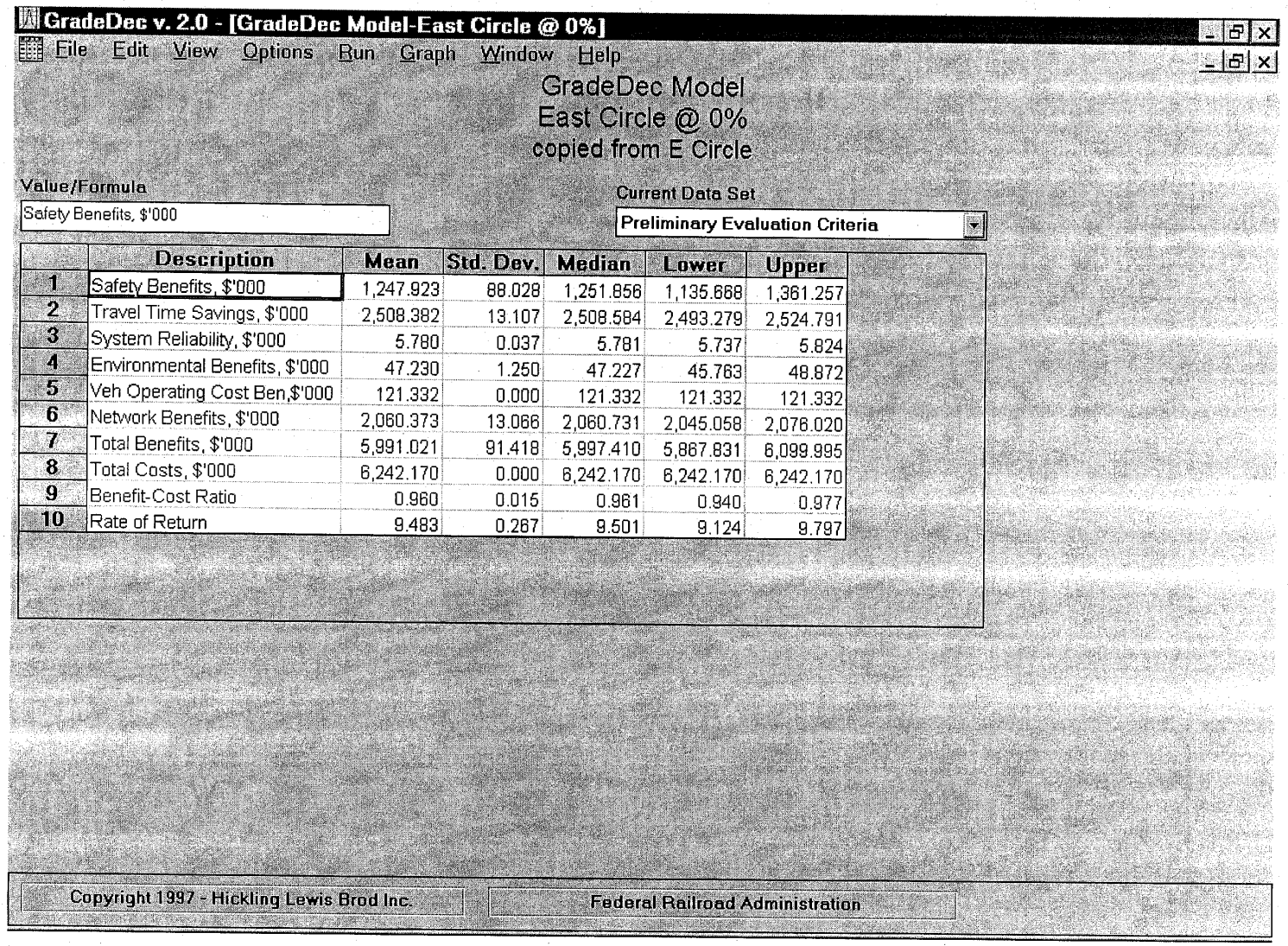
PAGE 5



	Description	Mean	Std. Dev.	Median	Lower	Upper
1	Safety Benefits, $'000	1,000.730	66.179	1,001.745	918.301	1,082.746
2	Travel Time Savings, $'000	2,919.946	13.526	2,919.669	2,902.835	2,936.295
3	System Reliability, $'000	6.454	0.036	6.455	6.412	6.499
4	Environmental Benefits, $'000	54.891	1.461	54.903	53.164	56.684
5	Veh Operating Cost Ben,$'000	141.263	0.000	141.263	141.263	141.263
6	Network Benefits, $'000	2,398.399	13.510	2,398.514	2,382.523	2,415.025
7	Total Benefits, $'000	6,521.683	71.524	6,519.290	6,432.015	6,611.386
8	Total Costs, $'000	5,914.630	0.000	5,914.630	5,914.630	5,914.630
9	Benefit-Cost Ratio	1.103	0.012	1.102	1.087	1.118
10	Rate of Return	12.039	0.212	12.032	11.776	12.304

EXHIBIT N

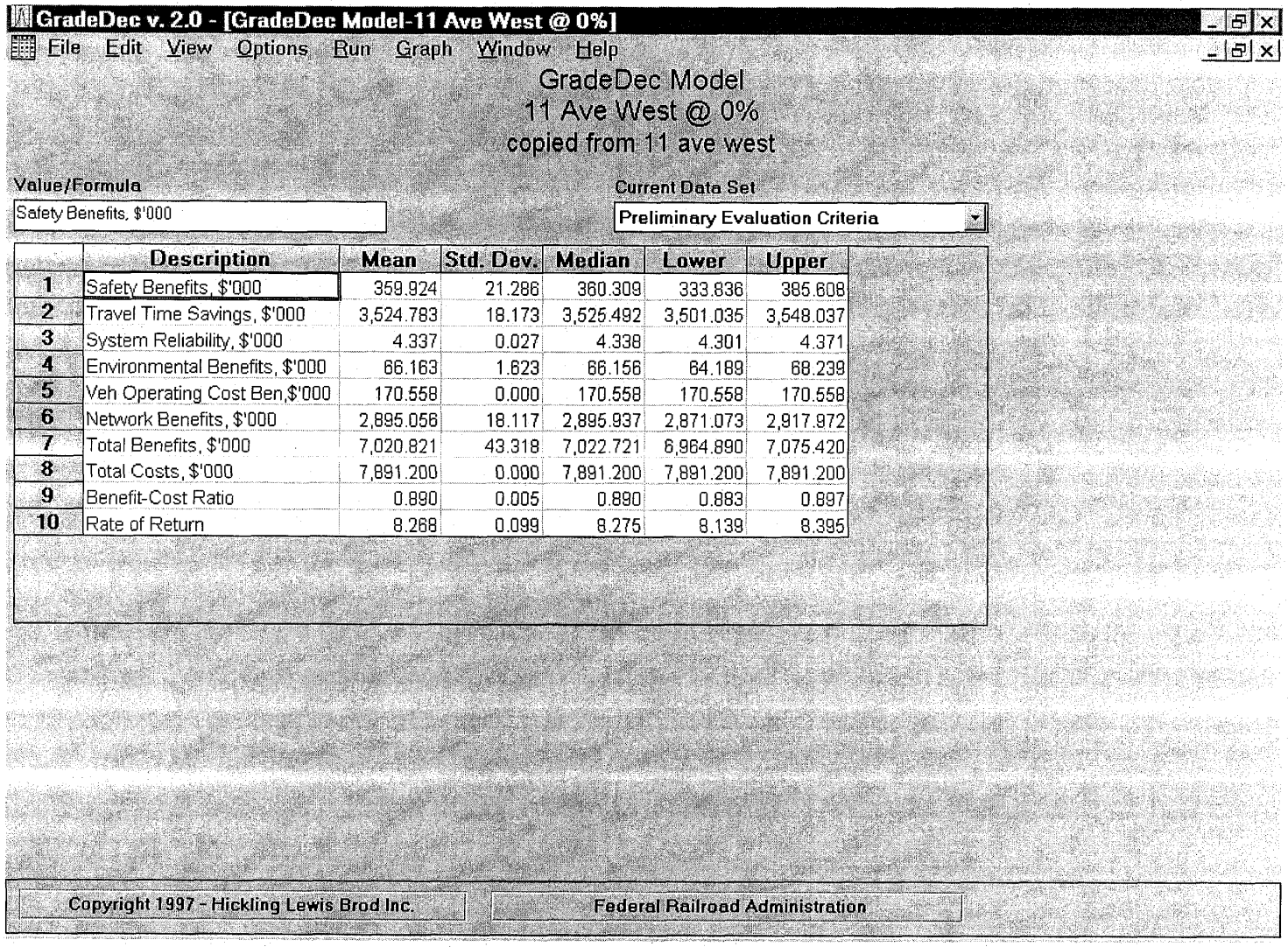
PAGE 6



	Description	Mean	Std. Dev.	Median	Lower	Upper
1	Safety Benefits, $'000	1,247.923	88.028	1,251.856	1,135.668	1,361.257
2	Travel Time Savings, $'000	2,508.382	13.107	2,508.584	2,493.279	2,524.791
3	System Reliability, $'000	5.780	0.037	5.781	5.737	5.824
4	Environmental Benefits, $'000	47.230	1.250	47.227	45.763	48.872
5	Veh Operating Cost Ben,$'000	121.332	0.000	121.332	121.332	121.332
6	Network Benefits, $'000	2,060.373	13.066	2,060.731	2,045.058	2,076.020
7	Total Benefits, $'000	5,991.021	91.418	5,997.410	5,867.831	6,099.995
8	Total Costs, $'000	6,242.170	0.000	6,242.170	6,242.170	6,242.170
9	Benefit-Cost Ratio	0.960	0.015	0.961	0.940	0.977
10	Rate of Return	9.483	0.267	9.501	9.124	9.797

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	Description	Mean	Std. Dev.	Median	Lower	Upper
1	Safety Benefits, $'000	359.924	21.286	360.309	333.836	385.608
2	Travel Time Savings, $'000	3,524.783	18.173	3,525.492	3,501.035	3,548.037
3	System Reliability, $'000	4.337	0.027	4.338	4.301	4.371
4	Environmental Benefits, $'000	66.163	1.623	66.156	64.189	68.239
5	Veh Operating Cost Ben,$'000	170.558	0.000	170.558	170.558	170.558
6	Network Benefits, $'000	2,895.056	18.117	2,895.937	2,871.073	2,917.972
7	Total Benefits, $'000	7,020.821	43.318	7,022.721	6,964.890	7,075.420
8	Total Costs, $'000	7,891.200	0.000	7,891.200	7,891.200	7,891.200
9	Benefit-Cost Ratio	0.890	0.005	0.890	0.883	0.897
10	Rate of Return	8.268	0.099	8.275	8.139	8.395

EXHIBIT N

PAGE 8

GradeDec v. 2.0 - [GradeDec Model-11 Ave East @ 0%]

File Edit View Options Run Graph Window Help

GradeDec Model
11 Ave East @ 0%
copied from 11 East

Value/Formula

Safety Benefits, $'000

Current Data Set

Preliminary Evaluation Criteria

	Description	Mean	Std. Dev.	Median	Lower	Upper
1	Safety Benefits, $'000	682.223	47.943	680.928	623.994	740.662
2	Travel Time Savings, $'000	2,512.030	13.201	2,512.042	2,495.912	2,528.611
3	System Reliability, $'000	3.980	0.023	3.980	3.953	4.010
4	Environmental Benefits, $'000	52.149	1.295	52.117	50.560	53.801
5	Veh Operating Cost Ben,$'000	134.129	0.000	134.129	134.129	134.129
6	Network Benefits, $'000	2,277.465	13.126	2,277.368	2,261.904	2,294.367
7	Total Benefits, $'000	5,661.976	55.762	5,660.411	5,595.244	5,735.649
8	Total Costs, $'000	8,269.211	0.000	8,269.211	8,269.211	8,269.211
9	Benefit-Cost Ratio	0.685	0.007	0.685	0.677	0.694
10	Rate of Return	4.385	0.138	4.382	4.222	4.566

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Federal Railroad Administration

GRADE SEPARATION COST ESTIMATES

	BROADWAY	2ND AVE NE	EAST CIRCLE DR	11TH AVE NW	11TH AVE NE
BASE CONSTRUCTION	$ 4,638,000	$ 2,524,000	$ 3,152,000	$ 2,510,000	$ 1,489,000
RPU UTILITY RELOCATION	$ 628,000	$ 216,000	$ 255,000	$ 614,000	$ 529,000
CITY UTILITY RELOCATION	$ 1,008,000	$ 556,000	$ 200,000	$ 36,000	$ 190,000
TOTAL	$ 6,274,000	$ 3,296,000	$ 3,607,000	$ 3,160,000	$ 2,208,000
MULTIPLIER	1.4	1.4	1.4	1.4	1.4
TOTAL	$ 8,783,600	$ 4,614,400	$ 5,049,800	$ 4,424,000	$ 3,091,200
RIGHT OF WAY	$ 1,344,120	$ 162,000	$ 24,000	$ 2,271,480	$ 3,971,000
GRAND TOTAL	$ 10,127,720	$ 4,776,400	$ 5,073,800	$ 6,695,480	$ 7,062,200

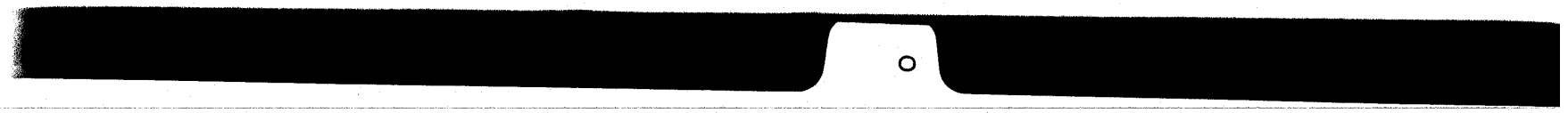


EXHIBIT O

DESCRIPTION OF TRAFFIC SIMULATION ANALYSIS

Traffic simulation analysis of the downtown Rochester street system was conducted using the program CORSIM. Pages 1 and 2 provide a brief introduction into the fundamental features of this program.

Page 3 contains an illustration of the section of the downtown street system that was studied in this evaluation. It essentially covered all intersections within 3-4 blocks of the rail corridor from TH 52 on the west to 2nd Ave NE (West Silver Lake Drive) on the east.

The purpose of this analysis was to identify the overall system level delay that the train traffic would create, including not only the delay at the rail crossing itself but also delay caused by queues forming and blocking traffic on side streets, which is not estimated in the traffic delay analysis conducted in the DEIS or reported in Exhibit J of this document. An example of the traffic delay this analysis is trying to capture is illustrated on page 4 of the exhibit. Page 5 briefly describes the methodology, while page 6 provides a sample printout illustrating how the non-crossing delay attributable to the blocking of a highway-rail crossing is calculated. This particular scenario is for the Year 2008 (assumed to be 1st Year of full 37 trains) with no grade separations constructed.

CORSIM--A State-of-the-Best Practice for Traffic Operation Analysis

Recognizing a strong demand for powerful tools to address complex issues on traffic operations and roadway design for integrated networks, including freeways and surface streets, FHWA has recently developed the first Windows-based version of a traffic simulation model. It's called CORSIM, and it integrates the existing NETSIM and FRESIM models. CORSIM is a microscopic, stochastic traffic simulation model that can realistically represent the real world dynamic traffic environment. CORSIM has the most sophisticated car-following and lane-changing logic to simulate vehicle movements on a second-by-second basis.

Each vehicle is moved based on dynamic interactions among roadway conditions, traffic control, positions of adjacent vehicles, vehicle characteristics, driver behaviors, etc. CORSIM produces a variety of measures of effectiveness for engineers to quantify traffic network performance. Furthermore, CORSIM produces animated graphics allowing the user to look and feel the simulation results and perform many more reviews of outputs in much less time. In turn, this enables the effective and efficient application of this powerful tool to a wider range of traffic engineering problems.

With these powerful features, CORSIM is capable of providing comprehensive simulation capabilities in (1) geometric design evaluation; (2) transit operation; (3) sign and signal control at intersections; (4) ramp metering control for freeways; (5) site impact analysis; (6) incident detection, management, and control; and (7) assessment of traffic system management strategies.

CORSIM (CORridor SIMulation) was developed in the mid-1970's through the Federal Highway Administration (FHWA). It serves as the microscopic simulation model of the TRAF system and is capable of modeling surface streets, freeways, and basic transit operations.

TSIS (Traffic Software Integrated Shell) provides an interface and environment for executing CORSIM. Once the CORSIM input files are simulated using TSIS, TRAFVU (TRAF Visualization Utility), which is a program within the TSIS environment, is provided to view the simulation animation.

Network Structure

The model's networks are based on a link-node representation. Each link represents a one-directional segment connecting a upstream and downstream node. Nodes represent link intersections and points of origins or destinations. Link curvature can be modeled in CORSIM by entering the curved length between two nodes (NETSIM) or by specifying the radius of curvature (FRESIM). Dummy nodes may be needed to accurately construct the geometric conditions of the roadway (e.g., S-shaped curves).

Traffic Generation/Distribution

Traffic volume may be entered in terms of hourly rates (NETSIM and FRESIM) or O-D demands (NETSIM) for up to 19 time periods, having a range of 10 second to 9,999 seconds. The input data for a certain time period are used until changes are implemented by a subsequent time period. Vehicles are generated using a uniform distribution.

Vehicle/Driver Classification

Traffic stream may consist of nine different types of vehicles having various operating and performance characteristics. Four different categories of vehicle fleets are available: private automobiles, trucks, mass transit, and carpool vehicles. The user can reserve lanes for buses and carpools, specifying the percentage of trucks and carpool vehicles on each link.

Travel Characteristics

As a vehicle enters the network, the vehicle and driver characteristics are randomly generated. As the vehicles move from one link to another, their turning movements on the new link are randomly assigned while satisfying the user-specified turning movement percentages.

Operating as an interval-based scanning model, each vehicle in the network is processed once every second. Vehicle motion is governed by a series of car-following, queue discharge, and lane-changing algorithms in response to the traffic control devices.

Route Selection/Traffic Assignment

Routing logic is based on link-specific turning movement volumes or percentages for NETSIM and FRESIM models. A traffic assignment model interfaces with the NETSIM and uses static traffic assignment techniques, along with equilibrium and optimization capabilities. The routing logic will convert the O-D tables into turning percentages and entry volumes for the NETSIM model.

Incident Simulation

Incidents may occur at any time, have any duration, and have a variety of severities. Incidents may be specified in terms of number of lanes blocked or volume constraints for the lane.

NETSIM: Short-term events are incidents, such as illegal parking, standing, and stopping occurring only on lane 1 (i.e., the rightmost lane). The user can not select the length and location of short-term and long-term events. NETSIM's logic assigns the event randomly throughout the desired link. Events of duration longer than 60 seconds must be specified as long-term events.

NETSIM: Long-term events consist of incidents, such as illegal parking, vehicle breakdowns, etc., having a duration of more than 60 seconds. Long-term events may be specified for any channelized or unchannelized lane, but not a turn-pocket lane. Also, the simulation logic permits only one event (whether short or long-term) on a link at any moment.

Traffic Control

Models yield signs, stop signs, and traffic signals. CORSIM is capable of simulating pretimed and actuated signals controllers allowing one signal plan to be implemented per simulation period. The program can simulate the Type 170 or NEMA controller logic accommodating up to eight-phases. Actuated controller operation may include semi-actuated, fully-actuated, and volume-density functions. Since CORSIM knows the position and time of each vehicle within the network and the location of the vehicle detectors, it realized when and where a "call" is placed. Therefore, CORSIM will accommodate the vehicle based on the input parameters of the signal control. Coordinated and uncoordinated signal operation may be used in the same network

Measures of Effectiveness

CORSIM provides a variety of numerical output that is link specific, aggregated for multiple links, and network wide. The user may specify time intervals for generating output reports. Some of the statistical output that is calculated include traffic volume, delay time, travel time, stopped delay, queue time, queue length, speed, fuel consumption, emission levels (hydrocarbons, carbon monoxide, and nitrous oxide).

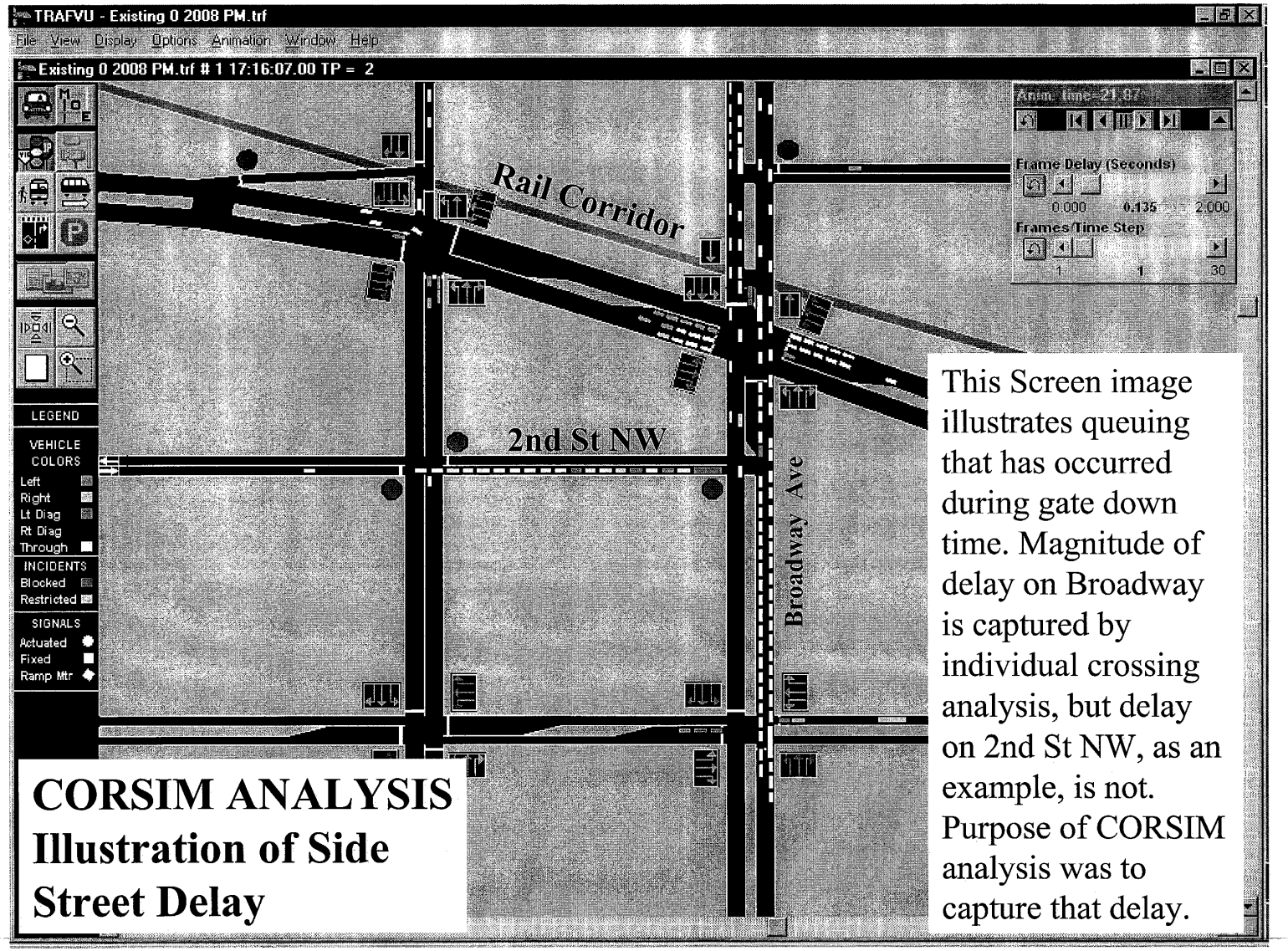
Taken From: ITT Industries Inc., Traffic Software Integrated System Version 4.32: User's Guide, Colorado Springs, CO, 1995-1999.

Oak Ridge National Laboratory, ITRAF Version 3.0: User's Guide, Oak Ridge, TN, 1999

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1
30
11th Ave NW
6th Ave NW
4th Ave NW
Broadway Ave
2nd Ave NE
7th St North
Rail Corridor
Civic Center Dr
LEGEND
SIGNALS
Actuated
Fixed
Ramp Mtr
CORSIM NETWORK
FOR SIMULATION
ANALYSIS

EXHIBIT O

PAGE 4



CORSIM ANALYSIS
Illustration of Side Street Delay

This Screen image illustrates queuing that has occurred during gate down time. Magnitude of delay on Broadway is captured by individual crossing analysis, but delay on 2nd St NW, as an example, is not. Purpose of CORSIM analysis was to capture that delay.

TRAFFIC SIMULATION ANALYSIS – DELAY CREATED BY TRAIN TRAFFIC ON NON-CROSSING STREETS

The methodology for determining the additional delay created by train traffic was as follows:

1. Identify total system delay for the Network with the train traffic present. (This is a single value for entire network)
2. Subtract the delay occurring at each of the Highway – Rail Crossings (this is the sum of delay values determined for each individual highway – rail crossing)
3. Subtract the background delay for the Network (this is the amount of delay the traffic simulation model calculates for the entire network assuming there is no train traffic.

Since the simulation model is run for a one hour period (PM Peak Hour and an Off-Peak models were run), the results are factored to a daily total using hourly trip distribution patterns and assumptions regarding train distribution patterns across the 24 hours of the day as illustrated on the following page.

Network Wide Vehicle Hours of Delay

	2000 PM Peak Hour	2008 PM Peak Hour	2008 Off Peak Hour	2025 PM Peak Hour	2025 Off Peak Hour
Total System Delay with Trains (#1)					
• No Improvements	352.57	511.18	229.58	927.51*	254.28
• 2 Grade Separations	*Not calculated*	491.61	209.87	880.93*	231.88
• 5 Grade Separations	*Not calculated*	*Not Available – Alternative Only Evaluated with Train Consist A*			
Background System Delay / No Trains (#3)					
• No Improvements	277.71	424.21	207.92	779.58	232.33

* Note: 2025 PM Peak Vehicle Hours of Delay for the No Improvement and 2 Grade Separation Scenarios were manually adjusted. Direct CORSIM results were unrealistic due to oversaturation of portions of the roadway network.

CALCULATION OF ANNUAL DELAY COSTS AT NON-RAIL CROSSINGS DUE TO TRAINS

SCENARIO: 2008 with No Grade Separations

Hour	% Daily Traffic Distrib.	Ratio of Hour to Reference Hour	Trains per Hour	2008 Peak Hr (System) Delay (Hrs) w/ Trains 511.18	2008 Peak Hr (System) Delay (Hrs) No Trains 424.21	2008 Off-Peak (System) Delay (Hrs) w/ Trains 229.58	2008 Off-Peak (System) Delay (Hrs) No Trains 207.92
1:00	0.5%	0.08	2			18	17
2:00	0.2%	0.03	1			4	3
3:00	0.2%	0.03	2			8	7
4:00	0.3%	0.05	2			12	11
5:00	1.0%	0.17	2			38	34
6:00	3.6%	0.59	1			67	61
7:00	6.7%	0.77	2	394	327		
8:00	5.1%	0.59	2	299	248		
9:00	4.9%	0.79	1			90	82
10:00	5.2%	0.83	2			190	172
11:00	6.1%	0.98	2			224	203
12:00	6.8%	1.10	1			126	114
13:00	6.2%	1.00	2			230	208
14:00	6.7%	1.08	2			247	224
15:00	7.4%	0.85	2	435	361		
16:00	8.2%	0.95	1	242	201		
17:00	8.7%	1.00	2	511	424		
18:00	5.9%	0.95	2			217	197
19:00	4.5%	0.72	2			165	150
20:00	3.9%	0.63	1			72	66
21:00	3.1%	0.50	2			115	104
22:00	2.4%	0.39	2			90	81
23:00	1.6%	0.25	1			29	26
24:00	0.7%	0.11	2			26	24
TOTAL	100.0%						
				1,881	1,561	1,969	1,783

SUMMARY

	TOTAL HOURS OF DAILY DELAY	TOTAL COST OF DAILY DELAY	TOTAL COST OF ANNUAL DELAY
TOTAL SYSTEM DELAY WITH TRAINS	3,850	$ 55,826	$ 20,320,840
TOTAL SYSTEM DELAY W/O TRAINS	3,344	$ 48,492	$ 17,651,060
TOTAL SYSTEM DELAY AT CROSSINGS	370	$ 5,364	$ 1,952,420
NON-CROSSING SYSTEM DELAY DUE TO TRAINS	136	$ 1,971	$ 717,359

[redacted]

[redacted]

EXHIBIT P

CALCULATION OF POLICE, FIRE AND AMBULANCE DELAY

This exhibit illustrates the final spreadsheet calculations used to estimate the number of police, fire and ambulance vehicles that would have been delayed if train traffic in 1998 had been at a level of 37 trains per day. Columns A through E report hourly traffic delay values by direction, which are taken from the Traffic Delay Analysis that Rochester completed, which is discussed in Exhibit J. Emergency response calls crossing the rail corridor are then distributed according to the hourly distribution of all calls for the year. This distribution % is reported in columns G and H on page 1 and column G on page 2.

The resulting number of calls that are estimated to have crossed the track each hour are then multiplied by the hourly delay factor to determine the number of calls which we estimate would have been delayed if there had be train traffic equal to 37 per day.

ESTIMATED NUMBER OF FIRE AND AMBULANCE EMERGENCY RESPONSE CALLS ANNUALLY IMPACTED*

**Calls with Lights and Sirens*

**Use of TH 52 and West Circle Drive accounted for in totals*

** Data for Ambulance from 1998 and for Fire calls from 1998-2000*

		Traffic Experiencing Delay by Hour (Composite of 11th, 6th, 4th, Broadway, 2nd Aves)			HOURLY DISTRIBUTION OF ALL CALLS		AMB CALLS CROSSING TRACKS 2501	FIRE CALLS CROSSING TRACKS 926	ESTIMATED % AMB CALLS IMPACTED	ESTIMATED % FIRE CALLS IMPACTED	FREQ OF AMB CALLS IMPACTED (DAYS)	FREQ OF FIRE CALLS IMPACTED (DAYS)
		NB	SB	Average	AMB CALLS	FIRE CALLS						
12:00 AM	1:00 AM	7.9%	7.8%	7.85%	4.00%	3.27%	100	30	8	2	*46*	*183*
1:00 AM	2:00 AM	9.0%	9.3%	9.15%	3.09%	3.01%	77	28	7	3	*52*	*122*
2:00 AM	3:00 AM	8.6%	9.5%	9.05%	2.40%	2.37%	60	22	5	2	*73*	*183*
3:00 AM	4:00 AM	7.3%	9.0%	8.15%	2.24%	1.95%	56	18	5	1	*73*	*365*
4:00 AM	5:00 AM	11.7%	11.2%	11.45%	1.60%	1.47%	40	14	5	2	*73*	*183*
5:00 AM	6:00 AM	8.5%	7.9%	8.20%	1.97%	1.98%	49	18	4	1	*91*	*365*
6:00 AM	7:00 AM	10.9%	12.5%	11.70%	2.59%	2.57%	65	24	8	3	*46*	*122*
7:00 AM	8:00 AM	10.6%	13.2%	11.90%	3.87%	3.82%	97	35	12	4	*30*	*91*
8:00 AM	9:00 AM	10.1%	10.5%	10.30%	4.44%	4.71%	111	44	11	5	*33*	*73*
9:00 AM	10:00 AM	10.2%	10.7%	10.45%	4.63%	4.57%	116	42	12	4	*30*	*91*
10:00 AM	11:00 AM	11.1%	10.7%	10.90%	4.68%	5.36%	117	50	13	5	*28*	*73*
11:00 AM	12:00 PM	11.0%	10.5%	10.75%	5.08%	4.87%	127	45	14	5	*26*	*73*
12:00 PM	1:00 PM	11.4%	11.1%	11.25%	5.19%	5.10%	130	47	15	5	*24*	*73*
1:00 PM	2:00 PM	11.3%	10.9%	11.10%	5.16%	5.52%	129	51	14	6	*26*	*61*
2:00 PM	3:00 PM	12.1%	11.2%	11.65%	5.48%	5.29%	137	49	16	6	*23*	*61*
3:00 PM	4:00 PM	12.3%	11.2%	11.75%	5.06%	5.54%	127	51	15	6	*24*	*61*
4:00 PM	5:00 PM	14.0%	11.2%	12.60%	5.35%	4.96%	134	46	17	6	*21*	*61*
5:00 PM	6:00 PM	15.4%	11.3%	13.35%	5.36%	5.77%	134	53	18	7	*20*	*52*
6:00 PM	7:00 PM	10.5%	10.0%	10.25%	4.79%	5.26%	120	49	12	5	*30*	*73*
7:00 PM	8:00 PM	10.7%	10.3%	10.50%	5.63%	5.70%	141	53	15	6	*24*	*61*
8:00 PM	9:00 PM	9.7%	9.2%	9.45%	4.62%	4.73%	116	44	11	4	*33*	*91*
9:00 PM	10:00 PM	10.3%	9.8%	10.05%	4.84%	4.64%	121	43	12	4	*30*	*91*
10:00 PM	11:00 PM	8.7%	8.6%	8.65%	4.14%	3.88%	104	36	9	3	*41*	*122*
11:00 PM	12:00 AM	9.8%	9.5%	9.65%	3.76%	3.65%	94	34	9	3	*41*	*122*
TOTALS				10.42%	100%	100%	2,502	926	267	98		
							3.5 HOURS	**9.5 HOURS**	Annual Totals *Overall*	365	**32.8 HOURS**	**89.4 HOURS**
							Overall Frequency of Crossing				*Frequency of Impacted Crossings*	

EXHIBIT P

	A	B	C	D	E	F	G	I	K	M	N
1	**ESTIMATE OF DELAY TO POLICE EMERGENCY RESPONSE CALLS CROSSING RAILROAD CORRIDOR**										
2	**Calls with Lights and Sirens*										
3											
4								TOTAL			
5			Traffic Experiencing Delay by Hour			TOTAL	HOURLY	POLICE	ESTIMATED		
6			*(Composite of 11th, 6th, 4th, Broadway, 2nd Aves)*			Priority	DISTRIBUTION	CALLS	POLICE	FREQ OF	
7						1&2 Calls	of All Police	CROSSING	CALLS	Police Calls	
8			NB	SB	Average	by Hour	CALLS	RAIL CORRIDOR 21000	DELAYED BY TRAIN	IMPACTED (DAYS)	
9	12:00 AM	1:00 AM	7.9%	7.8%	7.85%	2096	6.19%	1300	102	*4*	
10	1:00 AM	2:00 AM	9.0%	9.3%	9.15%	1932	5.70%	1198	110	*3*	
11	2:00 AM	3:00 AM	8.6%	9.5%	9.05%	996	2.94%	618	56	*7*	
12	3:00 AM	4:00 AM	7.3%	9.0%	8.15%	627	1.85%	389	32	*11*	
13	4:00 AM	5:00 AM	11.7%	11.2%	11.45%	455	1.34%	282	32	*11*	
14	5:00 AM	6:00 AM	8.5%	7.9%	8.20%	425	1.25%	263	22	*17*	
15	6:00 AM	7:00 AM	10.9%	12.5%	11.70%	439	1.30%	272	32	*11*	
16	7:00 AM	8:00 AM	10.6%	13.2%	11.90%	874	2.58%	542	64	*6*	
17	8:00 AM	9:00 AM	10.1%	10.5%	10.30%	1074	3.17%	666	69	*5*	
18	9:00 AM	10:00 AM	10.2%	10.7%	10.45%	995	2.94%	617	64	*6*	
19	10:00 AM	11:00 AM	11.1%	10.7%	10.90%	1094	3.23%	678	74	*5*	
20	11:00 AM	12:00 PM	11.0%	10.5%	10.75%	1138	3.36%	706	76	*5*	
21	12:00 PM	1:00 PM	11.4%	11.1%	11.25%	1110	3.28%	688	77	*5*	
22	1:00 PM	2:00 PM	11.3%	10.9%	11.10%	1206	3.56%	748	83	*4*	
23	2:00 PM	3:00 PM	12.1%	11.2%	11.65%	1329	3.92%	824	96	*4*	
24	3:00 PM	4:00 PM	12.3%	11.2%	11.75%	1496	4.42%	928	109	*3*	
25	4:00 PM	5:00 PM	14.0%	11.2%	12.60%	1599	4.72%	991	125	*3*	
26	5:00 PM	6:00 PM	15.4%	11.3%	13.35%	1619	4.78%	1004	134	*3*	
27	6:00 PM	7:00 PM	10.5%	10.0%	10.25%	1567	4.63%	972	100	*4*	
28	7:00 PM	8:00 PM	10.7%	10.3%	10.50%	1768	5.22%	1096	115	*3*	
29	8:00 PM	9:00 PM	9.7%	9.2%	9.45%	2342	6.91%	1452	137	*3*	
30	9:00 PM	10:00 PM	10.3%	9.8%	10.05%	2606	7.69%	1616	162	*2*	
31	10:00 PM	11:00 PM	8.7%	8.6%	8.65%	2639	7.79%	1636	142	*3*	
32	11:00 PM	12:00 AM	9.8%	9.5%	9.65%	2445	7.22%	1516	146	*3*	
33											
34		**TOTALS**			10.42%	33871	100%	21,002	2,159		
35								**0.4**		**4.1**	
36								**HOURS**		**HOURS**	
37								*Overall Frequency*		*Frequency of*	
38								*of Crossing*		*Crossings Impacted*	

[redacted]

[redacted]

EXHIBIT Q

SUCCESSFUL APPEALS OF PROPERTY VALUATIONS

This exhibit contains press reports on homeowners who successfully appealed to have their property valuations lowered for tax purposes as a result of the impact of train traffic on properties in New Jersey and Illinois.

Boston's Logan Airport and Others Should Compenstate Neighbors

PUBLICATION: Boston Globe
DATE: May 18, 1999
SECTION: Economy; Pg. E4
BYLINE: by Lester C. Thurow
DATELINE: Boston, Massachusetts
The Boston Globe printed an Opinion piece by an MIT management and economics professor Lester Thurow suggesting that political difficulties with expanding airports, or better yet developing high-speed rail, be solved the way they are in France: financial compensation. In France, residents receive monthly checks depending on how close they live to power plants to compensate them for the risks. Thurow suggests that we pay premiums for houses that have to be torn down, compensate for train noise, and get a real high-speed rail system underway.
The piece centers on air traffic congestion at Logan airport. The author acknowledges that a convenient, time-competitive infrastructure must exist for Boston business to boom, but says that real high-speed rail (nearly twice as fast as the coming 'tilt train' between New York and Boston), going from center city to center city, could happen if we compensated those that would be hurt by construction and operating noise. High-speed rail between Paris and London has gotten people off of airplanes, reducing air-traffic problems while supplying convenient transportation.
The author believes that even checks around $200 per affected family could make politically impossible projects possible. By carefully compensating for projects that were most urgent, and only in cases of major disturbances, this method could remain cost-effective and expedite many useful public works projects.

NJ Residents Win Tax Cuts in Fight to Reduce Rail Noise

PUBLICATION: The Record (Bergen County, NJ)
DATE: May 7, 1998
SECTION: News; Pg. L01
BYLINE: John Cichowski
DATELINE: Bergen County, New Jersey
ACTIVISTS, INDIVIDUALS, AND GROUPS MENTIONED: Robert Belz, resident; Robert Samson, resident; Philip Spillane, resident; John Lucente, resident; Gary Strano, resident
The Record reports New Jersey residents are fighting train noise by making tax appeals. With one resident's victory setting a precedent, others are following suit, seeking compensation for the noise they endure. Meanwhile Congress is considering a ban on whistle-blowing at crossings while seeking alternative safety measures.
According to the article, Robert Belz of Denville convinced the Morris County Board of Taxation to reduce his annual tax bill by $300. "All I did was give the tax board a schedule showing the number of trains has increased daily from 87 to 120 since Midtown Direct started in 1996,"Belz said of his 1997 appeal. "The board looked at comparable sales in the neighborhood and concluded that values were declining." Belz persuaded the board that increased traffic and noise caused by Midtown Direct service on the Morris and Essex line had reduced his home's taxable value 5 percent. "I'd gladly give the money back if NJ Transit's engineers would stop blowing their whistles at grade crossings," Belz said. Later this year, Congress could give Belz his wish when it considers a proposal to ban whistle-blowing at crossings.
The article reports that in light of Belz's victory, others who reside near the Midtown Direct commuter line and near upgraded rail yards are asking the tax board for relief. "When I complained about the noise at council meetings, I'd get ridiculed," said Robert Samson, who lives about 100 feet from the Mount Tabor rail station in Parsimony-Troy Hills. "Now we'll see who's ridiculous." Philip Spillane, who lives near Belz, said, "Maybe some tax appeals will get NJ Transit to listen to us." Spillane pointed to nails popping out of his plasterboard. "This used to be a quiet, electrified line, but now NJ Transit is using big diesel engines that send huge vibrations through the house," he said. "Several times a week, engineers blow their whistles much too loud. You wake up in the middle of the night catching your breath!" Ollie Hiller, a retired nurse, said she is moving after living two decades on Memory Lane, only 50 feet from the tracks. "I'm too old to appeal," Hiller said. "I'm recovering from an illness. My doctor says I must have quiet, but NJ Transit refuses to give me quiet." Eleven miles to the northeast, Riverdale residents near a new rail yard owned by the New York, Susquehanna & Western Railway also are appealing. "We're not moving," declared John Lucente. "We're fighting!"
The article notes the latest wave of homeowner resistance comes in response to a new era of rail expansion. Commuter lines are expanding to the suburbs, the freight business is booming, and new federal regulations are limiting state and local control. "In the past, a lot of tax appeals have focused on noisy auto traffic," said Edward Norwich, Bergen County's assistant tax administrator. "In the future, I'm sure we'll be hearing similar arguments about noisy trains."
According to the article, in response to residents' complaints, NJ Transit commissioned a noise study. It found that Midtown Direct engineers sometimes exceeded the 110-decibel maximum recommended by the Northeastern Operating Rules Advisory Committee, the agency that sets rail standards. But in far more cases, engineers touched lightly on their horns, well below NORAC's 96-decibel minimum. Ironically, the study resulted in more noise. NJ Transit spokesman Steve Coleman said it prompted management to direct engineers who blew too softly to blow louder, "in compliance with the rules." About the noise study, resident Kenneth Miller of Lackawanna Avenue, said, "Since then, the noise got worse." Miller's neighbor, Robert Stehr agreed, "The louder we complain, the louder NJ Transit blows the horns. Both men are seeking tax reductions at a hearing today.
The article states Denville, Parsippany, and Madison are among the last towns on the line with crossings where engineers are required to blow whistles. "With three exceptions, our towns are the only ones on the line with grade crossings in areas that aren't heavily industrial or agricultural," explained Belz, who is leading the Morris fight. "Complaints usually come from residential areas, where the noise knocks people out of bed." As a safety precaution, the advisory committee recommends four beeps of 96 decibels at crossings. The three exceptions are Montclair, Glen Ridge, and Bloomfield, where ordinances have banned nighttime

whistle-blowing. However, those bans may not be upheld for long. Since 1995, federal law transferred rail regulation from the Interstate Commerce Commission to the U.S. Surface Transportation Board, which has put limits on state and local authority over rail issues. "We observe local whistle bans only out of courtesy because they began when others owned our lines," Coleman said. "Our executive director is reviewing the issue right now." Stehr does not understand the logic of the grandfathered ban. "If a ban is safe in Montclair, why isn't it safe here?" he asked.

According to the article, there is little doubt that failure to blow whistles at crossings can lead to tragedy. Coleman cited a Florida study showing that accidents at crossings rose 84 percent after a statewide whistle-blowing ban was initiated. "Motorists are killed when they try to get around the crossing gates," he said. "We sympathize with people who are annoyed by the whistles, but our first mission is safety. Gates and whistles are two of the only strategies we have to keep motorists from taking foolish chances." But recently, Congress has called for additional strategies. In 1994, it directed the Federal Rail Administration to design workable rules for banning horns at grade crossings while still maintaining safety. Two of the most popular devices being considered would make it virtually impossible for cars to cross lanes to evade gates. One requires concrete dividers to separate traffic lanes for 200 feet leading to gates. A more expensive option calls for four gates instead of two, to block both lanes. FRA spokesman Jim Gower said his agency expects to submit formal proposals to Congress this year. Officials agree, however, that unless the government expands transportation aid to the states, the local cost of installing dividers or gates on each of the nation's 266,000 crossings would be enormous. National estimates approach $16 billion; New Jersey's costs could top $130 million.

The article goes on to note that removal of grade crossings and an FRA-inspired public education program have led to a sharp decrease in crossing accidents since 1990, state and federal officials said. New Jersey accidents dropped from 85 to 27 through 1997; fatalities averaged less than two per year. In Westfield, where residents are battling Conrail over increased rail traffic and whistle noise, the town has earmarked funds to build dividers. Neither Conrail nor NJ Transit, however, has agreed to stop blowing whistles at crossings until Congress approves alternative safety measures. "We've been fighting for years in Westfield," said community activist Gary Strano. "But the real battle is in Washington."

Lorain County Residents and Officials Express Concerns Over Increased Rail Traffic; Top Concerns Were Safety, Noise and Blocked Roads, and Officials Noted that Continued Complaints to Federal Government Was the Best Road to Change

PUBLICATION: The Plain Dealer
DATE: August 7, 1999
SECTION: Metro; Pg. 1B
BYLINE: Karen Henderson
DATELINE: Lorain County, Ohio

The Plain Dealer reports that residents and officials from several communities in Lorain County, Ohio gathered at a forum to discuss the problem of increased rail traffic. Residents were upset about noise from trains, but officials said that whistles shouldn't be quieted until safety can be improved: in part by building overpasses. Ohio Rail Development Commission officials suggested continued pressure on the transportation department to fight for the overpasses: an approach that worked in the Cleveland area.

The article reports that residents and officials from several communities in Lorain County, Ohio gathered at a forum to discuss the problem of increased rail traffic. Ohio Rail Development Commission (ORDC) officials said that overpasses would be one solution, although the transportation department doesn't have enough money to build all of the needed $8-million structures all at once.

The article noted that residents were upset about noise from trains, but officials said that whistles shouldn't be quieted until safety can be improved: in part by building overpasses that will reduce the chances of an automobile/train collision. Officials also worry that communities who are cut off by trains for hours at a time could experience a tragedy if emergency vehicles needed to get through and couldn't. Communities who can offer some funds to help build overpasses will stand a better chance of getting overpasses soon.

The article notes that ORDC officials suggested continued pressure -- from residents and elected officials -- on the transportation department to fight for the overpasses; Cleveland area residents led a successful campaign to freeze the amount of rail traffic in their area after Conrail was bought out last year. As it stands now, Lorain County may see even more rail traffic as time goes on.

Residents Along Florida's Tri-Rail Expansion Demand Protection from More Noise

PUBLICATION: Sun-Sentinel (Fort Lauderdale, FL)
DATE: April 14, 1998
SECTION: Local, Pg. 1B
BYLINE: Lisa J. Huriash
DATELINE: Deerfield Beach, Florida
ACTIVISTS, INDIVIDUALS, AND GROUPS MENTIONED: Regeanne Simard, resident; Michel Charron, resident

The Sun-Sentinel reports residents at a mobile-home community for seniors in Deerfield Beach, Florida, fear current noise and vibrations from trains and rail tracks are about to increase.

According to the Sun-Sentinel, Tri-Rail is building a second set of tracks just west of the existing tracks along a 67-mile corridor through Palm Beach, Broward and Miami-Dade counties. Double-tracking will allow two trains to go by at the same time. "It will tremendously increase our capacity," Tri-Rail spokeswoman Lauren Krugman said. "It will increase our train frequencies. We'll be able to run trains much more often than what we are now." But

airport is asking for the renewal of variances which allow it to exceed noise standards, and already has plans to spend $15 million to soundproof 150 homes and 900 apartments that are affected by aircraft noise.
The article reports that a new study shows that growth at Los Angeles' Van Nuys Airport has stimulated the local economy. While numbers of aircraft at the airport have dropped, an 8% increase in the number of corporate jets coming in has helped to generate "$1.23 billion in economic activity last year, up 30 percent from 1991, and supported more than 10,000 jobs."
The article also talks to residents, who say that the study did not take noise-induced property value reduction. One resident noted that although the study showed a healthy demand for business at the airport that would allow the elimination of noisy Stage 2 jets without hardship, Stage 2 jets already stationed at the airport will stay.
The article notes that the airport is asking for the renewal of variances which allow it to exceed noise standards. The Airport already has plans to spend $15 million to soundproof 150 homes and 900 apartments that are affected by aircraft noise.
Top

Cook County, Illinois Residents Living Near Midway Airport Appeal Property Taxes, Saying Airport Noise Lowers Property Values

PUBLICATION: Chicago Tribune
DATE: April 30, 1999
SECTION: SECTION: METRO CHICAGO; Pg. 2; ZONE: N
BYLINE: Karen Craven
DATELINE: Cook County, Illinois
The Chicago Tribune reports that about a dozen Cook County, Illinois residents living near Midway Airport are asking the County Board of Review to relieve some of their property tax burden, saying that airport noise lowers property values. Residents told of " jet fuel being dropped in swimming pools, levels of noise so high that phone conversations are not possible and windows that don't stop rattling," but the Board would not take action.
The article goes on, saying that residents claim the County assessor's office is not taking the problems associated with living near an airport when property values are set. Homeowners are having to sell their homes up to 23 percent below the assessed price because of airport noise. Commissioners claimed that home sales and new construction in the area are up, but residents countered that this is because of firefighters and police moving into the area.

Costly Noise Abatement Program Recommended by Consultants for Tulsa International Airport in Oklahoma

PUBLICATION: Tulsa World
DATE: June 19, 1998
BYLINE: D.R. Stewart
DATELINE: Tulsa, Oklahoma
Tulsa World reports that the noise consultant for Tulsa International Airport - Barnard Dunkelberg & Co.,- has recommended a five-year $20 million noise abatement program that includes purchases of easement rights, sound insulation and property buyouts for about 1,000 residents of neighborhoods. The consultant also advised Tulsa Airport Authority trustees to alter takeoff and landing procedures so that low-level aircraft flights over residential areas are minimized.
The article stated that trustees believe noise mitigation measures are Tulsa's best bet to settle contentious noise problems that have plagued airport-area residents for more than a decade.
The trustees adopted a new transport landing fee of $2.79 per thousand pounds gross landing weight last month. The consultant's recommended program targets reducing airport noise for the estimated 1,000 residents who live within the 24-hour-average 65-decibel noise contour. Under Federal Aviation Administration guidelines, homes experiencing noise levels of 65 decibels or higher qualify for federal buyout assistance or sound insulation programs.
According to the article, some residents are stating the only solution is a comprehensive property buyout. Dunkelberg is quoted saying, "If you're going to purchase the entire neighborhood -- 1,600 to 1,800 homes -- the cost would be $70,000 to $90,000 per home because under that scenario, you would have relocation costs. At $90,000 per home, you're looking at a property buyout of $180 million that would take 20 to 40 years."

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R

[redacted]

EXHIBIT R

RESEARCH ON THE CUMULATIVE IMPACT OF NOISE AND VIBRATION

This exhibit contains two research articles for the Journal of Sound and Vibration reporting on the impact of simultaneous exposure to noise and vibration in residential settings.

Journal of Sound and Vibration (1997) **205**(4), 555–560

EFFECTS OF EXPOSURE TO RAILWAY NOISE—A COMPARISON BETWEEN AREAS WITH AND WITHOUT VIBRATION

E. ÖHRSTRÖM

Department of Environmental Medicine, Göteborg University, Medicinaregatan 16, *S*-413 90 *Göteborg, Sweden*

(*Received* 3 *March* 1997)

This paper presents some of the results of field investigations on effects of exposure to noise and vibration from railway traffic. Effects on annoyance, sleep disturbances and psycho-social well-being as well as disturbance of different activities were evaluated by a postal questionnaire. Fifteen different sites located near railway lines in Sweden were investigated. The study covered areas with different number of trains per 24 hours in areas with strong vibration caused by the railway traffic exceeding 2 mm/s as measured in the buildings as well as areas without vibration, or vibration weaker than 1 mm/s. 2833 persons between 18 and 75 years of age participated in the study. This paper presents only the results from two areas with and without vibration and a high number of trains per 24 hours. The results show that railway noise is experienced as more annoying in areas where there is simultaneous exposure to vibration from railway traffic. Disturbance of communication was the most frequently mentioned annoyance reaction, outside and inside the dwelling. To ensure an acceptable environmental quality where less than 5% of the exposed population is rather or very annoyed by railway noise, these noise levels must be below 80 L_{Amax} and below 55 L_{Aeq} in areas without vibration. In areas with simultaneous exposure to strong vibration, action against vibration or a longer distance between houses and the railway line is needed, corresponding to a 10 dB(A) lower noise level than in areas without vibration.

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1. BACKGROUND AND AIM

A majority of the studies reported in the literature show that railway noise causes less general annoyance (4–15 dB) than road traffic noise [1]. In Sweden, railway noise is a minor problem as compared to road traffic noise [2, 3]. About 350 000 people are exposed to noise levels from railway traffic exceeding 55 dB(A) L_{Aeq}, whereas about 1 600 000 people are exposed to similar noise levels from road traffic. For road traffic, the recommended guideline value for dwellings is 55 dB(A) L_{Aeq} (outside level). For indoor levels, 30 dB(A) L_{Aeq} per 24 hours and 45 L_{Amax} during night time are recommended. There are at present no guideline values for railway noise in Sweden but, as new railway lines are planned and railway traffic is increasing, there is an urgent need for guideline values.

A study involving a number of investigations in different areas with and without vibration was designed to elucidate different effects of noise and vibration from railway traffic as a basis for Swedish guideline values.

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2. METHOD AND MATERIALS

2.1. DESIGN OF THE STUDY

In the first phase, and as a basis for the design of the study, an inventory of the Swedish railway lines was performed. Parameters of interest were the extent of vibration in buildings caused by railway traffic, total number of trains per 24 hours and proportion of freight trains. The following parameters were included in the design of the study: vibration level (< 1 mm/s, > 2 mm/s) and number of trains (less than 25 trains to over 150 trains per 24 hours). In a second phase, all cities and suburbs located near railway lines with low, medium or high number of trains per 24 hours and having more than 1000 inhabitants were identified in areas with and without vibration. In a third phase, before the final selection of areas, site visits were made at each area. In total, 15 cities or urban areas were selected for the investigation. The sites were located between ten and about 300 m from the railway line.

2.1.1. *Noise exposure*

Noise levels were calculated according to the Nordic calculation model for railway noise. The levels were calculated in 5 dB(A) intervals for L_{Amax} and L_{Aeq}. In some of the areas, control measurements were made at different distances from the railway line.

2.1.2. *Vibration*

The aim was *not* to study vibration in detail, but vibration levels in the buildings had previously been measured in some of the areas classified as areas with strong vibration. Vibration level is expressed in mm/s [mean maximum level not frequency weighted]. The vibration level varies with type of house, distance from the railway line and with speed and weight of the trains. The distance between each house and the railway line was therefore measured on the map and questions about the construction of the dwelling were included in the questionnaire.

Table 1 shows the design of the study and the noise levels in areas with and without vibration. Most categories of area include at least three different sites. Each category of area is named after the first (underlined) site: Huskvarna, Hässleholm and Lund (without vibration) and Säffle, Kungsbacka and Partille (with vibration). The number of freight trains is written in brackets. Only results from the two areas Lund and Partille are presented in the following.

TABLE 1

Design, sites and noise exposure

	< 25 trains/24 h	25–75 trains/24 h	76–100 trains/24 h	> 100 trains/24 h
		Vibration < 1 mm/s		
Site		Huskvarna Tenhult, Forserum	Hässleholm Sösdala, Höör	Lund, Stångby Örtofta, Eslöv
Number		48 [19]	85 [39]	143 [44]
L_{Amax}		70–95	70–95	65–95
L_{Aeq}		40–70	45–70	40–70
		Vibration > 2 mm/s		
Sites	Säffle, Grums Vålberg	Kungsbacka		Partille
Number	20 [9]	59 [25]		160 [53]
L_{max}	70–90	70–95		70–95
L_{Aeq}	40–65	45–65		45–75

2.1.3. *Evaluation of effects*

The effects were evaluated by a postal questionnaire similar to the one previously used in studies on road traffic noise. The questionnaires were sent together with an introductory letter to one person in each household between 18 and 75 years of age who had lived in the area for at least one year. The main questionnaire was designed in such a way as to conceal the real object of the enquiry. It contained questions about the dwelling and the neighbourhood, annoyance related to different sources in the neighbourhood (noise, dust, exhausts, vibration etc.), work environment, sleep and sleep disturbances and questions on health and general well-being. General annoyance was evaluated by a five-point verbal category scale: 0 = "do not observe", 1 = "observe, but is not annoyed", 2 = "not very annoyed", 3 = "rather annoyed" and 4 = "very annoyed". The questionnaire also contained questions on different parameters that are known to act as modifiers of annoyance such as noise sensitivity, position of bedroom windows and construction of the house.

Those who responded that they were "rather" or "very" annoyed by noise or vibration from railway traffic received a second questionnaire with specific questions on disturbance of different activities.

3. RESULTS

The results from the two areas with the highest number of trains, Partille with vibration and Lund without vibration, are presented here. The response rate for the main questionnaire in the two areas was 72 and 77%, respectively, or 390 (Partille) and 553 (Lund) respondents. The response rate for the second questionnaire on activity disturbances was 90% in both areas.

Socio-demographic factors such as age, time of residence, employment rate, noise sensitivity and general health were similar in the two areas. A majority of respondents lived in villas or terraced houses. Most respondents were very satisfied with their dwelling and their neighbourhood, and perceived environmental quality was high in both areas.

3.1. GENERAL ANNOYANCE TO RAILWAY NOISE

Table 2 illustrates annoyance to railway noise at different L_{Amax} levels. It shows that, at similar noise levels, the average mean annoyance reaction as well as the percentage of rather + very annoyed respondents was much higher in the area with strong vibration (e.g., 22% higher at levels between 81 and 85 L_{Amax}) and 29% higher at levels between 66 and 70 L_{Aeq} (see Table 3).

TABLE 2

Annoyance to railway noise at different L_{Amax} levels

	70–75 L_{Amax} Annoyance		76–80 L_{Amax} Annoyance		81–85 L_{Amax} Annoyance		86–90 L_{Amax} Annoyance		91–95 L_{Amax} Annoyance	
L_{Amax}	Mean	rather +very	Mean	rather +very	Mean	rather +very	Mean	rather +very	Mean	rather +very
Partille (vibration)	1·10	8·1	1·35	10·7	1·77	29·6	2·58	53·3	2·88	60·6
Lund (no vibration)	0·83	0	1·01	2·7	1·23	7·2	1·71	18·0	2·03	34·3

TABLE 3

Annoyance to railway noise at different L_{Aeq} levels

	46–50 L_{Aeq} Annoyance		51–55 L_{Aeq} Annoyance		56–60 L_{Aeq} Annoyance		61–65 L_{Aeq} Annoyance		66–70 L_{Aeq} Annoyance	
L_{Aeq}	Mean	rather +very	Mean	rather +very	Mean	rather +very	Mean	rather +very	Mean	rather +very
Partille (vibration)	0·93	0	1·26	12·4	1·26	9·6	1·99	34·7	2·71	61·3
Lund (no vibration)	0·81	0	1·03	3·2	1·18	6·7	1·80	19·1	1·94	32·3

The mean average annoyance reaction was better correlated with the different noise measures than the percentage of rather + very annoyed or the percentage of very annoyed respondents. (Vibration area: L_{Amax}, 0·98, 0·97 and 0·93, respectively, and L_{Aeq}, 0·97, 0·96 and 0·91, respectively. Areas without vibration: L_{Amax}, 0·99, 0·91 and 0·88, respectively, and L_{Aeq}, 0·98, 0·92 and 0·88, respectively.)

3.1.1. *Comparisons between annoyance to nosie and vibration*

Figure 1 shows comparisons between annoyance to noise and vibration respectively at different distances from the railway line. The figure shows that the average annoyance reaction was higher for vibration than for noise up to about 200 m from the railway line.

The location of the bedroom has a significant effect $p < 0.001$ on general annoyance. This is shown in Table 4. The table shows that respondents who lived in apartments with bedroom windows facing the railway line were more annoyed by noise than those having bedroom windows not facing the railway. About 40% of those who were exposed to outside noise levels about 80 L_{Amax} and had bedroom windows facing the railway seldom or never slept with open windows as opposed to 20% among in the group with windows *not* facing the railway.

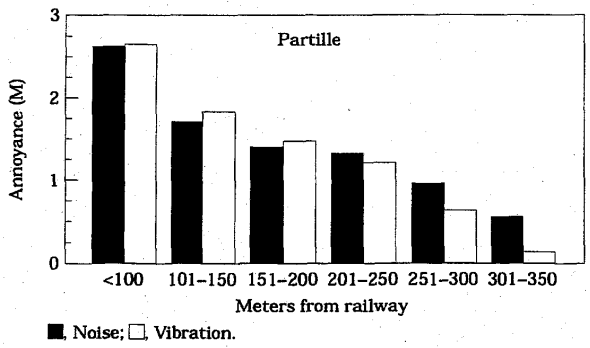


Figure 1. Annoyance to noise and vibration at different distances from the railway line. ■, Noise; □, Vibration.

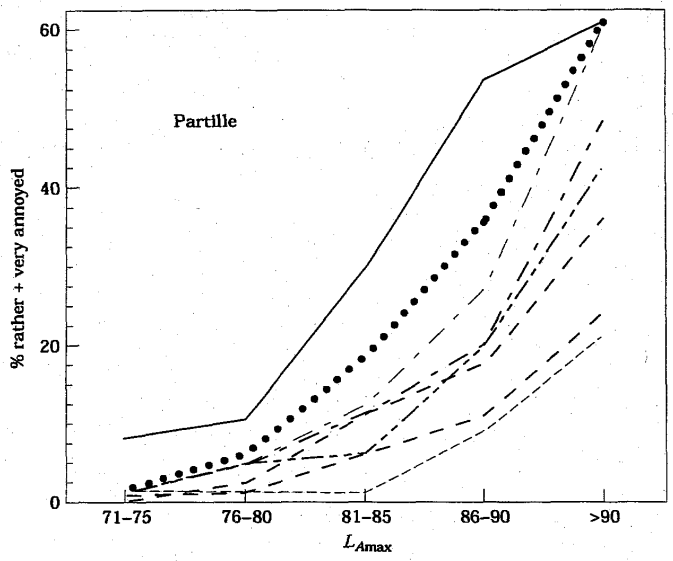


Figure 2. Percentage of respondents who reported that they were rather or very annoyed by railway traffic during different activities in areas without vibration. ——, annoyance; • • •, outdoor speech; — — —, radio/tv; — — —, outdoor relaxation; — · — ·—, indoor relaxation; – – –, indoor speech; — — —, awakenings; ...., fall sleep.

3.2. ACTIVITY DISTURBANCE

Disturbance of different activities was evaluated by the second questionnaire sent to respondents who had reported in the main questionnaire that they were rather or very annoyed by noise or vibration from railway traffic. The results showed that 98% in the vibration area and 89% in the area without vibration were annoyed by railway traffic every day or at sometime during the week. About half of the respondents were more annoyed during specific times of the year, mostly during summer. Annoyance reactions were also more frequent during evenings and night-time.

The response pattern of general annoyance and activity disturbances outdoors and indoors due to noise and vibration from railway traffic is shown in Figure 2 for the area with vibration. The result is calculated as percentage of the total number of respondents on the main questionnaire. The figure shows that disturbance during communication

TABLE 4

Annoyance to noise in relation to outdoor noise level and location of bedroom windows

	Partille (Vibration >2 mm/s) Annoyance (mean value)				Lund (vibration < 1 mm/s) Annoyance (mean value)			
	n	Facing railway	*n*	Not facing railway	*n*	Facing railway	*n*	Not facing railway
$>80\ L_{Amax}$	28	3·0	131	2·06	84	1·89	168	1·29
$<80\ L_{Amax}$	24	2·0	207	1·10	23	1·30	276	0·84

outdoors was mentioned frequently, followed by radio/TV, relaxation outdoors and relaxation indoors. Sleep disturbance effects were less frequently mentioned. There was a strong increase in disturbance at noise levels higher than 81–85 L_{Amax}. This was also the case in areas without vibration.

4. CONCLUSIONS

The results on general annoyance and activity disturbances in this study show that railway noise is experienced as more annoying in areas where there is simultaneous exposure to vibration from trains. This may be caused by difficulties the individual has in differentiating between noise and vibration, which leads to exacerbation of annoyance from noise. Vibration may also make habituation to noise more difficult. In the area with vibration >2 mm/s, vibration was generally experienced as at least as annoying as noise up to about 200 m from the railway line.

To ensure an acceptable environmental quality where less than 5% of the exposed population is rather or very annoyed by railway noise, these noise levels must be below 80 L_{Amax} and below 55 L_{Aeq} dB(A), respectively, in areas without vibration. In areas with simultaneous exposure to strong vibration, action against vibration or a longer distance between houses and railway line is needed, corresponding to a 10 dB(A) lower noise level than in areas without vibration.

The results indicate that annoyance from noise from railways can be prevented/reduced if bedrooms are located in the quieter side of the house.

Interference with speech and communication is the dominating reaction to railway traffic. It is thus important to take measures against these effects especially for dwellings and schools.

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EFFECTS OF COMBINED NOISE AND VIBRATION ON ANNOYANCE

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Four experiments were conducted to investigate the combined effects of noise and vibration on rated intensity and annoyance. Four levels of vibration and noise (none, low, medium and strong) were presented to subjects, in every possible combination. These levels were chosen according to those which were measured in the flats where the stimuli were recorded. The background noise was low to simulate the appropriate noise level. Each experiment was carried out with different subjects. Two signals with different characteristic time histories were investigated, a passing tram and a hammermill. The intensity and annoyance were measured on graphic scales ranging from 0 to 9. The results show that vibration influences the evaluation of noise annoyance, especially if one asks for the total annoyance. The assessment of the combined stimuli is dominated by the noise level, but it is also influenced by the simultaneously perceptible vibration. All of these results were highly significant. On the other hand, only the assessment of the vibration caused by the tram is significantly influenced by a simultaneous noise level ranging up to 60 dB(A). According to these experiments, the gradient for the subjective equivalence of noise and vibration is only half as high as that estimated by Howarth and Griffin in similar investigations for higher noise levels and higher magnitudes of vibration.

1. INTRODUCTION

If heavy machines or vehicles cause noise, they often emit vibration as well. This adds a new modality to the perception of the environment and leads to a total disturbance in residential flats, which varies due to subjective and objective parameters.

The effects of emissions on human beings do not have to be monosensoric. Nevertheless, the norms, guidelines and development of protection measures are based on this premise. In Germany the indoor noise level (L_{eq}) in living rooms should not exceed 40 dB(A) (or 30 dB(A) in bedrooms at night) [1]. Even if this limit is not exceeded, the subjective total annoyance may be considerable because of simultaneous vibration. The combined effects of both stimuli can be an explanation for this phenomenon. The interaction (intensification, masking) of the stimuli—vibration and noise—is the subject of this examination.

The effects of noise and vibration have often been examined separately. Especially during the examination of the perception threshold of vibration, authors have been confronted with the modifying effects of noise. Richter *et al.* [2], for example, came to the conclusion that the perception threshold shifted under the influence of strong noise.

Previous studies concerned with simultaneous noise and vibration have mainly dealt with the effect of one stimulus on the other. Artificial stimuli (sine, random noise) have often been the subject of these investigations. Only a few studies have been concerned with

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combined effects of environmental stimuli. Howarth and Griffin [3] reported a laborat study on the combined effects caused by simultaneous noise and vibration from railw Twenty-four subjects were exposed to stimuli recorded in a flat near the railway. In th sessions the subjects were asked for the annoyance caused by vibration, noise and combination of both stimuli. The subjects had to indicate the annoyance by the meth of magnitude estimation. The noise was presented via loudspeakers, and the vibrat stimuli were induced via a seat. The feet of the subjects were positioned on a solid footr while their backs leant against a stationary backrest. The six levels of noise varied fr 54 dB(A) to 79 dB(A), while the six magnitudes of vibration ranged from 0·02 0·125 m/s^2. The background noise level of the laboratory was 42 dB(A). The evaluati of vibration in the presence of high noise levels decreased when the vibration magnitu was small, but increased when the vibration magnitude was large. The assessment of noi however, was not significantly influenced by the vibration. Finally, the total annoyance noise and vibration was intensified whenever one of the stimuli levels—noise or vibration was increased.

Howarth and Griffin [4] conducted a further study to investigate the annoyance caus by simultaneous vibration and noise, varying not only the intensity, but the duration a the frequency spectrum of the stimuli as well. These various influences were taken in account to predict the subjective response caused by combined stimuli. The results of t study proved that the consideration of both stimuli was more suitable for predicting t effect than the consideration of just one stimulus.

In a different study on the combined effects of vibration and noise, Meloni a Krüger [5] did not find a significant influence of one stimulus on the evaluation of t other. Both stimuli had an influence on the evaluation of the overall stimulus. T apparatus of this experiment differed from that of the Howarth and Griffin experimen The subjects sat on a chair which was attached to a vibrator table, so that the vibratio were perceived through the seat, feet and back. Noise was presented via headphones. T stimulus was a passing tram, recorded in a house (situated 5 m from the rails). T background noise level in the laboratory was 42 dB(A). The stimuli were presented the subjects at four levels of noise (including no noise, 52, 62 and 72 dB(A)) a four magnitudes of vibration (including no vibration, 1/2, 1/1 and 2/1 of the origin signal).

In all of these investigations noise levels higher than 50 dB(A) were used. If the noi is decreased, e.g., through noise protection measures, one would expect to find th perception of vibration to be increased in the presence of low noise levels. This would lea to an intensified response to the overall stimulus. According to this, the noise annoyan did not decrease because of the intensified annoyance caused by vibration.

In order to determine the effects of vibration and noise on the total annoyanc experiments dealing with noise levels between 33 and 60 dB(A) and vibration in the rang of the perception threshold were conducted. A further goal of the experiments was t predict the subjective response to the overall stimulus in real housing conditions by mean of dose–response relations.

On the assumption that the respective line of questioning might influence the evaluatio of the stimuli, our experiments were conducted with inexperienced subjects. The phrasin of the questions was very specific and aimed at the vibration or the noise or the situatio (without mentioning special aspects exactly for single components) to prove that the lin of questioning influences the evaluation of modalities.

Furthermore, the influence of the quality of stimuli (duration and frequency spectrum on total annoyance was investigated by using the emission of a passing tram and that o a hammermill, both recorded in a nearby flat.

2. METHODS

During the investigation of combined effects of environmental stimuli, e.g., vibration and noise, the reproduction of these stimuli in the laboratory should be as "natural" as possible. Even being in the laboratory, the subjects should have the impression of sitting in their living room.

Since this study dealt with the effects of short-time stimuli, the duration of the stimuli was limited to 16 s, which corresponded to the actual duration of the passing of the tram. Every combination of the four levels (no stimulus, low, medium and strong stimulus) of noise and vibration was presented in a single session of 20 minutes.

Combined noise and vibration stimuli occur in different levels and time histories. In order to consider this ecological aspect two different sources were investigated. A passing tram was chosen as a stimulus representing traffic, whereas the emission of a hammermill represented the "industry" stressor. The classes of stimuli levels were determined due to the original measured signal. The medium level represented the original signal, whereas the "low" level stimulus was just perceptible and the "strong" level stimulus was clearly perceptible (see Table 1). Furthermore, only the volume of the stimuli was varied; additional filters which might have simulated distance or insulation were not used. The standard was the average value which was measured during the stimuli exposure duration; i.e., the L_{Aeq} of noise and the average of the vibration velocity (r.m.s.). The values of the L_{Aeq} and the r.m.s. of the velocity for both sources (tram and hammermill) were equally adjusted to the same level. The velocity of the vibration was chosen for the description of the vibration magnitude, since this investigation was part of an EC project. In this project the vibration velocity was chosen as a neutral standard, not dependent on national assessments. Due to the frequency spectrum of the used signals, the r.m.s. scale and the KB scale [6, 7] (the latter is usually used in Germany) resulted in the same numerical values. Therefore the dimension "mm/s", used in this paper, can be exchanged for "KB".

2.1. STIMULI

Both stimuli used in this experiment have different time histories. A passing tram was chosen as an example of a stimulus which is clearly temporally limited (see Figures 1 and 3).

TABLE 1

Stimuli matrix (targets and measured values, $n = 320$)

	Level 0, none	Level 1, low	Level 2, medium	Level 3, strong
Target v (mm/s)	—	0·05	0·11	0·32
Tram				
Mean	0·03	0·05	0·12	0·31
Standard deviation	0·009	0·007	0·006	0·015
Hammermill				
Mean	0·03	0·05	0·12	0·33
Standard deviation	0·009	0·009	0·014	0·035
Target L_{eq} (dB(A))	—	34·0	45·0	60·0
Tram				
Mean	32·5	33·4	45·4	59·9
Standard deviation	3·6	2·6	1·3	0·7
Hammermill				
Mean	31·0	33·4	45·0	60·1
Standard deviation	1·8	1·1	0·2	0·4

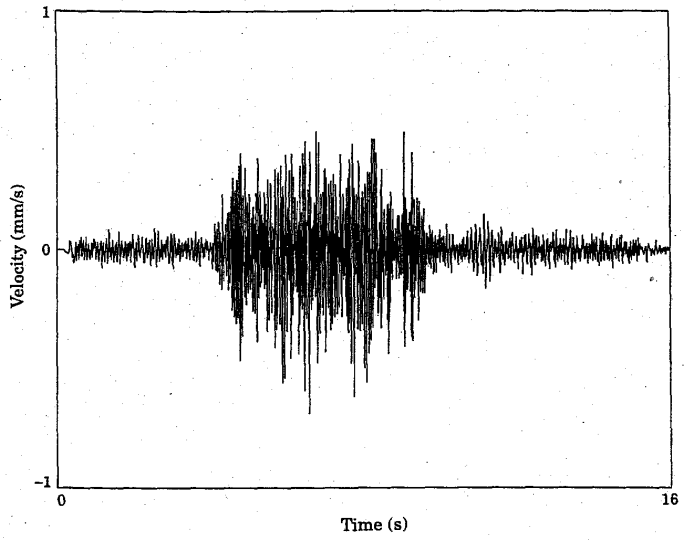


Figure 1. The velocity time history of vibration stimulus "tram".

On the other hand, the industrial stimulus describes a part of a homogeneous load cau by an irregular series of single impulses (see Figures 5 and 7).

The tram stimulus was recorded in a flat on the first floor. The tram passed about away from the buiilding, and had been decelerating due to a stop. In Figures 1–4 are sh the time history and the spectrum of the vibration and noise stimuli, as they were measu in the laboratory.

The hammermill stimulus was also recorded on the first floor of a two-st building. The building was located in front of a factory, where several drop hammers w operating irregularly. The average time between the clangs was approximately 1 s Figures 5–8).

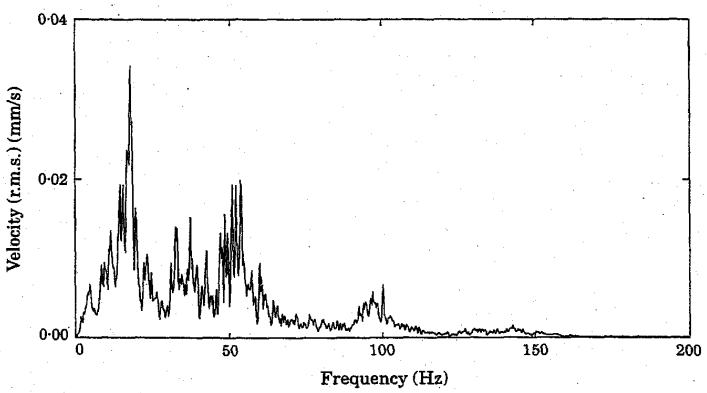


Figure 2. The velocity power spectrum of vibration stimulus "tram".

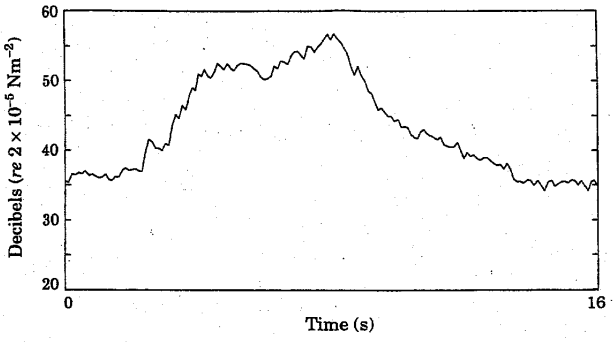


Figure 3. The sound pressure level time history of noise stimulus "tram".

In both cases the stimuli were recorded in the living room, where the sources could be seen from the window. Noise magnitude and vibration velocity were measured in the middle of the room and recorded synchronously.

2.2. APPARATUS

A chamber of 10·2 m^2 size had been built in the laboratory to exclude as many of the surroundings' disturbing influences as possible. Since the noise was presented via loudspeakers, the influence of the room on the reproduction of the noise had to be kept at a minimum. Therefore the interior of the room had been lined with sound-absorbing plates and the floor had been carpeted. The room had no windows and was ventilated by the central ventilation of the house, which was switched off during the experiments. The background noise was below 30 dB(A).

The aim of the experiments was to investigate the effect of vibrations on the z-axis of sitting persons. For that purpose a vibrator table giving the subjects the impression that the floor was the source of the vibration had been constructed: an electrodynamic vibrator (Ling Dynamic Systems V 406), moving a weight of 500 g, was set on the middle of a rectangular plate (0·85 × 1·1 m^2). The vibration resulted from the reaction of the plate to

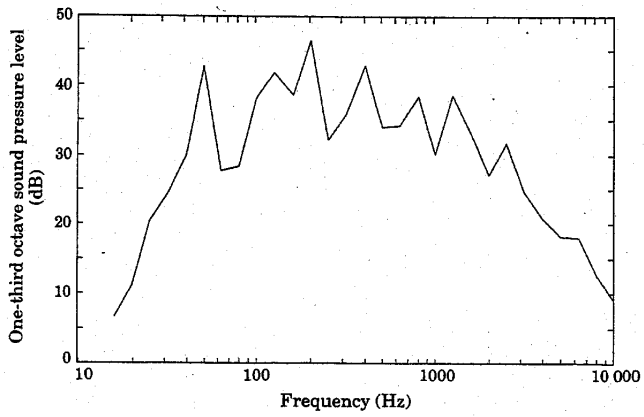


Figure 4. The spectrum of noise stimulus "tram", one-third octave bands.

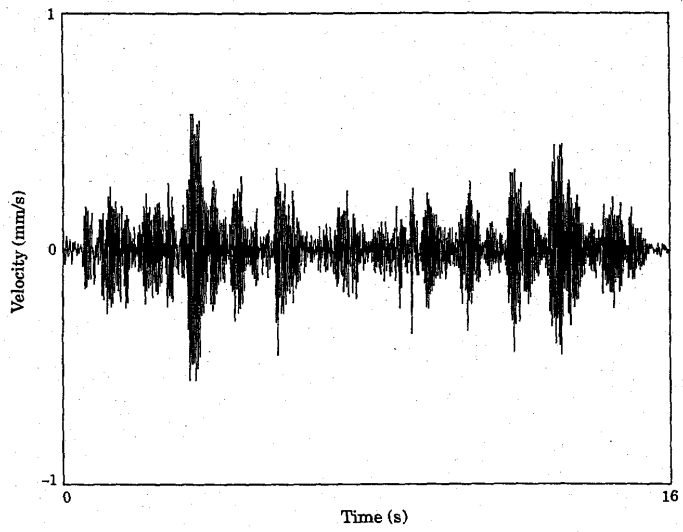


Figure 5. The velocity time history of vibration stimulus "hammermill".

the movements of the shaker. The plate consisted of a multi-layered beech–plywood p
a steel plate and a rubber plate placed in between.

Four rubber pieces were used to reduce the contact to the floor; lateral movements v
not perceptible. This was necessary, since the aim of these experiments was to investi
the vibration of the z-axis. Moreover, the reduction of the lateral movements sh

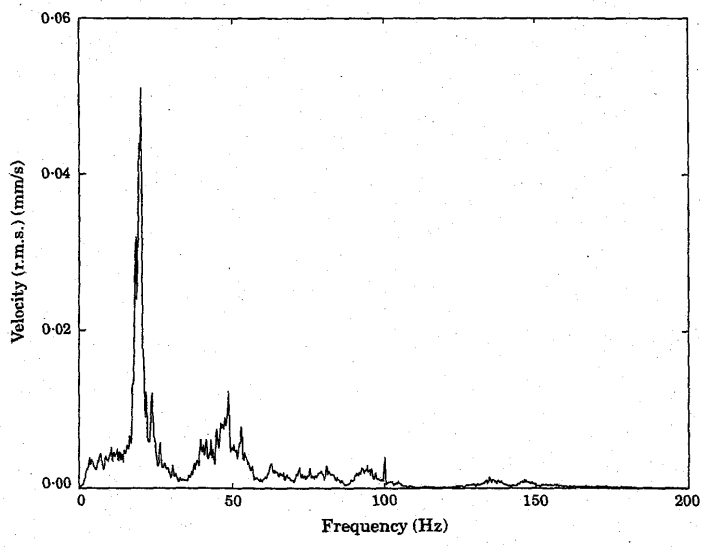


Figure 6. The velocity power spectrum of vibration stimulus "hammermill".

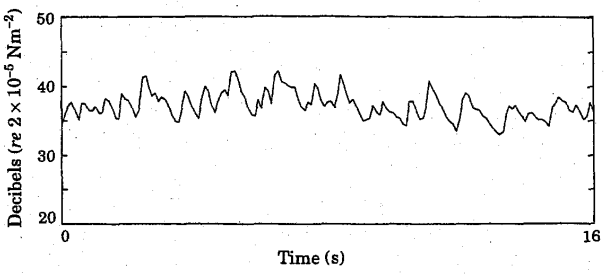


Figure 7. The sound pressure level time history of noise stimulus "hammermill".

prevent the subjects from being irritated by a "swaying" movement of the vibrator table when entering the plate.

A chair was firmly attached to the vibrator table. The frame of the chair was made of steel tubes, whereas the seat was made of wood. The steel tube frame and the arm-rests were strengthened with additional braces to make the chair as solid as possible.

On account of this construction, the vibration was transmitted to the body by various contact areas: i.e., feet, seat/thighs and forearms. The way in which the vibrations occurring at these points compared to the measuring point used in the experiments was checked by means of white noise. Series of measurements on the different contact areas were conducted with several subjects. The results of the velocity (r.m.s.) for the different contact areas corresponded to the measuring point—except for minimal deviations (underestimation < 6 dB)—in a frequency range of 10–50 Hz. The amount of energy of most of the signals used in the experiments falls into this range. For higher frequencies within the relevant range an underestimation at the standard measuring point of up to five times is possible.

During the experiments the subjects were instructed how to sit and where to place their feet to secure constant transmission of the vibration.

The noise and vibration sources (loudspeakers and shaker) in the laboratory were controlled by a microcomputer and a digital attenuator with an appropriate booster. The

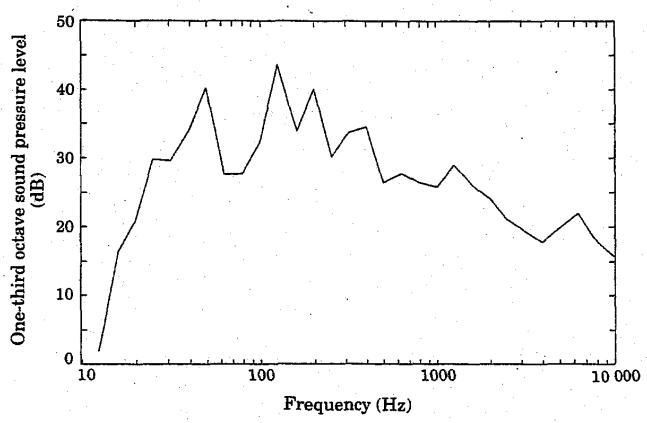


Figure 8. The spectrum of noise stimulus "hammermill", one-third octave bands.

signals, pre-processed by filters to compensate the sounding-frequency of the vibrat table, were recorded on a PCM tape at 1 minute intervals.

In order to control the physical data, noise and vibration were measured during tl presentation of the stimuli. The measuring point for the vibrations was between the fro legs of the chair. Noise was measured next to the left ear. The automatically measure values (velocity (r.m.s.) and L_{Aeq}) were stored by the computer.

2.3. SUBJECTIVE PARAMETERS

The subjects rated the intensity and the annoyance of the stimuli by scales ranging fro 0 (not perceptible/not at all disturbing) to 9 (extremely strong/unbearable disturbing). Tl stimuli were announced as "environmental stimuli" and there was no reference stimulu Moreover, the subjects were not given any information about the stimuli magnitude

After each presentation of a stimulus there was a break of 35 s to give the subjects tl opportunity to evaluate the stimulus. For that purpose a keyboard was positioned ne the arm-rest. There were three scales on this keyboard. The first scale, asking for tl perception of the stimulus, offered the two categories "YES/NO". The other scales range from 0 to 9, asking for the intensity and the annoyance caused by the stimulus. Visu feedback of the response was given by a red light above each key; all of the lights we lit up to the pressed key. The subjects were able to correct their answers at any time durir the response period, and then the responses were accumulated and the indication w cleared.

Three additional lights ("stimulus", "answer" and "five seconds left to answer") we positioned on the keyboard, to inform the subjects about the stage of the experimen

2.4. DESCRIPTION OF THE EXPERIMENTS

Four experiments were conducted to investigate the effects of the following factors: (the vibration of a tram (three sessions), (2) the vibration of a hammermill (three sessions (3) the noise of a tram and of a hammermill (one session each), and (4) the overall situatio stimulus: tram and hammermill (one session each).

The mean noise level (L_{Aeq}) and the mean velocity of the vibration (r.m.s.) of bot sources were kept constant.

Sixteen paid subjects (eight male and eight female) took part in each experiment. Th subjects were students with no experience in vibration experiments, and they did nc participate in more than one experiment.

One session consisted of a 4×4 matrix, which consisted of each possible combinatio of the four levels (none, low, medium and strong) of both modalities, vibration and nois During each minute a 16 s stimulus was presented. The sequence of the stimuli varied fc the subjects and the sessions according to the latin square in order to avoid sequenti effects. Experiments one and two concentrated on just one source of vibration. The subject participated in three sessions. The first two sessions were separated by a break of 1 minutes. The third session took place on another day. The third and fourth experimer consisted of just two sessions each. The tram stimulus was the subject of one sessio whereas the other session presented the hammermill stimulus. The stimuli presented durin the sessions of the third and fourth experiments were the same stimuli as used in the firs two experiments.

At the beginning of the experiment the subjects were carefully informed about the us of the keyboard and the meaning of the different lights. The subjects were instructed t sit in an upright position, to place their feet on the marked positions and to lean thei forearms on the arm-rests during the presentation of the stimulus. Moreover, they wer instructed to avoid everything that could influence the measurement of the physic

parameters, such as movements, coughing or clearing their throats during the presentation of the stimuli. The subjects had the opportunity to ask questions if necessary, but questions concerning the stimuli were not answered.

The instructions given to the subjects at the beginning of each session are given in the Appendix.

The noise was measured close to the subject's ear, while the velocity of the vibration was measured on the vibrator table. Thus, individual measurements were determined for each subject. Since the subjects on the vibrator table were part of the whole system, the vibration measurement was partly dependent on the subjects. The measurement of the noise, however, did not depend on the subjects. Parameters such as the subjects' height and weight, had an influence on the actual measurement of the vibration. These parameters had more influence when the velocity of the vibration was increased. Since the deviation caused by these influences was not balanced, individual differences concerning the velocity (r.m.s.) had to be accepted. In Table 1 are presented the mean and the standard deviations of each stimulus level (five sessions per stimulus, four levels and 16 subjects) of the measured mean velocity. The differences between the desired values for the r.m.s. of each level and the actual measurements were small, and could be explained by movements of the subjects before or during the presentation of the stimuli. Since the variation of the measurements was small, the measurements of the vibration levels were clearly distinguishable.

Since the first level of the vibration, v1 (low vibration), should be just perceptible, the velocity of the vibration of the stimulus v1 was slightly above the vibration background level produced by the system of the vibrator table. Therefore there was only a small difference between the vibration levels v0 (no vibration) and v1. The v1 stimulus, however, was clearly perceptible according to the spectrum of the signal measured on the vibrator table.

The strongest vibration level (v3) was audible under low noise conditions (n0 and n1, no noise and low noise), because the vibrator table emitted noise (33 dB(A)), which was within the range of the low noise level (n1).

2.5. STATISTICS

The statistical program package of the SAS Institute Inc. was used for the analysis of the data. The GLM (general linear models) procedure was used for regression analysis, T-tests and the analysis of variance.

3. RESULTS

Since the tram and the hammermill are different stimuli, the results of the four experiments were interpreted separately. During experiment four, the subjects were asked only for the annoyance caused by the overall situation.

The results in Table 2 indicate that the subjects perceived the strong vibration stimuli (v2 and v3), when they were asked specifically for the vibration. Especially when being exposed to strong noise levels (v2 and v3), only a few subjects perceived the low stimuli (v0 and v1). The perception of vibrations seemed to be influenced by strong noise levels.

The perception of noise, on the other hand, was hardly influenced by simultaneous vibration. Many of the subjects being exposed to the noise level n0 reported the perception of noise. This can be explained by the fact that the vibrator table emitted noise of 33 dB(A) when producing the strong vibration for the vibration level v3.

Since the evaluation of the intensity and the annoyance of the stimuli were highly correlated ($0{\cdot}78 < r < 0{\cdot}91$), the further analysis of the data was concentrated on the

TABLE 2

Stated perception of vibration/noise stimulus (in percent)

Stimulus		Perceived vibration		Perceived noise	
v	n	Tram, exp one, $n = 48$	Hammermill, exp two, $n = 48$	Tram, exp three, $n = 16$	Hammermill, exp three, $n = 16$
0	0	4·2	6·3	12·5	0·0
0	1	2·1	12·5	93·8	87·5
0	2	8·3	25·0	100·0	87·5
0	3	18·8	14·6	93·8	93·8
1	0	87·5	75·0	37·5	25·0
1	1	91·7	77·1	100·0	93·8
1	2	91·7	66·7	100·0	100·0
1	3	75·0	50·0	100·0	100·0
2	0	95·8	97·9	75·0	66·7
2	1	93·7	100·0	93·8	100·0
2	2	97·9	91·7	100·0	100·0
2	3	87·5	85·4	93·8	100·0
3	0	97·9	100·0	87·5	93·8
3	1	93·6	100·0	93·8	100·0
3	2	97·9	100·0	100·0	100·0
3	3	95·8	97·9	93·8	93·8

annoyance reaction. The means and standard deviations of the annoyance reactions to t four noise and vibration levels are shown in Figures 9–11.

3.1. ANNOYANCE CAUSED BY VIBRATION

The first two experiments were focused on the reaction to the vibrations of combin noise and vibration stimuli. The results indicate that the annoyance depends on t vibration level. The influence of the simultaneous noise signal on the annoyance reacti of the subjects is small and can be neglected (see Figure 9).

Annoyance reactions to the stimuli tram and hammermill differ. Although the me velocity of the vibration (r.m.s.) was identical for both sources, the maximum amplitu of the tram was 1·2 times higher than the maximum amplitude of the hammermill. Th could be a possible explanation for the annoyance differences, although the size of th factor does not sufficiently explain the whole extent of the difference. The type and meani of the signals seem to influence the annoyance reactions of the subjects.

3.2. ANNOYANCE CAUSED BY NOISE

If one asks for the noise only, the noise level determines the annoyance reaction. I Figure 10 are shown the mean values of the annoyance reaction to the tram (a) and t the hammermill (b). The influences of the vibrations are clearly detectable, especially a low noise levels (n0 and n1). There are only small differences between the annoyan caused by the tram or the hammermill, and the differences between the noise levels n0 an n1 were not significant concerning the noise annoyance (see Table 3). Vibration level v differs significantly from all the other levels concerning the noise annoyance reactio

3.3. ANNOYANCE CAUSED BY THE OVERALL SITUATION

In the first three experiments attention was drawn to the modalities noise and vibratio by means of the phrasing of the questions. The reaction to the same environmental stimu

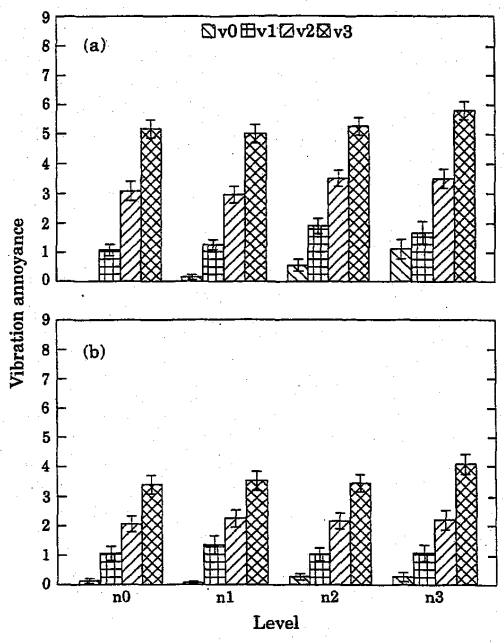


Figure 9. Annoyance caused by vibration. Means and standard errors for 16 subjects and three sessions for four noise levels and four vibration levels. (a) Tram (experiment one); (b) hammermill (experiment two).

was examined in the fourth experiment without mentioning the key words "noise" and "vibration". Instead of these signal words, the neutral term "overall situation" was chosen when asking for the annoyance reaction. The subjects were expected to integrate the modalities and report a total annoyance. The results of this experiment, requesting the annoyance reaction to the tram (a) and to the hammermill (b), are presented in Figure 11. As found in the other experiments, the subjects' evaluations were mainly influenced by the noise level. Nevertheless, a stronger influence of the vibration could be proved in experiment four.

3.4. RANGE EFFECTS

A reference stimulus was not presented, so that the subjects had no information about the range of the magnitude of the stimuli level at the beginning of the experiments. The results of the sessions of each experiment differed; in the first session of each experiment the subjects exhibited lower reactions than in the later ones (see Table 4). The subjects being exposed to the tram stimulus showed significantly increasing annoyance reactions with each session for every experiment ($p < 0{\cdot}05$). In the second (and third) session of each experiment the mean annoyance reaction (measured on the graphical scale 0 to 9) was 0·5–1·3 higher than in the first sessions. Concerning the hammermill stimulus, a similar effect could be proved only in the fourth experiment. The mean annoyance reaction measured during the second session was 0·6 higher than during the first session.

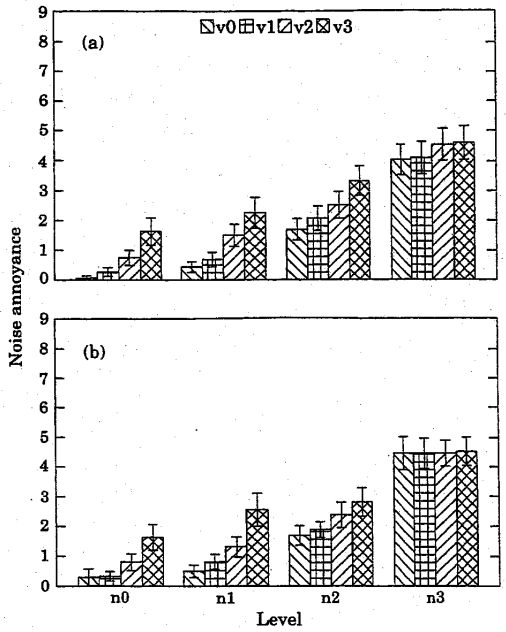


Figure 10. Annoyance caused by noise (experiment three). Means and standard errors for 16 subjects and tw sessions. (a) Tram; (b) hammermill.

4. DISCUSSION

A regression analysis based on the individual reactions to each combination of bot stimuli was conducted to predict the annoyance reaction to the combined stimulu consisting of the two modalities noise and vibration. It was assumed that the tot annoyance was a summation of the single annoyance reaction, which can be described b the equation

$$y = k + a \log_{10}(v) + b \log_{10}(n),$$

where a, b and k are constants, $\log_{10}(v) = \log_{10}(v_m)$ and $\log_{10}(n) = L_{eq}$.

TABLE 3

A T-test for annoyance as the dependent variable on vibration level or noise level as the independent variable ($p < 0{\cdot}05$); different letters indicate significantly different groups

		Vibration level				Noise level			
Experiment	Stimulus	v3	v2	v1	v0	n3	n2	n1	n0
v/1	Tram	A	B	C	D	A	A	B	B
v/2	Hammermill	A	B	C	D	A	A	A	A
v/3	Tram	A	B	BC	C	A	B	C	C
v/3	Hammermill	A	B	B	B	A	B	C	C
v/4	Tram	A	B	BC	C	A	B	C	C
v/4	Hammermill	A	B	BC	C	A	B	C	D

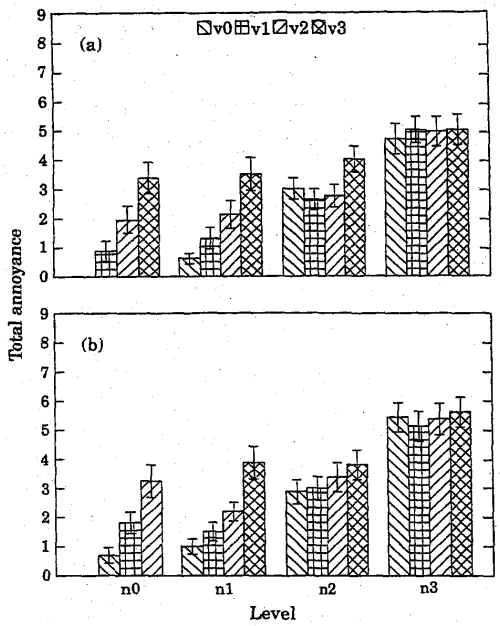


Figure 11. Annoyance caused by situation (experiment four). Means and standard errors for 16 subjects and two sessions. (a) Tram; (b) hammermill.

The following equations indicate the annoyance reaction to the combined stimuli, consisting of noise and vibration, on a graphical scale. The validity is restricted to the range of the stimulus magnitudes: i.e, 0·03–0·4 mm/s (r.m.s.) and 28–61 dB(A) (L_{eq}). The annoyance caused by the vibration of the combined stimuli is predicted by equation (1) describing the stimulus tram and equation (2) describing the hammermill. The correlation coefficients were highly significant (tram, 0·7; hammermill, 0·57). The results show that the

TABLE 4

Range effects in scaling annoyance in subsequent sessions according to experiments

		Session					
		1		2		3	
Experiment	Stimulus	Mean	*n*	Mean	*n*	Mean	*n*
1	Tram	2·30*	256	2·80	256	2·77	254
2	Hammermill	1·73	256	1·84	256	1·76	255
3	Tram	1·82	127	2·50*	127		
3	Hammermill	2·04	125	2·36	127		
4	Tram	2·19	128	3·53*	128		
4	Hammermill	2·77	128	3·37*	128		

(* Significantly different, $p < 0·05$.)

same r.m.s. value produced a higher annoyance reaction to the tram than tc hammermill (see Figure 12). The equations are as follows:

tram: $y = 6{\cdot}29 + 4{\cdot}61 \log_{10}(v_m) + 0{\cdot}03 L_{eq}$,

hammermill: $y = 5{\cdot}31 + 3{\cdot}28 \log_{10}(v_m) - 0{\cdot}001 L_{eq}$.

The regression equations indicate that vibration caused by the hammermill is evalu independently from the simultaneous noise stimulus ranging up to 61 dB(A). However reaction to the vibration caused by the tram is slightly dependent on the simultan noise.

The subjects did not evaluate the modality "noise" independently from the simultan vibrations. The following regression equations (3) and (4) show an increasing annoy.

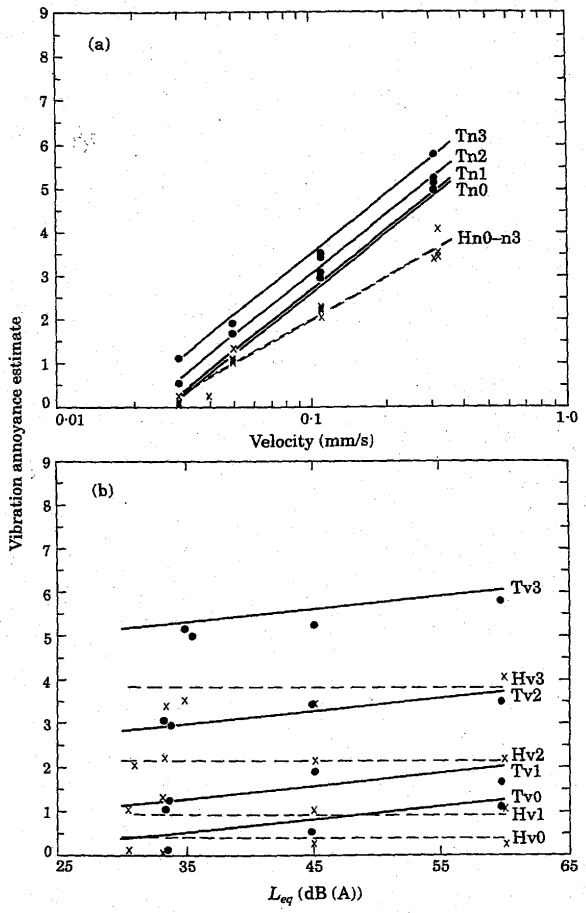


Figure 12. The predicted and mean estimated annoyance caused by vibration as a function of the avera velocity (a) and the L_{eq} (b) for tram (——, ●) and hammermill (– – –, ×) (equations (1) and (2)).

reaction during exposure to constant noise levels and increasing vibrations (see Figure 13). The influence of the sources (tram and hammermill) on the evaluation of the annoyance reaction was low. The correlation coefficients (individual basis: tram, 0·66; hammermill, 0·69) were highly significant. The equations are as follows:

tram: $$y = -1{\cdot}47 + 1{\cdot}2 \log_{10}(v_m) + 0{\cdot}11 L_{eq}, \quad (3)$$

hammermill: $$y = -1{\cdot}56 + 1{\cdot}12 \log_{10}(v_m) + 0{\cdot}12 L_{eq}. \quad (4)$$

Subjects were more annoyed when they were asked for the overall situation than when they were asked explicitly for the noise. The regression equations mark a growing annoyance with increasing vibration level (equations (5) and (6); see Figure 14). The

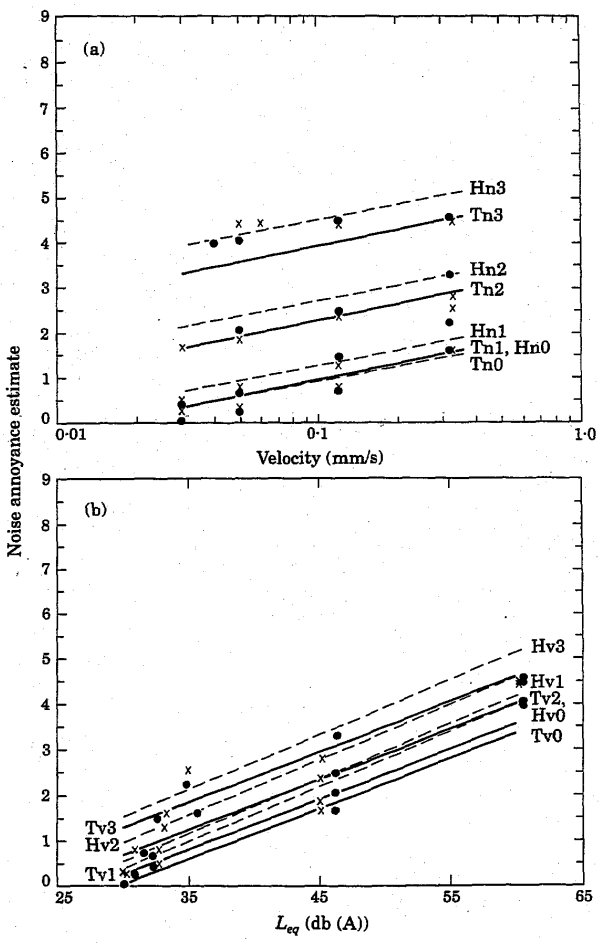


Figure 13. The predicted and mean estimated annoyance caused by noise as a function of the average velocity (a) and the L_{eq} (b) for tram (——, ●) and hammermill (– – –, ×) (equations (3) and (4)).

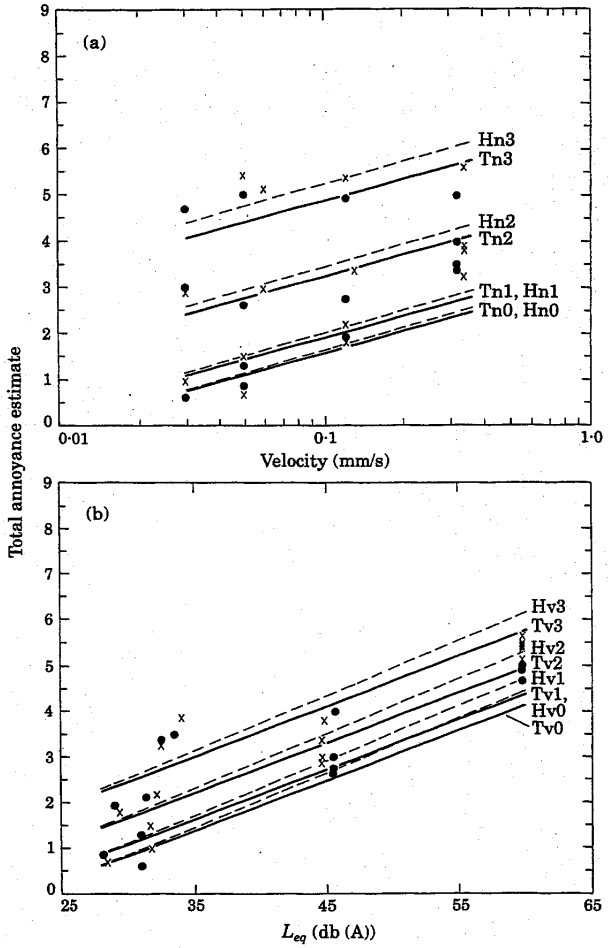


Figure 14. The predicted and mean estimated total annoyance (situation) as a function of the average veloc (a) and the L_{eq} (b) for tram (——, ●) and hammermill (– – –, ×) (equations (5) and (6)).

correlation coefficients (individual response: tram, 0·67; hammermill, 0·70) were high significant ($p < 0{\cdot}01$). The equations are as follows:

tram: $$y = -0{\cdot}15 + 1{\cdot}58 \log_{10}(v_m) + 0{\cdot}11 L_{eq},$$

hammermill: $$y = -0{\cdot}33 + 1{\cdot}64 \log_{10}(v_m) + 0{\cdot}12 L_{eq}.$$

A closer analysis of the experiments which concentrated on the noise annoyance a the overall situation (experiment three and four) confirmed an interaction between the two modalities. The analysis even showed that the gradients for the modality "noise" a independent of the phrasing of the question. In both cases an increase of the noise le of 8–9 dB(A) causes an increase of one point on the graphical annoyance scale. T evaluation of vibrations, however, is dependent on the phrasing of the question. If one as

for the vibration, the velocity (r.m.s.) has to be twice as high to cause an increase of about one point on the annoyance scale. If one asks explicitly for the noise, an increase of about one point on the annoyance scale is only reached if the initial vibration level is increased eight times. The resulting factor lies between two and eight if one asks for the overall situation: a vibration level four times higher leads to an increase of about one point on the annoyance scale.

Apart from the modalities "noise" and "vibration", the influence of the subjects themselves must not be neglected. An analysis of variance shows the influence of the independent factors "noise", "vibration" and "subject". In addition, the interaction between vibration and noise level, vibration and subject and between noise and subject was taken into consideration. A model consisting of these factors explains 82–89% of the annoyance ratings' variance. The distribution of the explained variance of the factors and the interactions is shown in Figures 15–17. Only significant portions ($p < 0{\cdot}01$) of the explained variance are presented. Independent of the phrasing of the question, the influence of the factor "subject" on the rated intensity of the stimulus level is lower than on the rating of the annoyance. If one asks for the vibration, the influence of the factor "subject" is higher than in the other experiments.

The noise level has no influence on the ratings of the intensity and the annoyance if one asks for the vibration. The factor "vibration" explains 53% of the variance of the intensity ratings and 41% of the variance of the annoyance ratings. The variance explained by the factor "subject" is in the range of 20–28%.

If one asks for the effects of noise, the noise level is the dominant modality concerning the ratings of the subjects. However, the amount of variance, explained by means of the modality vibration, is significantly higher if one asks for the situation.

The regression equations for the annoyance caused by combined noise and vibration stimuli (5) and (6) can be used to determine the subjective equivalence of noise and vibration:

tram: $$L_{AE} = 14{\cdot}4 \log_{10}(v_m) + 51{\cdot}9 \quad (7)$$

hammermill: $$L_{AE} = 13{\cdot}7 \log_{10}(v_m) + 50{\cdot}8. \quad (8)$$

The gradients of these graphs are indicated in terms of the ratio of the respective gradients for the annoyance caused by vibration and noise.

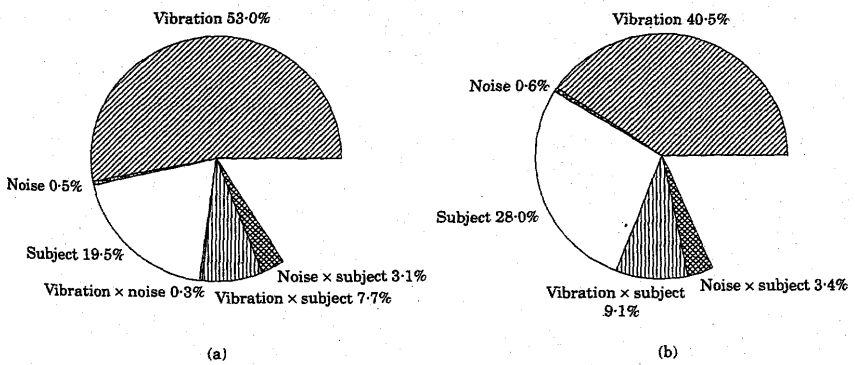


Figure 15. The explained part of the variance of the rated intensity (a) and the annoyance (b) caused by vibration (both sources).

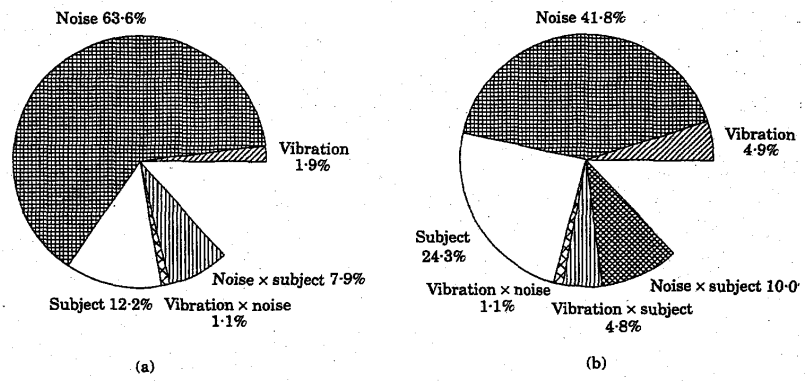


Figure 16. The explained part of the variance of the rated intensity (a) and the annoyance (b) caused by (both sources).

Howarth and Griffin used these equations to compare different studies [4]. A preliminary result, the authors suggested the following equation to describe the subjec equivalence of noise and vibration:

$$L_{AE} = 29{\cdot}3 \log_{10}(VDV) + 89{\cdot}2.$$

A comparison with the results of this study shows that the gradient of the graphs is half the size of the one found by Howarth and Griffin. The different background l in the laboratories (Howarth and Griffin, 42 dB(A); this study, 30 dB(A)) might b explanation for this difference. As the results of other studies dealing with the influ of the background noise level on the evaluation of noise stimuli (those of Powell and [8], and of Voss and Smoorenburg [9]) show, noise stimuli are more annoyin the presence of low background noise stimuli. Other explanations for this effect coul the existence of a possible non-linear relation between the annoyance reaction the combined stimuli or the reaction to special characteristics of the signals. Fu

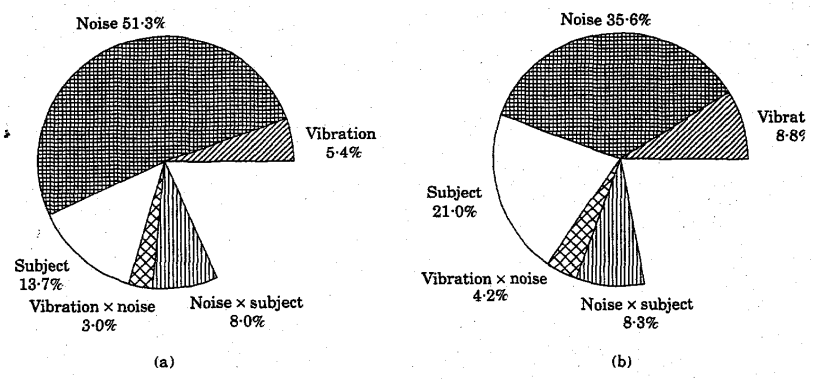


Figure 17. The explained part of the variance of the rated intensity (a) and the annoyance (b) cau situation (both sources).

research should deal with higher ranges of levels, different types and different durations of stimuli.

5. CONCLUSIONS

The combined effects of noise and vibration of two environmental stimuli were investigated in a noise level range of 30–60 dB(A). By varying the phrasing of the questions, the influence of the two modalities "noise" and "vibration" on the evaluation of annoyance was established. If one explicitly asks for the vibration, the evaluation of the vibration is largely independent of the simultaneous existing noise within the range of noise levels examined (only for the source "tram" was a small but significant influence found). If one asks for the noise, however, the evaluation of the noise depends on the simultaneous vibration levels. If noise and vibration are not mentioned but an overall evaluation of the stimuli is demanded, the assessment is dominated by the noise. At the same time, however, a smaller influence of the simultaneous vibration on the total annoyance can be noticed. All of these results were highly significant.

The equation for the description of the subjective equivalence of noise and vibration developed by Howarth and Griffin [4] cannot be confirmed by this study. The gradient found in this experiment is only half as high as the one reported by these authors. This difference might be due to the result of the low magnitudes of the stimuli, the low background noise level or the characteristics of the signals.

This experiment on the combined effects of vibration and noise shows that single stimuli should not be investigated separately, since both contribute to the overall effects. The reduction of the noise exposure, e.g., by sound-insulated windows, leads to easier perception of simultaneously occurring vibrations. Thus the effect of the exposure—the annoyance—does not decrease to the extent that the dose–response relationships would suggest.

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APPENDIX

Subject instructions given at the beginning of a session were as follows.

Experiments 1 *and* 2

"We will present you with a series of environmental stimuli. Please indicate whether y perceived a vibration (Yes/No)."

"Please indicate on a scale from 0 to 9 how strong the perceived vibration was. 0 me 'not at all' and 9 means 'extremely strong'. Please also scale the annoyance of the vibrati 0 means 'not at all' and 9 means 'unbearable'."

Experiment 3

"We will present you with a series of environmental stimuli. Please indicate whether y perceived noise (Yes/No)."

"Please indicate on a scale from 0 to 9 how strong the perceived noise was. 0 me 'not at all' and 9 means 'extremely strong'. Please also scale the annoyance of the no 0 means 'not at all' and 9 means 'unbearable'."

Experiment 4

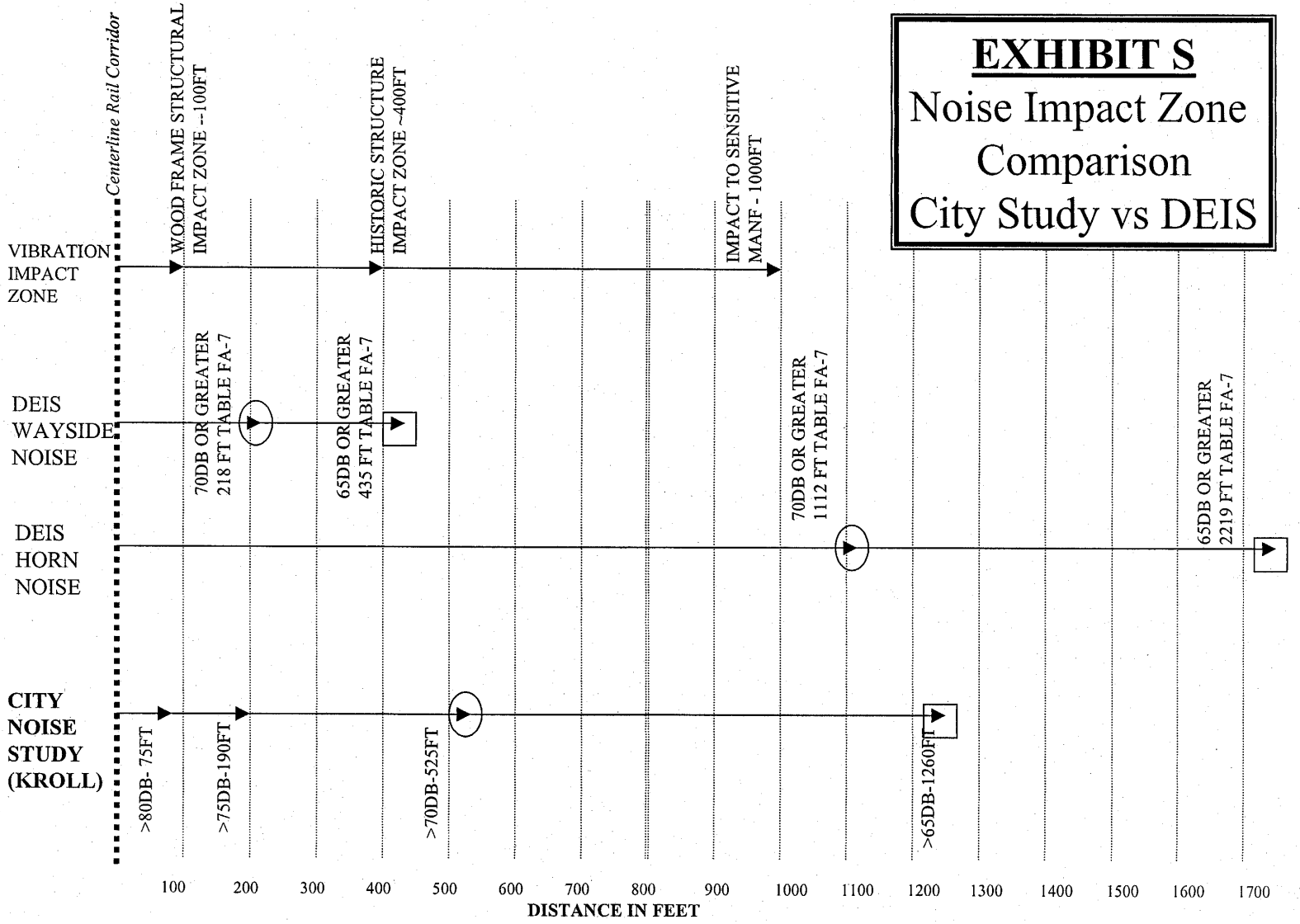
"We will present you with a series of environmental stimuli. Please indicate on a sc from 0 to 9 how strong the perceived situation was. 0 means 'not at all' and 9 me 'extremely strong'. Please also scale the annoyance of the situation. 0 means 'not at and 9 means 'unbearable'."


S

EXHIBIT S

COMPARISON OF NOISE CONTOURS FROM KROLL STUDY FOR CITY OF ROCHESTER AND DEIS

This exhibit maps the distances reported in the Kroll Study and the DEIS for different noise contour values at or above 65db.


EXHIBIT S
Noise Impact Zone
Comparison
City Study vs DEIS
Centerline Rail Corridor
WOOD FRAME STRUCTURAL
IMPACT ZONE --100FT
HISTORIC STRUCTURE
IMPACT ZONE ~400FT
IMPACT TO SENSITIVE
MANF - 1000FT
VIBRATION
IMPACT
ZONE
DEIS
WAYSIDE
NOISE
70DB OR GREATER
218 FT TABLE FA-7
65DB OR GREATER
435 FT TABLE FA-7
DEIS
HORN
NOISE
70DB OR GREATER
1112 FT TABLE FA-7
65DB OR GREATER
2219 FT TABLE FA-7
CITY
NOISE
STUDY
(KROLL)
>80DB- 75FT
>75DB-190FT
>70DB-525FT
>65DB-1260FT
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
DISTANCE IN FEET

T

EXHIBIT T

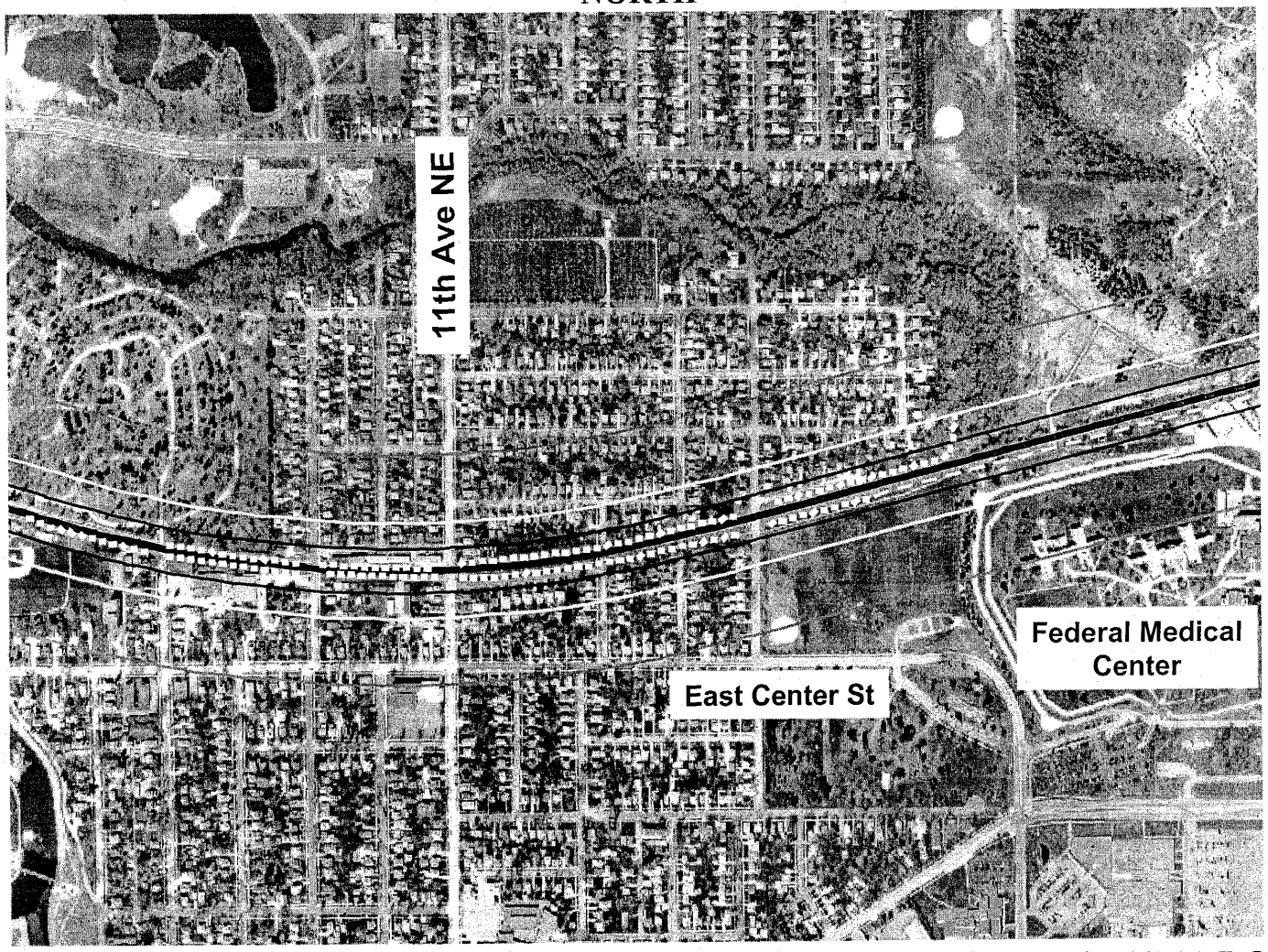
ILLUSTRATION OF NOISE WALL LOCATIONS CONTAINED IN CITY OF ROCHESTER MITIGATION PROGRAM

This exhibit illustrates the noise wall locations that are included in the cost estimate for Alternative R-2 as discussed in the City of Rochester's response to the DEIS

EXHIBIT T

PAGE 1

NORTH



NE Noise Wall Locations - Between Zumbro River and CSAH 22

NW Noise Wall Locations: Downtown Rochester west to TH 52

EXHIBIT T

PAGE 2

ANDREWS OFFICE PRODUCTS CAPITOL HEIGHTS, MD (K)

EXHIBIT U

MAPPING OF SIDING LOCATIONS IN OLMSTED COUNTY

This exhibit contains three illustrations indicating the location of sidings under Alternatives B, C and D that were described in the DEIS.

LOCATION OF SIDINGS AS LISTED IN DEIS
ALTERNATIVE B

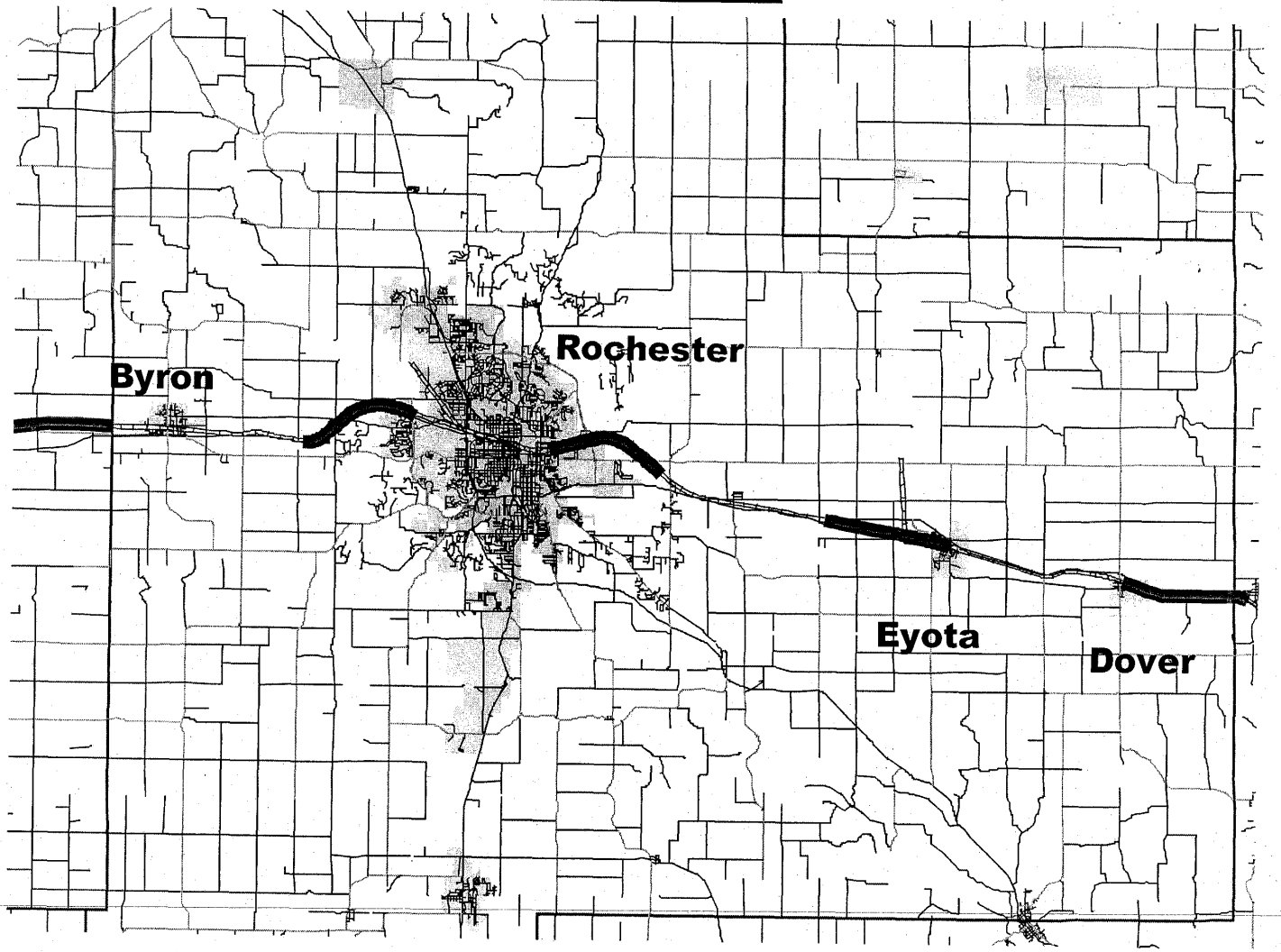


EXHIBIT U

PAGE 1

LOCATION OF SIDINGS AS LISTED IN DEIS
ALTERNATIVE C

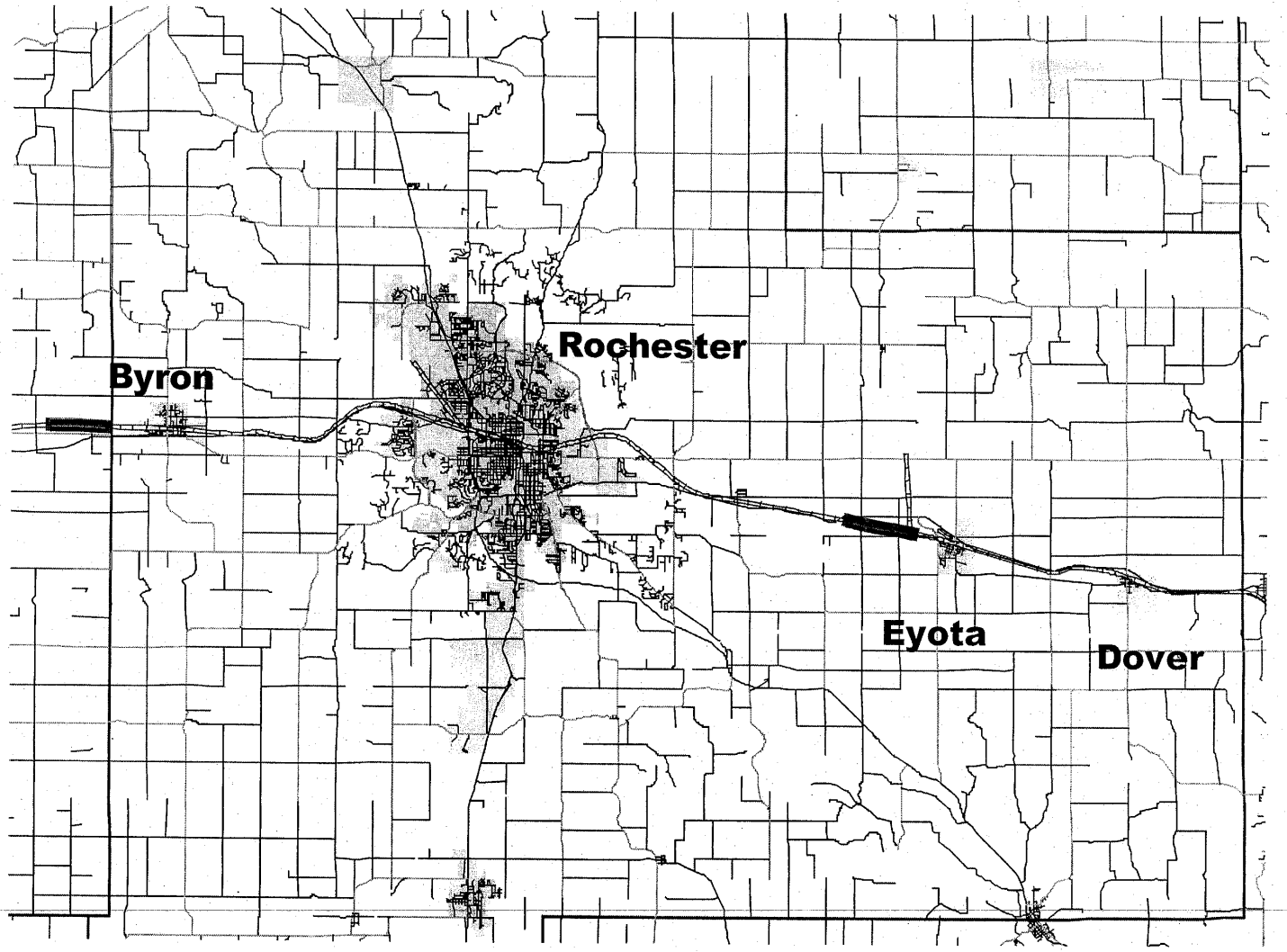


EXHIBIT U

PAGE 2

LOCATION OF SIDINGS AS LISTED IN DEIS
ALTERNATIVE D

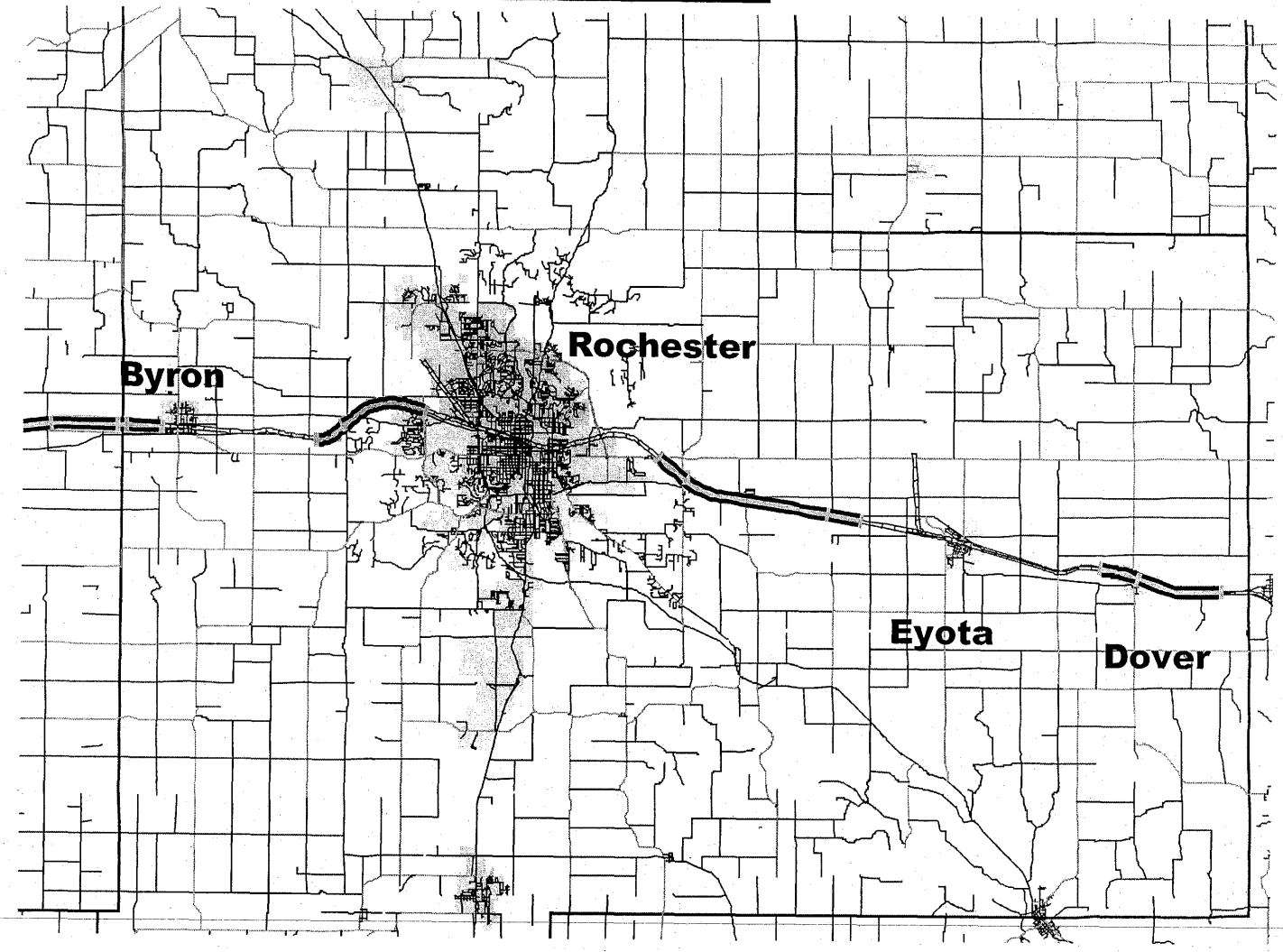


EXHIBIT U

PAGE 3



EXHIBIT V

CALCULATION OF TIME NEEDED TO ACCELERATE STANDING TRAIN TO SPEED

This exhibit reports on the results of Train Performance Calculator simulations which were conducted to determine the distance needed to accelerate a train from 0 MPH to 20, 40 and 45 MPH on the existing corridor in the vicinity of the City of Rochester.

DM&E Study

Time and Distance to Reach Specified Speeds

	135 CARS-- --7400' FEET				120 CARS-- --6600' FEET			
	Existing EB	Existing WB	Bypass EB	Bypass WB	Existing EB	Existing WB	Bypass EB	Bypass WB
20 mph	8min 30sec 9680 feet	45 sec 760 feet	8min 30sec 9680 feet	45 sec 760 feet	10min 15sec 10,200 feet	40 sec 620 feet	10min 15sec 10,200 feet	40 sec 620 feet
40 mph	13min 55sec 23,700 feet	3min 55sec 9760 feet	13min 45sec 23,180 feet	3min 55sec 9760 feet	15min 50sec 24,160 feet	3min 7300 feet	15min 35sec 23,670 feet	3min 7300 feet
45 mph	14min 30sec 25,880 feet		14min 20sec 25,490 feet		16min 30sec 26,730 feet	4min 15sec 11,890	16min 20sec 26,410 feet	4min 15sec 11,890

Consist A: 4-4,400 HP Locomotives, 135 Cars Empty Trains: 2 Locomotives Powered, 2 Locomotives Idle

Consist B: 3-4,400 HP Locomotives, 120 Cars Empty Trains: 2 Locomotives Powered, 1 Locomotive Idle

EB Loaded

WB Empty

Data Source: Wilbur Smith Associates TPC Model Runs

NOTE: WB COMING INTO THE CITY - CANNOT THROTTLE UP TO FULL SPEED ON DOWNGRADE INTO CITY BECAUSE THEY WILL NOT BE ABLE TO KEEP BELOW 49MPH. THUS 40 MPH IS PROBABLY MOST RELEVANT ON CONSIST A AS FAR AS ACCELERATION TOP.

EXHIBIT W

RESULTS OF GRADE SEPARATION SCREENING ANALYSIS

This exhibit illustrates the results of the screening analysis that was used to identify the critical corridors that warranted further detailed study in the transportation system analysis conducted by the City of Rochester in response to the DEIS

DM&E RAILROAD CORRIDOR STUDY

SCREENING ANALYSIS FOR ALTERNATIVE R-2

SUGGESTED SCREENING CRITERIA REFERENCED BY TRANSPORTATION RESEARCH BOARD

					ADT> 15,000		Exposure> 300,000		Exposure> 450,000		ADTxTRxClosure >13000		MnDOT Rules / Guidelines			MnDOT	TOTAL YES	
CROSSING ID	CROSS STREET	1998	2000*	2020	Base	20 Yr	Base	20 Yr	Base	20 Yr	Base	20 Yr	4 Lanes	30/5000	55/3000	Yes/No?	Base	20 YR
193288R	TWN 202	120	124	186	No	No	No	No	No	No	No	No					0	0
911209L	9TH AVE NW	360	382	637	No	No	No	No	No	No	No	No					0	0
193287J	2ND AVE NW	4820	5,018	7,902	No	No	No	No	No	No	No	No	*No*	*Yes*		No	0	0
193286C	BYRON AVE N	4710	4,794	5,690	No	No	No	No	No	No	No	No					0	0
193236Y	10TH AVE NE	475	660	3,599	No	No	No	No	No	No	No	No					0	0
193285V	CSAH 3	1010	1,048	1,484	No	No	No	No	No	No	No	No					0	0
193235S	COUNTY 104	3560	1,410	2,638	No	No	No	No	No	No	No	No					0	0
193232W	7TH ST NW	7500	8,178	12,452	No	No	Yes	Yes	No	Yes	No	Yes	*No*	*Yes*		No	1	3
193282A	11TH AVE NW	13125	18,967	24,769	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	*Yes*	*Yes*		Yes	5	5
193281T	6TH AVE NE	3800	4,397	5,751	No	No	No	No	No	No	No	No					0	0
193280L	4TH AVE NW	7950	7,317	9,406	No	No	No	Yes	No	No	No	Yes	*No*	*Yes*		No	0	2
193278K	1ST AVE NW	1750	1,916	1,960	No	No	No	No	No	No	No	No					0	0
193277D	BROADWAY	25020	27,257	36,713	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	*Yes*	*Yes*		Yes	5	5
193276W	2ND AVE NE	10900	10,300	13,881	No	No	Yes	Yes	No	Yes	Yes	Yes	*Yes*	*Yes*		Yes	3	4
193275P	7TH AVE NE	436	441	495	No	No	No	No	No	No	No	No					0	0
193274H	9TH AVE NE	780	805	826	No	No	No	No	No	No	No	No					0	0
193273B	11TH AVE NE	10080	12,866	14,959	No	No	Yes	Yes	Yes	Yes	Yes	Yes	*No*	*Yes*		No	3	3
193272U	15TH AVE NE	870	856	876	No	No	No	No	No	No	No	No					0	0
911202N	E. CIRCLE DRIVE	7820	10,002	21,769	No	Yes	Yes	Yes	No	Yes	Yes	Yes	*Yes*		*Yes*	Yes	3	5
193270F	COLLEGEVIEW ROAD	3330	3,454	4,854	No	No	No	No	No	No	No	No	*No*		*Yes*	No	0	0
193269L	50TH AVE SE	1250	1,308	1,978	No	No	No	No	No	No	No	No					0	0
193267X	60TH AVE SE	90	92	112	No	No	No	No	No	No	No	No					0	0
193266R	CHESTER AVE	460	466	517	No	No	No	No	No	No	No	No					0	0
193220C	3 MI W. OF EYOTA	100	102	122	No	No	No	No	No	No	No	No					0	0
193219H	COUNTY 102	30	32	53	No	No	No	No	No	No	No	No					0	0
193216M	TWN 1123	50	52	73	No	No	No	No	No	No	No	No					0	0
193264C	CSAH 7	3160	3,384	5,793	No	No	No	No	No	No	No	No	*No*		*Yes*	No	0	0
193263V	CENTER ST	2520	2,588	3,153	No	No	No	No	No	No	No	No					0	0
193262N	TWN 90	50	52	73	No	No	No	No	No	No	No	No					0	0
193261G	CSAH 32	250	254	284	No	No	No	No	No	No	No	No					0	0
193260A	CHATFIELD ST	1380	1,418	1,829	No	No	No	No	No	No	No	No					0	0
193195W	TWN 667	35	36	46	No	No	No	No	No	No	No	No					0	0
193259F	TWN 591	25	26	36	No	No	No	No	No	No	No	No					0	0
193258Y	TWN 668	25	26	36	No	No	No	No	No	No	No	No					0	0

*** YEAR 2000 TRAFFIC DATA IN ROCHESTER URBAN AREA BASED ON YEAR 2000 RAILROAD CROSSING COUNT COMPLETED AS PART OF 5 YEAR CROSSING COUNTS**
YEAR 2000 TRAFFIC DATA FOR OTHER CROSSINGS BASED ON PRO-RATING PREVIOUS 1998/2018 COUNTS SUBMITTED BY ROCHESTER/OLMSTED COUNTY

DM&E RAILROAD CORRIDOR STUDY

SCREENING ANALYSIS FOR ALTERNATIVE R-4

SUGGESTED SCREENING CRITERIA REFERENCED BY TRANSPORTATION RESEARCH BOARD

				ADT> 15,000		Exposure> 300,000		Exposure> 450,000		ADTxTRxClosure >13000		MnDOT Rules / Guidelines			MnDOT	TOTAL YES	
Highway	***1998***	**2000**	**2020**	Base	20 Yr	Base	20 Yr	Base	20 Yr	Base	20 Yr	4 Lanes	30/5000	55/3000	Yes/No?	Base	20 YR
North Frontage Road / T	2340	2,510	4,665	No	No	No	No	No	No	No	No					0	0
TH 14	11870	12,236	16,300	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	4	5
19th Ave NW	170	176	244	No	No	No	No	No	No	No	No					0	0
Frontier Rd	85	88	122	No	No	No	No	No	No	No	No					0	0
10th St SW	100	105	164	No	No	No	No	No	No	No	No					0	0
15th St SW	25	26	37	No	No	No	No	No	No	No	No					0	0
CSAH 25	385	417	836	No	No	No	No	No	No	No	No					0	0
CSAH 17	365	387	655	No	No	No	No	No	No	No	No					0	0
60th St SW	50	51	62	No	No	No	No	No	No	No	No					0	0
CSAH 26	360	398	929	No	No	No	No	No	No	No	No					0	0
80th St	65	67	89	No	No	No	No	No	No	No	No					0	0
110th Ave SW	45	46	57	No	No	No	No	No	No	No	No					0	0
CSAH 3	630	656	955	No	No	No	No	No	No	No	No					0	0
90th Ave SW	55	57	80	No	No	No	No	No	No	No	No					0	0
80th Ave SW	75	80	142	No	No	No	No	No	No	No	No					0	0
CSAH 15	250	260	374	No	No	No	No	No	No	No	No					0	0
60th Ave SW	110	120	254	No	No	No	No	No	No	No	No					0	0
CSAH 8	1780	1,946	4,184	No	No	No	No	No	No	No	No					0	0
MN 30	1740	1,820	2,753	No	No	No	No	No	No	No	No					0	0
31st Ave SW	10	10	10	No	No	No	No	No	No	No	No					0	0
TH 63	18900	19,868	31,347	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	5	5
2nd Ave SE	1	1	1	No	No	No	No	No	No	No	No					0	0
80th St SE	0	-		No	No	No	No	No	No	No	No					0	0
CSAH 20	700	708	791	No	No	No	No	No	No	No	No					0	0
20th Ave SE / 60th St SE	40	42	66	No	No	No	No	No	No	No	No					0	0
CSAH 1	1885	2,087	4,923	No	No	No	No	No	No	No	No					0	0
60th St SE east of CSAH	5	5	5	No	No	No	No	No	No	No	No					0	0
55th St SE	20	21	33	No	No	No	No	No	No	No	No					0	0
TH 52	18300	19,520	34,702	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	5	5
CR 123 (Old Marion Rd)	680	744	1,609	No	No	No	No	No	No	No	No					0	0
CR 123 (North of Grove'	240	246	311	No	No	No	No	No	No	No	No					0	0
70th Ave SE	1	1	1	No	No	No	No	No	No	No	No					0	0
77th Ave SE	0	-		No	No	No	No	No	No	No	No					0	0
CSAH 19	210	219	323	No	No	No	No	No	No	No	No					0	0
CSAH 23	310	325	501	No	No	No	No	No	No	No	No					0	0
CR 102	50	52	75	No	No	No	No	No	No	No	No					0	0
30th St SE	80	81	91	No	No	No	No	No	No	No	No					0	0
110th Ave SE	70	71	82	No	No	No	No	No	No	No	No					0	0
19th St SE	60	62	84	No	No	No	No	No	No	No	No					0	0

EXHIBIT X

TRANSIT DELAY ANALYSIS

This exhibit reports on Rochester's analysis of city transit system and school bus delay that would be anticipated to occur if 37 trains per day were traveling on the existing rail corridor.

To calculate this delay the results from the traffic delay analysis conducted by Rochester were used as a starting point. Total delay time during those hours when transit and school bus service are provided were calculated, and the percentage of time that delay was present during those hours was then applied to the total number of bus runs to determine how many would be delayed on an average daily basis.

Calculations were completed separately for the city transit system under existing train conditions (page 1) and future conditions (page 2), as well as for the school bus system under existing train conditions (page 3) and future conditions (page 4).

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
117	**TRANSIT DELAYS / CURRENT CONDITIONS WITH 3 TRAINS**																	
118																		
119	INDIVIDUAL EVENT TOTAL DELAY VALUE																	
120																		
121	1:00																	
122		11TH AVE W		6TH AVE W		11TH AVE NE		BROADWAY		15TH AVE NE								
123								Rt 1 - both										
124								Rt 2 - AM NB / PM SB		RT 2 - AM / IN PM / OUT								
125		RT 9 - BOTH																
126		RT 10 - BOTH																
127				RT 11 - BOTH														
128		RT 18 - OUT/NB																
129		SB	NB	SB	NB	SB	NB	SB	NB	SB	NB							
130	5:00 AM	2.54	2.55	2.54	2.56	2.60	2.62	2.58	2.58	2.54	2.53							
131	6:00 AM	2.61	2.61	2.57	2.61	2.69	2.80	2.71	2.62	2.55	2.56							
132	7:00 AM	2.80	2.70	2.65	3.11	3.58	3.30	3.21	2.83	2.54	2.58		0.125					
133	8:00 AM	3.10	2.83	2.86	5.17	6.45	5.51	3.87	3.20	2.56	2.67							
134	9:00 AM	2.96	2.82	2.86	3.12	4.51	4.05	3.46	3.19	2.60	2.63							
135	10:00 AM	2.95	2.79	2.88	2.96	4.27	3.92	3.42	3.36	2.60	2.59							
136	11:00 AM	2.93	2.80	2.89	2.97	4.00	4.08	3.46	3.48	2.58	2.61							
137	12:00 PM	3.03	2.93	3.16	3.07	4.57	4.62	3.61	3.93	2.60	2.58							
138	1:00 PM	3.15	2.97	2.96	3.03	4.48	4.31	3.78	4.02	2.63	2.65			**Results**				
207	Days betw	36	40															
208	**ROUTE 55 (ONE DAY - DELAYED VEHICLES MULTIPLED BY 1/5)**																	
209	Delay Time / Event/Service Hours							17.73	18.63									
210	# of Runs							5	5									
211	Hours of Service							5	5							10		
212	Ave Delay Time (1/2 delay x 0.125)							1.11	1.16									
213	Probability of Delay							0.4%	0.4%									
214	Freq of Delay							271	258									
215	Times per day							0.02	0.02									
216	Days between Delay Event							54	52			-	-	1.00	1.00		0.02	0.02
217																		
218												Best Case		Worst Case		Total	Average Conditions	
219												Scen ario		Scen ario		Runs	Scen ario	
220												SB	NB	SB	NB		SB	NB
221												TOTAL	TOTAL	TOTAL	TOTAL		TOTAL	TOTAL
222											***Number of Buses Affected by Direction***	0	0	8.00	8.00		0.56	0.53
223											***Total Number of Buses Affected***		0		16.00	225.00		1.09
											Daily % of Bus Runs Affected (on Affected Routes)		0.0%		7.1%			0.5%

EXHIBIT X

TRANSIT DELAYS / FUTURE CONDITIONS WITH 37 TRAINS

INDIVIDUAL EVENT TOTAL DELAY VALUE

1:00

	11TH AVE W RT 9 - BOTH RT 10 - BOTH RT 18 - OUT/NB		6TH AVE W RT 11 - BOTH		11TH AVE NE		BROADWAY Rt 1 - both Rt 2 - AM NB / PM SB		15TH AVE NE RT 2 - AM / IN PM / OUT	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
5:00 AM	2.54	2.55	2.54	2.56	2.60	2.62	2.58	2.58	2.54	2.53
6:00 AM	2.61	2.61	2.57	2.61	2.69	2.80	2.71	2.62	2.55	2.56
7:00 AM	2.80	2.70	2.65	3.11	3.58	3.30	3.21	2.83	2.54	2.58
8:00 AM	3.10	2.83	2.86	5.17	6.45	5.51	3.87	3.20	2.56	2.67
9:00 AM	2.96	2.82	2.86	3.12	4.51	4.05	3.46	3.19	2.60	2.63
10:00 AM	2.95	2.79	2.88	2.96	4.27	3.92	3.42	3.36	2.60	2.59
11:00 AM	2.93	2.80	2.89	2.97	4.00	4.08	3.46	3.48	2.58	2.61
12:00 PM	3.03	2.93	3.16	3.07	4.57	4.62	3.61	3.93	2.60	2.58
1:00 PM	3.15	2.97	2.96	3.03	4.48	4.31	3.78	4.02	2.63	2.65
Days betw	3	3								

ROUTE 55 (ONE DAY - DELAYED VEHICLES MULTIPLED BY 1/5)

	SB	NB
Delay Time / Event/Service Hours	17.73	18.63
# of Runs	5	5
Hours of Service	5	5
Ave Delay Time (1/2 delay x 0.125)	13.65	14.35
Probability of Delay	4.6%	4.8%
Freq of Delay	22	21
Times per day	0.23	0.24
Days between Delay Event	4	4

Results

-	-	1.00	1.00		0.23	0.24

10

	Best Case Scenario		Worst Case Scenario		Total Runs	Average Conditions Scenario	
	SB TOTAL	NB TOTAL	SB TOTAL	NB TOTAL		SB TOTAL	NB TOTAL
Number of Buses Affected by Direction	6.00	6.00	12.00	12.00		6.88	6.58
Total Number of Buses Affected		12.00		24.00	225.00		13.5
Daily % of Bus Runs Affected (on Affected Routes)		5.3%		10.7%			6.0%

SCHOOL BUS DELAYS / EXISTING CONDITIONS WIT

INDIVIDUAL EVENT TOTAL DELAY VALUE

1:00

	11TH AVE W		6TH AV	T CIRCLE DR		
	SB	NB	SB	B	NB	
5:00 AM	2.54	2.55	2.	2.54	2.57	
6:00 AM	2.61	2.61	2.	2.57	2.58	
7:00 AM	2.80	2.70	2.	2.67	2.63	
8:00 AM	3.10	2.83	2.	2.94	2.74	
9:00 AM	2.96	2.82	2.	2.75	2.66	
10:00 AM	2.95	2.79	2.	2.73	2.69	
11:00 AM	2.93	2.80	2.	2.76	2.66	
12:00 PM	3.03	2.93	3.	2.70	2.66	
1:00 PM	3.15	2.97	2.	2.74	2.69	
2:00 PM	3.08	2.94	2.	2.75	2.67	
3:00 PM	3.02	2.97	3.	2.75	2.71	
4:00 PM	3.31	3.09	3.	2.87	2.74	
5:00 PM	3.33	3.20	3.	2.86	2.77	
6:00 PM	3.16	3.11	3.	3.00	2.74	

Time during Service Hours	18.10	17.20	17	3.58	16.13			0.4% Ave
# of Runs	7	12		7	6	94		0.0% Best
Hours of Service	6	6		6	6			20.2% Worst
Ave Delay Time (1/2 delay x 0.125)	1.13	1.08	1	1.04	1.01			
Probability of Delay	0.4%	0.6%	0	.3%	0.3%	Sum of Percentages		5.4%
Freq of Delay (1 delay/xx runs)	273	167	9	298	357	SB	NB	TOTAL
Times per day bus delayed	0.03	0.07	0	.02	0.02	0.14	0.28	0.42
Best Case	-	-	-		-	0.00	0.00	0.00
Worst Case	1.00	1.00	1	.00	1.00	9.00	10.00	19.00
Frequency (Days between Delay)	39	14	4	43	60			

SCHOOL BUS DELAYS / PROJECTED CONDITIONS

INDIVIDUAL EVENT TOTAL DELAY VALUE

1:00

	11TH AVE W		6TH A		EAST CIRCLE DR	
	SB	NB	SB	NB	SB	NB
5:00 AM	2.54	2.55	2	2.53	2.54	2.57
6:00 AM	2.61	2.61	2	2.53	2.57	2.58
7:00 AM	2.80	2.70	2	2.56	2.67	2.63
8:00 AM	3.10	2.83	2	2.63	2.94	2.74
9:00 AM	2.96	2.82	2	2.58	2.75	2.66
10:00 AM	2.95	2.79	2	2.58	2.73	2.69
11:00 AM	2.93	2.80	2	2.59	2.76	2.66
12:00 PM	3.03	2.93	3	2.58	2.70	2.66
1:00 PM	3.15	2.97	2	2.61	2.74	2.69
2:00 PM	3.08	2.94	2	2.58	2.75	2.67
3:00 PM	3.02	2.97	3	2.62	2.75	2.71
4:00 PM	3.31	3.09	3	2.57	2.87	2.74
5:00 PM	3.33	3.20	3	2.57	2.86	2.77
6:00 PM	3.16	3.11	3	2.59	3.00	2.74

Time during Service Hours	18.10	17.20	17	15.58	16.58	16.13			5.5% Ave
# of Runs	7	12		2	7	6	94		4.3% Best
Hours of Service	6	6		6	6	6			21.3% Worst
Ave Delay Time (1/2 delay x 1.54)	13.94	13.24	13	12.00	12.77	12.42			
Probability of Delay	4.5%	7.4%	1	1.1%	4.1%	3.5%	Sum of Percentages		66.1%
Freq of Delay (1 delay/xx runs)	22	14		90	24	29	SB	NB	TOTAL
Times per day bus delayed	0.32	0.88	0	0.02	0.29	0.21	1.67	3.46	5.13
Best Case	-	1.00		-	-	-	1.00	3.00	4.00
Worst Case	1.00	1.00	1	1.00	1.00	1.00	9.00	11.00	20.00
Frequency (Days between Delay)	3	1		45	3	5			

EXHIBIT Y

LOCATION OF VIBRATION IMPACTED HISTORIC STRUCTURES IN DOWNTOWN ROCHESTER

This exhibit illustrates the location of structures on the National Register of Historic Structures that are located in close proximity to the rail corridor at distances that place the buildings at risk for vibration impact.

EXHIBIT Y

PAGE 1

EXHIBIT Y
Critical Vibration Locations / Switches & Proximate Historic Structures Downtown Rochester

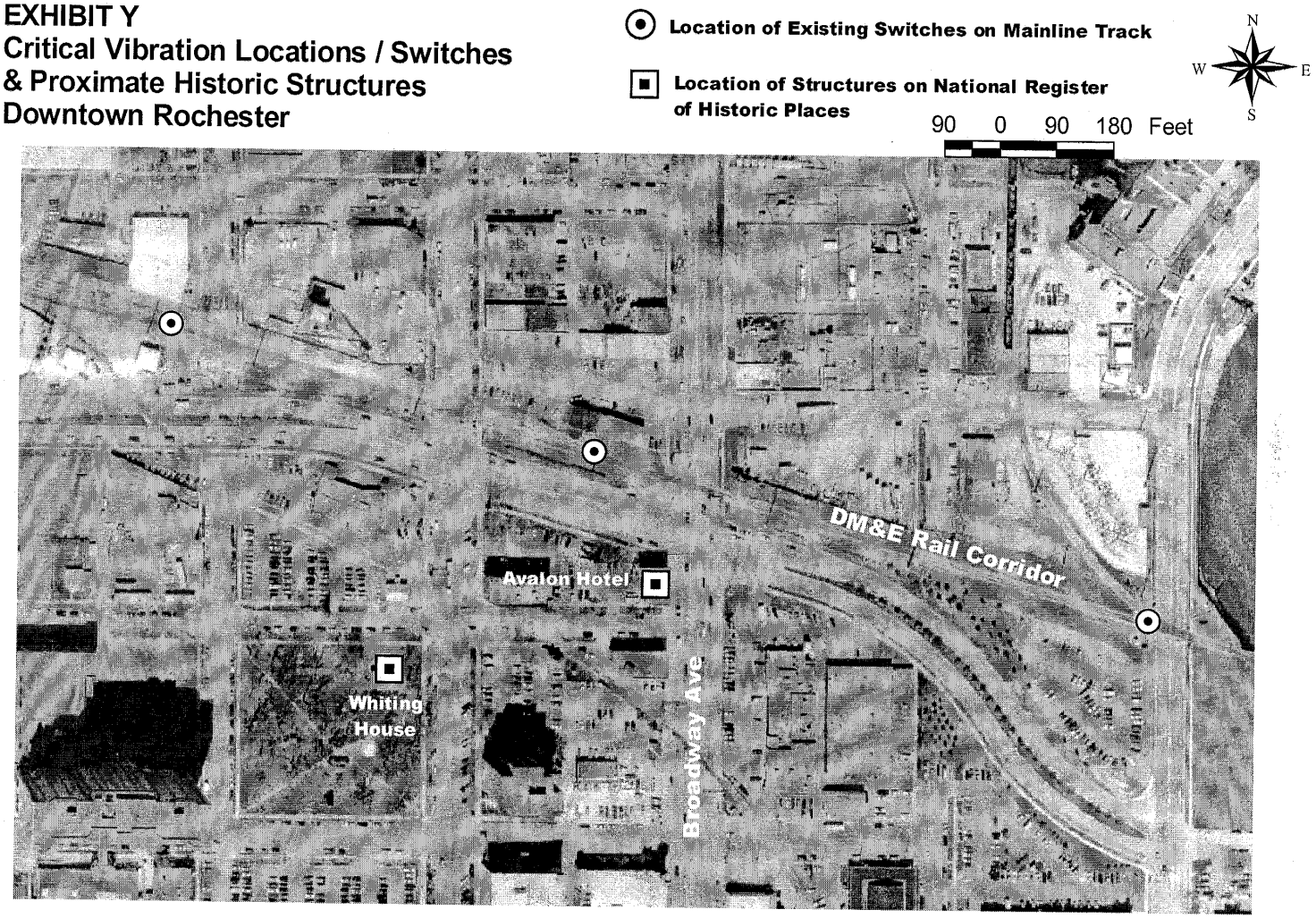




EXHIBIT Z

IDENTIFICATION OF NO-BUILD AREAS FOR PASSING SIDINGS IN VICINITY OF ROCHESTER

This exhibit illustrates a zone along the existing corridor extending from near CSAH 11 east of Rochester westward to between 7th St and CR 104 west of Rochester where sidings should not be constructed in order to minimize the impact of traffic delay, noise and vibration that could be created by siding traffic.

Exhibit Z
Page 1

Proposed Expansion of DM&E Railroad

Cost Comparison of Utilizing City Route Vs Bypass

Prepared for the City of Rochester

By

Rochester Area Economic Development Inc.

February 16, 2001

Introduction:

The DM&E railroad proposal to upgrade its line through Rochester is one of the most controversial and divisive issues our area has ever faced. There are many negative environmental impacts associated with this project relating to the health, safety, and general welfare of all area citizens. Given the power to make the decision, it would be near unanimous among citizens, elected officials, business and civic leaders to reject this proposal altogether. Unfortunately this is not a local decision. Laws passed long before the development of the knowledge-based economy favor the railroads and place the decision in the hands of the federal government.

The cost of environmental impacts will vary depending on the location of the rail line. The number of people and businesses impacted also vary depending on the location. The DM&E from their perspective clearly prefer to use the existing corridor. Those who would be impacted if the line were to be routed around Rochester prefer use of the existing corridor as well. Finally those who would be impacted along the existing route for the most part prefer the development of an alternative route. The fact is, if this project is approved and constructed there will be a cost to our economy regardless of its location. Therefore it is in our collective interest to identify and quantify these costs if at all possible. The purpose of this study is to do just that.

The scope of this study is to identify, quantify and compare the possible costs associated with locating an expanded DM&E railroad in the existing corridor through the city versus locating the project on a new route constructed for the purpose of bypassing the city.

Methodology:

The method used here is to ascertain to the extent possible all costs associated with each alternative. We then defined a set of basic assumptions and our rationale for making them. The next step of the process was to compare the cost of each alternative using current dollars as the basis for that comparison. Finally because some assumption have economic impact beyond the direct impact we employed the use of the Regional Input-Output Modeling System (RIMS II) devised by the U.S. Department of Commerce, Bureau of Economic Analysis to quantify the multiplied effect of these costs on our local economy. A final comparison of costs will be made using the RIMS II results.

RIMS II Multipliers for Output, Earnings, and Employment:

RIMS II provides users with five types of multipliers: final demand multipliers for output, earnings, and employment and direct-effect multipliers for earnings and employment. These multipliers measure the economic impact of a change in final demand, earnings, or employment on a region's economy.

Most regional economists agree that the most accurate method of estimating a regional input-output (I-O) model is to survey the businesses in a region in order to determine which goods and services are purchased by industries in the region and whether these goods and services are purchased from other industries in the region or from industries in other regions. However, because these surveys are costly, few regional I-O models in the United States are based on survey, or primary source, data.

As a result, the estimation of the regional input-output modeling system (RIMS II), like that of most regional I-O models, is based on data from the national I-O accounts and other secondary data. It is assumed that the national I-O data can be used to represent the composition of inputs purchased in the region. The national data are then adjusted by regional data, because the industries in a region cannot obtain all of their inputs from within the region. In RIMS II, a region consists of the county or counties that are specified by the user. In our case this means Olmsted County.

Basic Assumptions:

The following list of assumptions has been made in order to quantify and compare the possible economic costs associated with this study. While this is not an exact science we believe all assumptions to be both reasonable and plausible.

1. Estimated cost of upgrading existing rail line through Olmsted County is $24.9 million.
   Source: (DM&E)

2. Estimated Cost of Bypass Route including mitigation $91.8 million. The cost of land acquisition, rail line construction and construction of three overpasses at Hwys. 14, 63 and 52 as well as efforts to mitigate impacts from noise are included in this estimate. It also includes the cost of upgrading the line through Rochester for use as a spur line. While there may be other alternative routes better suited to serve as an alternative route this is the only one with a cost estimate prepared so therefore it was the one used for purposes of this analysis.
   Source (2/01 Engineering Study by Wilbur Smith Associates)

3. City cost of mitigation will include the provision of up to 7 grade separations and the undertaking of measures to reduce the impacts of noise and vibration. The estimated cost of providing this mitigation will be in the range of $48.7-$67.7 million. For the purposes of our analysis we have used the low-end estimate of five grade separations at an estimated cost of $48.7 million.
   Source: (2/01 Engineering Study by Wilbur Smith Associates)

4. The current total property value in the impacted area along the existing corridor is $381 million. Estimated property value loss along this corridor is $53.34 million. This value was computed using national studies, which indicate a 14% loss in value in similar projects nationwide.
   Source: (Consolidated Planning based on Federal Rail Administration Studies)

5. Estimated property value loss along bypass route of $7.3 million. There are 10,416 acres of land impacted in the corridor. Applying a $5000 per acre market value with a 14% loss of value due to rail construction results in this estimated loss.
   Source: (Consolidated Planning based on Federal Rail Studies)

6. Estimated cost due to potential loss of business on existing route $51 million. *(see notes)
   Source (Rochester Area Economic Development Inc.)

7. Estimated cost due to potential loss of business along bypass corridor $7.36 million. *(see notes)
   Source (Rochester Area Economic Development Inc.)

8. While a small portion of DM&E project costs will result in purchase of local goods and services, we have ignored this benefit, as it will accrue regardless of where the rail corridor is located.

9. The Minnesota Farm Bureau has estimated that completion of this project will result in a $90 million increase in farm output statewide. While Olmsted County would share this benefit, for purposes of this analysis we assume no benefit offsetting estimated costs of the project since it would be the same regardless of route option.

* Notes

- Fifty percent (50%) of Mayo Clinic patients reside outside the five states surrounding Minnesota. This is in direct contrast to major competitors who are all located in much larger metropolitan areas throughout the United States with seventy-five (75%) of their patients coming from within that metro area. This basic difference in market dynamic is an important consideration. Patient surveys indicate many reasons why people choose Mayo over other providers. Relative to this study is the fact that many patients choose Mayo in part because the City of Rochester is a clean, safe, and easy place "to get around". Due to environmental problems associated with the clinics close proximity to the railroad, it is reasonable to assume that the clinic is at "real" risk of losing patients as a result of the project as currently proposed. In addition rail proximity to highly vibration-sensitive medical imagery equipment may necessitate the relocation of the entire MRI facility. We estimate the cost to mitigate this potential impact to be in the range of $30-$50 million. Determining the precise impact cost on Mayo Clinic is difficult, however there is little doubt that there will be a fiscal impact. Given this set of circumstances it is reasonable to assume that Mayo could lose a relatively small portion of its business. Therefore, for purposes of this analysis, a minimum amount of one percent (1%) loss of business is assumed. Based on information provided to us by the Mayo Foundation this results in a $16 million dollar annual loss.

- A local electronics manufacturer occupies a facility directly adjacent to the rail line. Company officials have informed us that an increase in vibration caused by the railroad may require the business to relocate the portion of their production that is sensitive to vibration. Forced to relocate, there is no guarantee that this production will continue to take place in Rochester. The company operates several production facilities located around the world. Therefore the community is at risk of losing this production and the associated loss of output must be considered as a potential cost of the proposed project. Based on information provided to us by company officials we estimate that the Rochester MSA is at risk of losing $35 million of output as a result of the proposed project. There are other businesses located along the line which may be negatively impacted as well but no estimate of impacted cost are included for these businesses.

- Proponents of the project argue that project completion will result in an increase in farm output. However construction of a bypass will no doubt create a loss of some output as the result of taking 917 acres of farmland out of production. For purposes of this study we have calculated the potential loss of farm output as follows: According to Olmsted County Extension Service there are approximately 1300 farms located in Olmsted County. The Department of Commerce, Bureau of Economic Analysis reported 1998 total county farm income as approximately $127.8 million. The Economic Research Service of the U.S. Department of Agriculture reported 1999 Minnesota average gross farm income as $114,398. This equates to an income of approximately $149 million for all 1300 farms within Olmsted County. Finally, the Farm Business Management Report for southeast Minnesota published by Rochester Community and Technical College surveyed 383 farm operations reporting a 1999 average gross farm income of $332,266 for those surveyed or an equivalent of $431.9 million if applied to all farms within Olmsted County. For the purposes of this analysis we have averaged all of these sources of data in order to purposely estimate farm income on the high side. This approach produces approximately $236.2 million of farm income for Olmsted County. Using this estimate and assuming a minimum loss of one percent (1%) due to the construction of a bypass route results in the annual loss of farm income in the amount of $2.36 million.

- A potential loss of business also exists due to the close proximity of a turkey-breeding farm to the proposed alternative route. Company officials indicate that vibration impacts from the rail line could force them to relocate this business. It is estimated that a loss of $5 million of economic output could be lost if this firm relocated its operation outside of the county.

Proposed DM&E Railroad Expansion
Economic Cost Comparisons

Utilization of Existing Corridor vs. Bypass

Current Dollar Cost Comparison			Cost Over Ten years	
	In City	Bypass	In City	Bypass
Cost of Construction	$24,900,000	$91,800,000	$24,900,000	$91,800,000
Cost of Mitigation	$48,700,000	$0	$48,700,000	$0
Property Value Loss	$53,340,000	$7,300,000	$53,340,000	$7,300,000
Subtotal Direct Cost	**$126,940,000**	**$99,100,000**	**$126,940,000**	**$99,100,000**
Loss of Business	$51,000,000	$7,360,000	$510,000,000	$73,600,000
Total Cost	**$177,940,000**	**$106,460,000**	**$636,940,000**	**$172,700,000**

Cost Comparison With RIMS II Multiplier Effect Applied			Cost Over Ten years	
	In City	Bypass	In City	Bypass
Cost of Construction	$24,900,000	$91,800,000	$24,900,000	$91,800,000
Cost of Mitigation	$48,700,000	$0	$48,700,000	$0
Loss of 1% Health Care Business	$22,980,800	$0	$229,808,000	$0
Loss of $35 million of output Electronics MFG.	$49,318,500	$0	$493,185,000	$0
Loss of 1% Farm (grain) Business	$0	$3,088,060	$0	$30,880,600
Loss of $5 million Ag Business	$0	$9,659,500	$0	$96,595,000
Property Value Loss	$53,340,000	$7,300,000	$53,340,000	$7,300,000
Total Cost	**$199,239,300**	**$111,847,560**	**$849,933,000**	**$226,575,600**
Potential Job Impact	**(537)**	**(201)**		

Total Output in Health Services Sector
For Year 2000 $1,600,000,000
1% Loss of Output $16,000,000

Economic Impact on Area Economy

Hospitals
RIMS II Final Demand Multipliers

Industry Sectors	Output	Earnings	Jobs	Economic Cost Output	Earnings	Jobs
1 farm products & agricultural services	0.0064	0.0016	0.1483	$102,400	$25,600	2.3728
2 forestry & fishing products	0	0	0	$0	$0	0
3 coal mining	0	0	0	$0	$0	0
4 oil & gas extraction	0	0	0	$0	$0	0
5 metal mining & minerals except fuels	0	0	0.0001	$0	$0	0.0016
6 construction	0.0126	0.0031	0.0913	$201,600	$49,600	1.4608
7 food & kindred products	0.0101	0.0009	0.0305	$161,600	$14,400	0.488
8 textile mill products	0	0	0	$0	$0	0
9 apparel & other textile products	0	0	0.0004	$0	$0	0.0064
10 paper & allied products	0.0009	0.0001	0.0026	$14,400	$1,600	0.0416
11 printing & publishing	0.0101	0.0028	0.0876	$161,600	$44,800	1.4016
12 chemicals & allied products	0.0008	0.0001	0.0019	$12,800	$1,600	0.0304
13 rubber & miscellaneous	0.0007	0.0001	0.0024	$11,200	$1,600	0.0384
14 lumber, wood, furniture & fixtures	0.0001	0	0.0005	$1,600	$0	0.008
15 stone, clay and glass products	0.0002	0	0.001	$3,200	$0	0.016
16 primary metal products	0	0	0	$0	$0	0
17 fabricated metal products	0.0013	0.0002	0.0064	$20,800	$3,200	0.1024
18 industrial machinery and equipment	0.0021	0.0004	0.0085	$33,600	$6,400	0.136
19 electronic and other electric equipment	0.0003	0.0001	0.0018	$4,800	$1,600	0.0288
20 motor vehicles and equipment	0	0	0.0001	$0	$0	0.0016
21 other transportation equipment	0	0	0	$0	$0	0
22 instruments and related products	0.0102	0.0017	0.0423	$163,200	$27,200	0.6768
23 miscellaneous manufacturing industries	0.0001	0	0.0015	$1,600	$0	0.024
24 transportation	0.0178	0.0055	0.1807	$284,800	$88,000	2.8912
25 communications	0.007	0.0012	0.0284	$112,000	$19,200	0.4544
26 electric, gas, and sanitary services	0.0072	0.0013	0.028	$115,200	$20,800	0.448
27 wholesale trade	0.0184	0.0052	0.1233	$294,400	$83,200	1.9728
28 retail trade	0.0454	0.014	0.8728	$726,400	$224,000	13.9648
29 depository and nondepository institutions	0.0121	0.0029	0.0785	$193,600	$46,400	1.256
30 insurance	0.0069	0.0021	0.0518	$110,400	$33,600	0.8288
31 real estate	0.1017	0.0048	0.4667	$1,627,200	$76,800	7.4672
32 hotels, other lodging	0.0124	0.0042	0.3365	$198,400	$67,200	5.384
33 personal services	0.007	0.0028	0.1928	$112,000	$44,800	3.0848
34 business services	0.0445	0.0184	0.851	$712,000	$294,400	13.616
35 eating & drinking places	0.0242	0.0069	0.6723	$387,200	$110,400	10.7568
36 health services	1.0558	0.3856	12.8069	$16,892,800	$6,169,600	204.9104
37 miscellaneous services	0.02	0.0069	0.4192	$320,000	$110,400	6.7072
38 households	0.4724	0.0007	0.0871	$7,558,400	$11,200	1.3936
TOTAL ECONOMIC COST				$22,980,800	$7,566,400	281

Total Estimated Loss of Electronics Mfg. Output

Estimated Lost Output $35,000,000

Source Local Manufacturer's

Economic Impact on Area Economy

Computer Periphial Equipment
RIMS II Final Demand Multipliers

Industry Sectors	Output	Earnings	Jobs	Economic Cost Output	Earnings	Jobs
1 farm products & agricultural services	0.0022	0.0005	0.0508	$77,000	$17,500	1.778
2 forsetry & fishing products	0	0	0	$0	$0	0
3 coal mining	0	0	0	$0	$0	0
4 oil & gas extraction	0	0	0	$0	$0	0
5 metal mining & minerals except fuels	0	0	0	$0	$0	0
6 construction	0.0101	0.0026	0.075	$353,500	$91,000	2.625
7 food & kindred products	0.0035	0.0003	0.0101	$122,500	$10,500	0.3535
8 textile mill products	0	0	0	$0	$0	0
9 apparel & other textile products	0	0	0.0002	$0	$0	0.007
10 paper & allied products	0.0013	0.0001	0.0036	$45,500	$3,500	0.126
11 printing & publishing	0.0083	0.0024	0.0764	$290,500	$84,000	2.674
12 chemicals & allied products	0.0001	0	0.0003	$3,500	$0	0.0105
13 rubber & miscellaneous	0.0012	0.0001	0.0039	$42,000	$3,500	0.1365
14 lumber, wood, furniture & fixtures	0.0001	0	0.0004	$3,500	$0	0.014
15 stone, clay and glass products	0.0002	0	0.0009	$7,000	$0	0.0315
16 primary metal products	0	0	0	$0	$0	0
17 fabricated metal products	0.0111	0.0021	0.0551	$388,500	$73,500	1.9285
18 industrial machinery and equipment	1.1118	0.1942	4.0553	$38,913,000	$6,797,000	141.9355
19 electronic and other electric equipment	0.021	0.0044	0.1386	$735,000	$154,000	4.851
20 motor vehicles and equipment	0	0	0.0001	$0	$0	0.0035
21 other transportation equipment	0	0	0	$0	$0	0
22 instruments and related products	0.0005	0.0001	0.002	$17,500	$3,500	0.07
23 miscellaneous manufacturing industries	0.0003	0.0001	0.0029	$10,500	$3,500	0.1015
24 transportation	0.0081	0.002	0.0745	$283,500	$70,000	2.6075
25 communications	0.0068	0.0012	0.0317	$238,000	$42,000	1.1095
26 electric, gas, and sanitary services	0.0031	0.0005	0.0093	$108,500	$17,500	0.3255
27 wholesale trade	0.051	0.0143	0.3413	$1,785,000	$500,500	11.9455
28 retail trade	0.0256	0.0079	0.4915	$896,000	$276,500	17.2025
29 depository & nondepository institutions	0.0097	0.0022	0.061	$339,500	$77,000	2.135
30 insurance	0.004	0.0012	0.0927	$140,000	$42,000	3.2445
31 real estate	0.0426	0.0014	0.1397	$1,491,000	$49,000	4.8895
32 hotels, other lodging	0.0087	0.0029	0.2308	$304,500	$101,500	8.078
33 personal services	0.0031	0.0012	0.0845	$108,500	$42,000	2.9575
34 business services	0.02	0.0084	0.3192	$700,000	$294,000	11.172
35 eating & drinking places	0.0115	0.0033	0.3186	$402,500	$115,500	11.151
36 health services	0.0318	0.0137	0.4154	$1,113,000	$479,500	14.539
37 miscellaneous services	0.0114	0.0039	0.2382	$399,000	$136,500	8.337
38 households	0.2716	0.0004	0.0501	$9,506,000	$14,000	1.7535
TOTAL ECONOMIC COST				$49,318,500	$9,485,000	256

Total Output in Feed Grains Sector $236,000,000

1% Loss of Output $2,360,000

Economic Impact on Area Economy — Feed Grains — RIMS II Final Demand Multipliers — Economic Cost

Industry Sectors	Output	Earnings	Jobs	Output	Earnings	Jobs
1 farm products & agricultural services	1.039	0.1675	16.5315	$2,452,040	$395,300	39.01434
2 forestry & fishing products	0	0	0	$0	$0	0
3 coal mining	0	0	0	$0	$0	0
4 oil & gas extraction	0	0	0	$0	$0	0
5 metal mining & minerals except fuels	0.0012	0.0002	0.0044	$2,832	$472	0.010384
6 construction	0.0166	0.0042	0.1221	$39,176	$9,912	0.288156
7 food & kindred products	0.0027	0.0002	0.008	$6,372	$472	0.01888
8 textile mill products	0	0	0	$0	$0	0
9 apparel & other textile products	0	0	0.0002	$0	$0	0.000472
10 paper & allied products	0.0003	0	0.0007	$708	$0	0.001652
11 printing & publishing	0.0026	0.0007	0.0235	$6,136	$1,652	0.05546
12 chemicals & allied products	0.0002	0	0.0004	$472	$0	0.000944
13 rubber & miscellaneous	0.0003	0	0.0008	$708	$0	0.001888
14 lumber, wood, furniture & fixtures	0.0001	0	0.0005	$236	$0	0.00118
15 stone, clay and glass products	0.0003	0.0001	0.0015	$708	$236	0.00354
16 primary metal products	0	0	0	$0	$0	0
17 fabricated metal products	0.0004	0.0001	0.0018	$944	$236	0.004248
18 industrial machinery and equipment	0.0007	0.0002	0.0046	$1,652	$472	0.010856
19 electronic and other electric equipment	0.0002	0	0.0015	$472	$0	0.00354
20 motor vehicles and equipment	0	0	0.0001	$0	$0	0.000236
21 other transportation equipment	0	0	0	$0	$0	0
22 instruments and related products	0.0004	0.0001	0.0015	$944	$236	0.00354
23 miscellaneous manufacturing industries	0.0001	0	0.0007	$236	$0	0.001652
24 transportation	0.013	0.003	0.1088	$30,680	$7,080	0.256768
25 communications	0.0034	0.0006	0.0137	$8,024	$1,416	0.032332
26 electric, gas, and sanitary services	0.0065	0.0013	0.0294	$15,340	$3,068	0.069384
27 wholesale trade	0.0326	0.0092	0.2185	$76,936	$21,712	0.51566
28 retail trade	0.022	0.0068	0.4232	$51,920	$16,048	0.998752
29 depository and nondepository institutions	0.0077	0.0019	0.0552	$18,172	$4,484	0.130272
30 insurance	0.0042	0.0013	0.0318	$9,912	$3,068	0.075048
31 real estate	0.0919	0.0058	0.5717	$216,884	$13,688	1.349212
32 hotels, other lodging	0.0046	0.0016	0.1264	$10,856	$3,776	0.298304
33 personal services	0.0026	0.001	0.0707	$6,136	$2,360	0.166852
34 business services	0.0111	0.0043	0.204	$26,196	$10,148	0.48144
35 eating & drinking places	0.0078	0.0022	0.215	$18,408	$5,192	0.5074
36 health services	0.0266	0.0114	0.3481	$62,776	$26,904	0.821516
37 miscellaneous services	0.0094	0.0032	0.1948	$22,184	$7,552	0.459728
38 households	0.2273	0.0003	0.0419	$536,428	$708	0.098884
TOTAL ECONOMIC COST				$3,088,060	$535,484	46

Total Output in Meat Animals Sector
For Year 2000 $5,000,000
Loss of Output $5,000,000

Economic Impact on Area Economy — Meat Animals RIMS II Final Demand Multipliers — Economic Cost

Industry Sectors	Output	Earnings	Jobs	Output	Earnings	Jobs
1 farm products & agricultural services	1.5414	0.2653	26.8831	$7,707,000	$1,326,500	134.4155
2 forestry & fishing products	0	0	0	$0	$0	0
3 coal mining	0	0	0	$0	$0	0
4 oil & gas extraction	0	0	0	$0	$0	0
5 metal mining & minerals except fuels	0.0004	0.0001	0.0014	$2,000	$500	0.007
6 construction	0.0219	0.0055	0.1613	$109,500	$27,500	0.8065
7 food & kindred products	0.0044	0.0004	0.013	$22,000	$2,000	0.065
8 textile mill products	0	0	0	$0	$0	0
9 apparel & other textile products	0	0	0.0003	$0	$0	0.0015
10 paper & allied products	0.0003	0	0.0007	$1,500	$0	0.0035
11 printing & publishing	0.004	0.0011	0.0356	$20,000	$5,500	0.178
12 chemicals & allied products	0.0004	0	0.001	$2,000	$0	0.005
13 rubber & miscellaneous	0.0002	0	0.0005	$1,000	$0	0.0025
14 lumber, wood, furniture & fixtures	0.0001	0	0.0007	$500	$0	0.0035
15 stone, clay and glass products	0.0003	0.0001	0.0016	$1,500	$500	0.008
16 primary metal products	0	0	0	$0	$0	0
17 fabricated metal products	0.0005	0.0001	0.0023	$2,500	$500	0.0115
18 industrial machinery and equipment	0.0009	0.0002	0.0047	$4,500	$1,000	0.0235
19 electronic and other electric equipment	0.0002	0	0.0016	$1,000	$0	0.008
20 motor vehicles and equipment	0	0	0.0001	$0	$0	0.0005
21 other transportation equipment	0	0	0	$0	$0	0
22 instruments and related products	0.0007	0.0001	0.0028	$3,500	$500	0.014
23 miscellaneous manufacturing industries	0.0001	0	0.001	$500	$0	0.005
24 transportation	0.024	0.0055	0.1991	$120,000	$27,500	0.9955
25 communications	0.0054	0.0009	0.0215	$27,000	$4,500	0.1075
26 electric, gas, and sanitary services	0.0066	0.0011	0.022	$33,000	$5,500	0.11
27 wholesale trade	0.0507	0.0142	0.3395	$253,500	$71,000	1.6975
28 retail trade	0.0337	0.0104	0.6469	$168,500	$52,000	3.2345
29 depository and nondepository institutions	0.012	0.0029	0.0826	$60,000	$14,500	0.413
30 insurance	0.0068	0.0021	0.0513	$34,000	$10,500	0.2565
31 real estate	0.1084	0.0062	0.6107	$542,000	$31,000	3.0535
32 hotels, other lodging	0.0069	0.0024	0.1922	$34,500	$12,000	0.961
33 personal services	0.004	0.0015	0.1078	$20,000	$7,500	0.539
34 business services	0.0143	0.0057	0.2556	$71,500	$28,500	1.278
35 eating & drinking places	0.0121	0.0034	0.3347	$60,500	$17,000	1.6735
36 health services	0.0567	0.0219	0.8047	$283,500	$109,500	4.0235
37 miscellaneous services	0.0145	0.005	0.3042	$72,500	$25,000	1.521
38 households	0.3567	0.0005	0.0658	$1,783,500	$2,500	0.329
TOTAL ECONOMIC COST				$9,659,500	$1,780,500	155

PEMSTAR Position Statement
DM&E Coal Train Proposal
Surface Transportation Board Hearing
November 16, 2000

PEMSTAR is a Minnesota-based, publicly held, high tech contract manufacturing and engineering consulting company with 14 facilities worldwide, an employment base of over 4000 people, and annual revenues exceeding $500 million. Company headquarters are in Rochester, MN, with facilities on Hwy 14 West and Technology Drive Northwest. PEMSTAR employs over 700 people in Rochester and has consistently expanded operations in Rochester since its incorporation in 1994. Recently, PEMSTAR was ranked number four in the Minnesota Fast 50 competition to recognize the fastest growing technology companies in Minnesota. PEMSTAR has had positive impact on economic diversification in SE Minnesota and serves numerous important constituencies in the state, including Fortune 500 customers, a growing supplier base, shareholders, and employees.

On April 7, 1999, PEMSTAR CEO Al Berning, wrote a letter to the Surface Transportation Board (STB) expressing concern about the DM&E Coal Train Proposal. Part of this letter reads as follows:

> *Our company operates a major lab and plant at 2535 Highway 14 West in Rochester, Minnesota. The facility property is adjacent to the DM&E tracks. In addition to the health and safety concerns of the nearby at-grade crossing, we have several significant economic concerns with the DM&E proposal. Our 2535 Highway 14 West facility, adjacent to the DM&E tracks, designs and builds complex electronic instruments and equipment, which is affected by vibration of passing trains. We invested approximately $5 million in facility enhancements to the building. If the DM&E proposal proceeds, with constant train traffic, we will not be able to continue operations in this facility and will incur a significant loss on our investment.*

During March of 2000 Mr. Bob Ahmann, an executive in PEMSTAR's Engineering Services group with operations, at the Highway 14 West facility, wrote the following memo to the STB updating concerns about company operations:

> *This letter is to document our discussion on the impact of the DM&E railroad on our business. We currently engage in the design and build of high precision automation and test systems. These are for the disk drive, medical, telecom, and semiconductor industries. As a consequence, we constantly have operations that are subject to potential disruption by strong vibrations caused by passing trains. Today, the situation is tolerable because of the current infrequency of train traffic and the typical load on the trains. However, should the frequency increase as projected, coupled with the increased loads on the train (i.e. weight of the coal), the vibration situation will likely become intolerable.*

Examples of systems we design include balance analyzers for disk drives. These systems measure minute imbalance in spinning disk packs to fractions of a gram millimeter. We can readily demonstrate the passing of even an empty train on the readings. Another example is our development and utilization of precision laser measurement systems. These measure devices with micron resolution. Again, any vibration can ruin a measurement. We are also currently developing automated assembly systems where again we have to make placements with micron accuracy. These systems would also be impacted by vibrations. In this case, the vibration could go undetected and impact the quality of the parts we ship to our customer.

I can continue to list other examples, but they change on a regular basis. Since we do custom systems, the nature of the technology we have on-site at any one time varies. However, our systems all share the common theme of being high precision and high accuracy. Therefore, we have grave concerns about this proposed project and the likely impact on our business.

Finally, during October, 2000, Mr. Ahmann wrote the following memo to Mr. Gary Neumann of the City of Rochester Administrative Staff expressing additional concerns about the effects of train vibrations.

Since I wrote the 3/17/00 memo (to the STB) the breadth and magnitude of the precision automated assembly opportunities have greatly increased. When you were here, I showed you the FSA assembly (flex suspension assembly) and the optical head assembly. They have accuracy tolerances of 10 microns respectively. As I mentioned, we are now proceeding with work that will require sub-micron tolerances.

We are also being requested to do pilot line and prototype production here. Therefore, besides just building the machines, we are being asked to operate them on a continual basis. This is all new since this letter was written and will thus necessitate predictable periods of prolonged stability. That will likely not be the case with the continual trains projected in the DM&E expansion. Therefore, the potential impact to Pemstar has increased significantly since the original letter. Per our discussion, you can view us on par with semiconductor manufacturers relative to vibration sensitivity. Please let me know if you need additional information.

Since these expressions of concern PEMSTAR has continued to win new precision automation business of a highly technical and vibration sensitive nature that will fill the Highway 14 West facility and necessitate expanding into adjacent facilities now being constructed. The investment in facilities has increased. The effect of coal trains in close proximity to these facilities would likely cause PEMSTAR to move the facilities, at great cost and with very significant economic impact to the company, the City of Rochester and the state of Minnesota.

DEPARTMENT OF THE ARMY
HUNTSVILLE CENTER, CORPS OF ENGINEERS
P O BOX 1600
HUNTSVILLE ALABAMA 35807-4301

REPLY TO ATTENTION OF

July 15, 1998

Mechanical-Electrical Division
(CEHNC-ED-ME-T)

Mr. Tom Harris
Facility Manager
Federal Medical Center
2110 East Center Street
Rochester, Minnesota 55903

Dear Mr. Harris:

Reference telephone conversations among Mr. Joe Hanley, yourself, and Mr. John A. Brown, Jr. of this office on July 9 and 10, 1998.

Background: During the referenced telephone conversations, you expressed concern that a proposed relocation of train tracks near your facilities might adversely affect performance of electronic security systems recently installed on the facility fenceline. In the conversations, you explained that the sensored fenceline could be as close as 150 feet to the train tracks. You further explained that the train traffic would be significant, consisting of as many as 50 crossings per day of heavily loaded coal cars. You have recently installed the Perimeter Products FPS-3 fence-mounted sensor on the fenceline in question and have concerns that sensor performance will be adversely affected. This letter is generated in response to your concerns.

This office has been designated by the Headquarters, U.S. Army Corps of Engineers as the Corps' center of expertise for electronic security systems. As such, our involvement with Corps of Engineers projects which include electronic security systems is mandated. The Electronic Security Center has designed and installed numerous electronic security systems which incorporate the Perimeter Products, Incorporated FPS family of sensors. The sensor is a special coaxial cable transducer which essentially "listens to the fence." The signal received from the transducer is fed into a signal processor in order to discriminate whether a security breech is in process. If the signal characteristics are consistent with those associated with climbing, cutting, or prying the fence, an alarm is generated. The alarm is displayed to the system operator who must visually and/or audibly assess the fenceline in order to determine the cause of the alarm.

The relocation of the train tracks per your description will likely impact the performance of the electronic security system installed at your facility. First of all, the vibrations associated with significant train traffic will result in increased ambient noise levels coupled into the fence. This higher ambient noise level will likely require a decrease in the sensor's sensitivity adjustment in order to keep the false alarm rate (FAR) low. There is a direct relationship between any sensor's detection probability and FAR. Therefore, adjusting the sensor's sensitivity to reduce FAR will also mean an associated decrease in probability of detection. Effectively, the fence mounted sensor's performance will be degraded. If the sensitivity is not adjusted to accommodate the train traffic, the operators will begin to associate alarm activity with train passings. This phenomenon introduces a potential vulnerability which could be exploited by individuals seeking to breech the fence. For instance, if the perpetrator knows that alarms generated during train passings are ignored, then he or she would likely attempt to breech the fence at that time and would be far more likely to go undetected. Lastly, the FPS-3 system is equipped with an audio "listen-in" feature which is often used for troubleshooting and as an assessment tool. The additional noise induced into the fence will make the "listen-in" feature far less capable.

Therefore, it is the professional opinion of our engineers in the Electronic Security Center that performance of the electronic security system would be degraded if subjected to the nearby train traffic noted above.

If we may be of further assistance in this matter, please do not hesitate to call. The point of contact in this office is Mr. John A. Brown, Jr. who may be reached at 256-895-1756.

Ronald R. Lein, P.E.
Director of Engineering

U. S. Department of Justice

Federal Bureau of Prisons

Federal Medical Center

P.O. Box 4000
Rochester, MN 55903-4000

October 11, 2000

Gary Neumann
City Administrator's Office
City of Rochester
201 4th Street SE
Rochester, MN 55904

RE: Environmental Impact Statement

Dear Mr. Neumann:

This is in response to our recent telephone conversation wherein you request information from the Federal Medical Center (FMC) regarding whether there remains a concern surrounding the DM&E Railroad expansion and the potential impact of that expansion on our perimeter fence security system.

The excerpt of the Environmental Impact Statement (EIS) that you provided to us indicates that the authors of the Statement contend that the vibrations from passing coal trains as a result of the proposed upgrade would have no impact on the security of the fence alarm system. However, the information we have received and the research we have conducted yielded vastly different information than that presented in the EIS. The following information is provided to assist you in responding to the EIS.

The Federal Medical Center (FMC) in Rochester, Minnesota is a correctional facility operated by the United States Department of Justice, Federal Bureau of Prisons. FMC Rochester did submit comments to the STB early in the process. Shortly thereafter, officials at FMC Rochester recognized that this change in usage of the tracks could adversely impact the perimeter security systems on the fencing adjacent to the tracks abutting the facility. Staff at FMC Rochester contacted the manufacturer of our fencing alarm system seeking a letter of certification and warranty guaranteeing the effectiveness of their system with a change in conditions such as that which would be present in the event of the railroad upgrade. Unfortunately, the system manufacturer was not able to provide such a guarantee, and at that time, even supported our suspicions that our alarm system would be adversely impacted by the concomitant vibrations produced as a result of the proposed upgrade. Subsequently, an opinion was solicited from an unbiased third party to further evaluate potential effects of the proposed railroad upgrade on our perimeter security system. Accordingly, the Department of Army, Corps of Engineers, was contacted and confirmed in writing that the proposed use of the track would adversely impact the system. A copy of that letter is attached hereto for your review.

As previously noted in correspondence dated June 10, 1998, to the Surface Transportation Board, FMC Rochester identified an inherent risk associated with operating high speed trains carrying hazardous cargo adjacent to a non-evacuatable facility. However, in the information you provided to our office, we found no commentary addressing what we consider to be a very serious concern and we request that our concerns be reiterated with respect hazardous chemical being transported at high speeds past our non-evacuatable facility.

I trust this is responsive to your request. If you need any further information, please contact me at (507) 287-0674.

Sincerely,

Constance Reese
Warden

cc: file

ALL-AMERICA CITY

ROCHESTER

Minnesota

October 24, 2000

GARY H. NEUMANN
Assistant City Administrator
City Administrator's Office
201 4th Street SE, Room 266
Rochester, MN 55904-3781
(507) 285-8082
FAX #(507) 287-7979

Constance Reese
Warden
Federal Medical Center
P.O. Box 4600
Rochester, Minnesota 55903-4600

RE: STB Environmental Impact Statement

Dear Warden Reese:

Thank you for your letter dated October 11, 2000. The City, for its part, will certainly bring the concerns that you have expressed to the attention of the Surface Transportation Board. Given the seriousness of your concerns, I would also recommend that the FMC provide a letter directly to the STB during the 90-day comment period on the DEIS which ends on January 5, 2001.

The letter that you attached from Huntsville Center of the Corps of Engineers was also very informative and useful to explain the concerns relating to your fence security system. There are, however, two statements in that letter that are incorrect and should be clarified with the Corps to determine if the clarifications in any way affect the conclusions that they have reached. If these statements are not clarified it might affect the degree to which the STB views the veracity of the concerns. The items that you should have the Corps clarify in writing are:

1. In the first paragraph entitled "Background" the Corps letter references a proposed "relocation" of the train tracks. As you are aware, the train tracks pass by your facility presently. However, the number of trains is about 3 per day and the weight of the cars and the length of the trains are not as great as that expected to be experienced with one and one-half mile long coal trains. I have attached some information on the train "consist" assumed by the STB in the DEIS.

2. The same paragraph references as many as 50 trains per day. The figure used in the STB DEIS is up to 37 trains per day of which 3 would reflect the local freight traffic and 34 would be assumed to be coal trains. However, the STB approval process will not set any maximum on the number of coal trains that would be allowed. The market forces will determine how many coal trains would be a reality. It may be more or less than 34 coal trains. However, the STB has recognized 37 as

the number to be used in their study. Please ask the Corps whether a reduction in the number of total trains from 50 to 37 would affect their conclusions.

There are sections of the DEIS relating to vibration. I have previously provided your staff with a CD version of the DEIS. If the Corps has any questions concerning vibration assumptions, you may want to refer them to those sections.

Thank you for your interest and involvement in this matter.

Sincerely,

Gary Neumann
Assistant City Administrator

c: Steve Kalish

1.4.1 Construction

The proposed project would include construction of new rail line along a new rail right-of-way and the reconstruction or upgrade of existing rail line along existing rail right-of-way. All new construction and rebuild activities would follow methods approved by the American Railway Engineering and Maintenance of Way Association (AREMA).[51] Following is a discussion of how construction of new rail line would occur. The text primarily describes the new construction of the rail line extension in South Dakota and Wyoming. New construction in Minnesota would be similar in nature, but limited to the 13.31 mile new rail line proposed near Mankato, Minnesota. The procedure for rebuilding the existing rail line is also discussed.

New Construction[52]

New construction of the rail line extension in South Dakota and Wyoming would occur along new right-of-way. New rail line would be designed for 315,000-pound rail cars, operating in 135-car, with either three 6,000 horsepower locomotive or four 4,400 horsepower locomotives.[53] The trains will be approximately 7,400 feet (1.4 miles) in length. Locomotives would be distributed throughout the train, with two in series at the lead and the third located either at the end of the train or located approximately two-thirds of the way from the front of the train. If four locomotives are used, three would be in a series at the lead and the fourth either at the end or two-thirds of the way from the front of the two. Maximum operating speed on the new rail line would be 49 miles per hour (mph) for empty coal trains and other commodity trains and 45 miles per hour for loaded coal trains. The new rail line would consist of 136-pound, continuously welded rail. Ties would be wood spaced at 19.5 inches or concrete spaced at 24 inches. Maximum grade for the rail line would be 1.0 percent along tangent (straight) sections and 1.0 percent compensated (grade reduction to account for additional drag forces created when a train makes a turn) on curves.

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[51] American Railway Engineering and Maintenance of Way Association. 1999. Manual for Railway Engineers. Volumes I and II. Published by Railway Engineering and Maintenance of Way Association; 8201 Corporate Drive, Suite 1125, Landover, Maryland 20785-2230.

[52] Based on information contained in DM&E's Application and in supplemental information provided by DM&E at the request of SEA.

[53] This would be the maximum operating capacity of the rail system. Because large portions of other rail carriers' existing systems could not currently accommodate such trains, initial trains operating on the system would use 115-cars (approximately 6,400 feet long) consisting of 286,000-pound cars. As other carriers' systems are upgraded, DM&E would be able to utilize the heavier capacity rail cars.

DEPARTMENT OF THE ARMY
HUNTSVILLE CENTER, CORPS OF ENGINEERS
P.O. BOX 1600
HUNTSVILLE, ALABAMA 35807-4301

December 18, 2000

REPLY TO ATTENTION OF:
Mechanical-Electrical Division
(CEHNC-ED-ME-T)

Ms. Constance Reese
Warden
Federal Medical Center
P.O. Box 4600
Rochester, Minnesota 55903 4600

Dear Warden Reese:

We have reviewed the contents and attachments to your letter of November 15, 2000, requesting an opinion about the impact to electronic security sensor performance associated with the proposed DM&E Railroad project. Whether the daily train traffic is 37 or 50 trains, we believe the fence-mounted sensor will suffer some performance degradation as explained in our previous correspondence dated July 15, 1998. In your letter, you stated that the distance from the railroad tracks to the fence is approximately 150 feet. Our previous correspondence to you also referenced that distance. Therefore, while the number of train crossings and the exact location of the railroad tracks in relation to your perimeter fence may vary somewhat from our original understanding, our professional opinion remains essentially unchanged.

If we may be of further assistance in this matter, please do not hesitate to call. The point of contact in this office is Mr. John A. Brown, Jr. at 256-895 1756

Sincerely

Ronald R. Lein, P.E.
Director of Engineering

Mosque unites Islamic community

By Gregg Aamot
Associated Press

The Rochester Islamic Center sits just off the busy streets of downtown, a conventional, stone-faced building with a snow-slicked parking lot on one side and a guitar shop on the other.

Posters in its window tell passersby about Islam and what Muslims believe about Jesus. But little else suggests the former American Legion hall houses a mosque — the spiritual center for thousands of Muslims who call Rochester home.

"It's amazing that we have this mosque, and it's really been a big change," says Mohammed Monirul Islam, 27, a bearded, soft-spoken IBM computer engineer. "I feel great to see this change."

Like a decent job or a house or a spot on the school board, this visible, permanent place of worship has given Muslims a sense of identity in their adopted community. Five daily prayers provide a common experience that was elusive just a few years ago, when Muslims gathered to pray at each other's homes and later, in a room at the Kahler Hotel.

As many as 3,500 Muslims are thought to be living in Rochester after a decade-long flood of refugees from hot spots in Africa and the Balkans. The Rochester-Olmsted County Planning Department estimates that 1,800 Somalis and 550 Bosnians live in the county, most of them in the city limits. It's believed that several hundred more residents are from the Middle East or other regions where Islam is prevalent.

Some residents say a long-standing culture of diversity — as many as 3,000 patients from the Middle East alone visit the Mayo Clinic each year — has helped residents adapt.

City officials waive parking meter enforcement near the mosque on Friday afternoons, providing less hassle for worshippers dashing to the mosque from work. Police officers take cultural training courses. And the Rochester School District lets students pray between classes or during other breaks (the district does not provide official space or accommodations).

Efforts like those have helped to smooth over some ugly incidents, like the 1996 beating of a 12-year-old Somali boy, who lost eight teeth when he was struck by men wielding baseball bats. Two white men were convicted of assault and sent to prison. Some Somalis were also arrested after fights.

"Really, if you compare what it was like in '96 to how it is now, you will see a tremendous difference," says Mohamoud Hamud, a counselor at the Mayo Clinic. "We are all human beings, and we all have our inhibitions and baggage. You can't expect someone to hug you in the spur of the moment. But this community is an integrated community."



Associated Press

Worshipers meditate and pray during one of five daily prayers conducted at the Rochester Islamic Center Mosque. The mosque helps unify the approximately 3,500 followers of Islam in this region.

It was Hamud who won a spot on the Rochester School Board, chosen last year from among applicants to complete nine months remaining on the term of a board member who moved out of state. Though Hamud lost a November election for a regular term on the board, he says he received plenty of support and might run again.

Muslim leaders spent $600,000 to buy and renovate the Islamic center and began using it about 2½ years ago. They raised much of the money locally and got a surprise donation from a Mayo Clinic patient from the United Arab Emirates who, Hamud said, "put us over the top."

Nearing sundown on a January evening, a deep and steady tenor seeps through the walls of the mosque — named Masjid Abu-Bakr Al-Sidique in Arabic — and into the bitterly cold air outside, summoning a group of Muslim men visiting before prayers.

The men move into a warm entryway, take off their shoes and file into the worship area, a rectangular, whitewashed room with bright red carpet. The steady voice is that of the prayer leader — an Imam — covered in a white gown and chanting customary Arabic greetings such as, "God is Great. There is no God except one God."

About 80 men form four rows behind the Imam. Silently or praying softly, they fall to their knees, bow with faces to the ground and get back to their feet — all the while facing east toward Mecca, the most important city in Islam.

There's a Mayo Clinic doctor in chinos and a white shirt, a tiny boy swallowed up in his purple Vikings jacket, a teen-ager in a T-shirt and rolled up bluejeans. About a dozen women pray apart from the men, according to Islamic tradition, behind a partition.

Zaid Khalid, who has lived in Rochester for about five years, remembers when things were different.

"It seemed like there were maybe 30 of us in the whole city," says Khalid, an IBM software engineer. "We had to meet for prayers in our basements."

These days, a crowd of 30 is an average-sized group at any of the daily prayers, gatherings of eight or nine minutes that altogether attract 200 people or more each day. An afternoon service each Friday, a longer session that includes a sermon, often brings in several hundred people.

"This is absolutely essential. Definitely," says Amer Mikati, a 42-year-old pharmacist from Lebanon. "Gathering together is part of every community. This is our center of community gathering."

While highly educated Muslims have long had a presence in Rochester — at places like Mayo Clinic or IBM — Islam remained on the far margins of city life until Somalis, fleeing clan warfare that erupted in 1991, began arriving in the mid-1990s.

While official population figures are not available, public school statistics show that Somalis have settled mainly in Rochester and Minneapolis, as well as a few other pockets of southern Minnesota.

By 2000, according to the state agency Minnesota Planning, the Rochester School District had 482 Somali-speaking students. The Minneapolis district had 1,563 such students, Owatonna 131, St. Paul 87 and Mankato 59. Minnesota Planning says that 1,580 Somalis moved to Minnesota in 1997 and 1998, and estimates of the entire Somali population in the state run as high as 50,000.

Several Somalis learned about Rochester in refugee camps and were told it was a safe and tolerant place with good schools and abundant jobs.

Ahmed Abdullah, a 17-year-old Somali, organizes a collection of videos and audio tapes in the library of the Islamic center. He appears studious in wire-rimmed glasses, gray turtleneck and one of the flat, multicolored hats often seen on football great Jim Brown.

"You come to America, and people don't understand your point of view," says Ahmed, whose family lived in Marshall in the early 1990s before moving to Rochester in 1996. "You always have to work it out between points of view."

Ahmed uses that philosophy in a conflict resolution group at Mayo High School, saying he enjoys his classes and classmates. After school, however, he prefers the familiarity of the library and the worshippers streaming in and out of the mosque.

"I participate with the American-born kids in school, but otherwise there's not a lot of socializing," he says. "But it's terrific here. I really enjoy the education I'm getting. It's terrific — except for the cold."

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BEFORE THE
SURFACE TRANSPORTATION BOARD

FINANCE DOCKET NO. 33407

DAKOTA, MINNESOTA & EASTERN RAILROAD CORPORATION
CONSTRUCTION INTO THE POWDER RIVER BASIN

RECEIVED
MAR 6 2001
MANAGEMENT
STB

COMMENTS OF ROCHESTER, MINNESOTA ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

Volume III-Exhibits 11 through 28

Steven J. Kalish
McCarthy, Sweeney & Harkaway, P.C.
Suite 600
2175 K Street, N.W.
Washington, D.C. 20037
(202) 393-5710

Dated: March 6, 2001

BEFORE THE
SURFACE TRANSPORTATION BOARD

FINANCE DOCKET NO. 33407

DAKOTA, MINNESOTA & EASTERN RAILROAD CORPORATION
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Dated: March 6, 2001

VOLUME III EXHIBITS

11. Verified Statement of Philip H. Wheeler

12. Verified Statement of Michael J. LaPlante

13. October 30, 2000 memorandum from Steve Thornhill to Steve Kalish; December 14, 1998 memorandum from Bill Otter to Steve Thornhill; November 13, 1998 memorandum from Bill Otter to David Levy, David D'Amico, Louise Baglio; and February 23, 1999 memorandum from Steve Thornhill to David Levy

14. Verified Statement of Gary Neumann

15. Verified Statement of Edward J. Walter, Jr.

16. Verified Statement of Charlotte Sprague

17. Table 5-OH-11 from F.D. No. 33388, CSX/NS/Conrail DEIS, Volume 3B, served December 12, 1997

18. Joint Verified Statement of Jeff Leland and Rick Lovett

19. Verified Statement of Roger Peterson

20. Verified Statement of Anthony J. Knauer

21. Verified Statement of Roy Sutherland

22. Joint Verified Statement of Ana G. Vargo and Ronald B. Farmer

23. 62 FR 15957, Tennessee Valley Authority, Kingston Fossil Plant (KIF) Alternative Coal Receiving Sstems, Roane County, Tennessee

24. 62 FR 65478, Department of Transportation, Federal Railroad Administration, FOX High Speed Rail Safety Standards

25. Verified Statement of Richard Freese

26. Verified Statement of Greg A. Woodworth

27. Verified Statement of Michael J. Nigbur

28. Verified Sttement of Steven W. Leqve

Dakota, Minnesota and Eastern Railroad Corporation Application to extend Rail Service into the Powder River Basin

STB Finance Docket No. 33407

Verified Statement prepared by Philip H. Wheeler, AICP, Planning Director, Rochester-Olmsted Planning Department, 2122 Campus Drive SE, Rochester, MN. 55904

My name is Philip H. Wheeler. I have a Bachelor of Arts degree in History from Carleton College and a Master of Urban Planning degree from Michigan State University. I have been a Member of the American Institute of Certified Planners since 1987. I have recently served on the Governor's Council on Geographic Information, as an advisor to the Governor's Task Force on Sustainable Economic Development, as chair of the Minnesota Association of Directors of Metropolitan Planning Organizations, and as a member of a national "pooled fund study" task force identifying geographic information requirements for transportation planning. I am currently a member of the policy advisory committee for the scoping phase of the Urban Development Generic Environmental Impact project of the Minnesota Environmental Quality Board.

I am employed with the Rochester-Olmsted Planning Department, which is the public agency providing comprehensive planning and community development services for the City of Rochester and Olmsted County, Minnesota. My title with the department is Planning Director. The Department is responsible for transportation and land use planning; land development regulation; management of geographic information services; management of housing assistance activities of the Olmsted County Housing and Redevelopment Authority; management and enforcement of environmental regulations dealing with wells and groundwater, solid waste disposal, flood plain, wetland, and shoreland protection; and the development of population and other demographic

estimates and projections. I have been employed full time by the Planning Department since June, 1976, and have held the position of Planning Director since 1990.

In my review of the Draft Environmental Impact Statement (DEIS) I have identified a number of concerns and issues. These include what I believe to be the use of inaccurate data in various analyses, errors or flaws in the methodology used for analysis purposes, incorrect conclusions as to the significance of impact and, in certain instances, a failure to identify or consider mitigation for conditions representing major impacts to the community.

In my verified statement I will be addressing the following areas of concern:

1. Environmental Justice
2. Noise
3. Land Use
4. Geology

I. ENVIRONMENTAL JUSTICE

The Draft Environmental Impact Statement (DEIS) analysis of environmental justice (EJ) issues has several serious flaws. The analysis inadequately identifies EJ populations and minimizes the impacts that EJ populations will be subjected to. All of the analysis flaws tend to minimize the extent of EJ concerns.

The analysis of EJ populations and their relative exposure to adverse impacts is inadequate for several reasons:

1. The scale of analysis is too large, and therefore distorts the analysis both by diluting the EJ population and by reducing the average level of impact.

2. Even were it to be determined that the 1990 Census data is the best data source available (despite the availability of neighborhood school enrollment data and real estate tax data), Census data is not used as fully as it should be. Block group level relationships or relationships derived from the Census Public Use Microsample (PUMS) data could have been used to derive income attributes from block level data. Block level race data is provided by the 1990 Census and could have identified smaller neighborhoods more accurately reflecting EJ communities.

3. The 1990 Census data is out of date, especially in a County that has experienced a tenfold increase in Black student enrollment, a tripling of total non-white student enrollment, and almost a doubling of students enrolled in the free and reduced price lunch program (FARPL). Eligibility for the FARPL program is determined by family income. Children qualify for free or reduced price lunch when their family income falls below 135 percent or 180 percent, respectively, of the poverty level.

4. The DEIS pays inadequate attention to adverse property value impacts on EJ populations, thereby understates cumulative impacts, and unjustifiably asserts a beneficial effect from increased housing demand generated by the railroad project.

5. By inflating the base condition with regard to train traffic and resultant noise, vibration, and traffic disruption impacts, the DEIS underestimates the extent to which the project worsens these existing conditions.

6. There are serious shortcomings in the approach taken to comparing impacts on EJ neighborhoods with impacts on the balance of the community.

7. The potential for EJ populations being affected by bypass alternatives is ignored.

1. SCALE OF ANALYSIS:

The geographic scale of analysis is too large, and therefore distorts the analysis both by diluting the EJ population and by reducing the average level of impact. At Appendix D.2.1, page D-5, it is stated that "... SEA considered communities to be those assemblages of persons living within individual subdivisions, neighborhoods, or similar types of areas ..." and that the use of U.S. Census block groups to represent communities is appropriate because they are "small." In fact, Census block groups are relatively large compared to "individual neighborhoods" and "subdivisions." Especially on the fringes of Rochester and in rural parts of Olmsted County, the use of block groups as the unit of analysis obscures impacts on low income and minority communities by grouping neighborhoods with significantly different characteristics. For example, Census Tract 7 block group 1 (CT7 BG1) includes both a lower income neighborhood immediately abutting the DM&E tracks and a number of very high value, newer single family homes and townhouses along Viola Road more than a mile away from the DM&E tracks. CT7 BG1 is roughly eight square miles in area. Census block group data from 1990 for CT7 BG1 reports a median value for owner occupied housing of $72,000, only $100 less than the County median value of $72,100. However, based on 1990 Census block data, mean values for owner occupied homes in blocks within CT7 BG1 range from $49,000 (32% below the County average) to $171,000 (139% above the County average). The block group data reports that only 6.6% of households are renters, compared to 27.5% for the

County. Based on block data from 1990, the percentage of renters by block ranges from 0% to 66.7%. The median cash rent from block group data is $408 ($410 is the median for the County), while the mean monthly cash rent paid by renter households from block data ranges from $50 to $625. These extreme ranges in property-related values are clearly not characteristic of what is conventionally meant by the term "neighborhood." As a result of the scale of analysis, no part of CT7 is identified as an EJ community on Tables D-1 or D-4.

Analysis of 1990 Census block group and public use micro sample (PUMS) data (see below) shows that differences in housing value are strongly correlated with differences in median income. In general, the use of 1990 block group level data obscures the discrepancy in housing value between houses in blocks adjacent to the DM&E tracks and blocks farther away. Because housing value is related to income, the use of block group data thus obscures differences in income among blocks within large block groups as well. For all Census tracts in the urbanized area of Rochester, the difference between Census – reported median housing value for block groups *partly* within the 2,230 foot area of impact (page D-5) and the median for the urbanized area is only around 15%. The difference for the mean value of owner occupied housing in the blocks that are *entirely* within the 2,230 foot boundary, compared to the mean for the urbanized area, was over 27% in 1990.

CT7 BG1 is only one example of how the use of block group data has the effect of excluding neighborhoods with EJ characteristics from the analysis. This also occurs in other parts of the City of Rochester. The approach used in the DEIS thus appears to have seriously distorted the analysis of neighborhoods in the City of Rochester.

The reliance on block group data in the DEIS also excludes any rural villages and any neighborhoods in smaller cities from being considered as environmental justice communities. In the village of Chester (part of CT9 BG8, roughly 7.5 square miles in area) and in the cities of Dover (part of CT20 BG3, roughly 48.25 square miles in area) and Eyota (part of CT20 BG4, roughly 5.75 square miles in area), there are neighborhoods abutting the railroad tracks whose housing values and housing styles differ from the balance of the block group and indicate the probable presence of environmental justice communities. Immediately adjacent to the tracks in the City of Eyota are two apartment buildings constructed with Farmers' Home Administration funding for elderly low income tenants. Further to the north of the tracks is a subdivision of manufactured homes and stick built housing of low value. Exclusive reliance on block group data has the effect of eliminating these neighborhoods from consideration as EJ communities.

2. IMPROPER OR INCOMPLETE APPLICATION OF 1990 CENSUS DATA:

Census data is not used as fully as it should be. In addition to the scale problems described above, the following are problems with the way the 1990 Census data were applied:

Median Income: The DEIS should have relied on comparisons of median household income to aid in identifying environmental justice populations. This approach has been used in other studies conducted by the Surface Transportation Board[1]. The approach clearly applies in Olmsted County as well. Using this approach would have

[1] See, for example, Docket Numbers FD 33388 1 ID 28329, FD 33388 2 ID 28330, FD 33388 3 ID 28331, FD 33388 4 ID 28332, FD 33388 5 ID 28333, FD 33388 6 ID 28334 (in which, evidently, Census block data was used to compare poverty rates and median income), and FD 33388 7 ID 28335 (in which, again, Census block data was used to compare poverty rates and median income).

revealed that 11 of the 25 block groups along the railroad have median household incomes more than 30% lower than the median income for Olmsted County. It is not clear from the environmental reviews conducted by SEA whether there is a consistent standard applying to median income that SEA uses to distinguish EJ communities. However, a disparity in median income of 30% or more should be considered significant.

Minority Populations: The DEIS also identifies minority populations en masse. Olmsted County had small populations of Native American, Black, and Hispanic persons in 1990. Our largest non-white ethnic group were Southeast Asians, classified in the Census as Asian - Pacific Islanders. This group averaged 3% of the County's population but 16.5% of Holmes Elementary School enrollment in 1990. Holmes Elementary is located within one block of the current DME line. (Holmes had 25% Asian enrollment in 1999). Several block groups along the railroad tracks had significant Southeast Asian communities, as high as 18% of block group population in 1990. By lumping non-white populations in the single category "minority," the DEIS reduced the number of block groups identified as EJ populations. In addition, since block data includes population by race category, there is no reason to rely on block group level data to identify potential EJ communities based on race. Block level data indicates that 25 individual blocks along the current DME route had Asian – Pacific Islander population percentages exceeding 13% (ten percent more than the average for the community), with several blocks having Asian-Pacific Islander proportions exceeding 25% of population.

Linguistic Isolation: Given the large number of recent immigrants in Olmsted County's population, Census data on linguistically isolated households should have been relied on to identify areas of poverty and EJ communities. Block group data shows a very

strong correlation between linguistic isolation and rate of poverty, which is confirmed by PUMS data applying to Olmsted County as well as to other areas in Minnesota.

Relationship Between Housing and Income Data: Analysis of the 1990 Census data at the block group level and from the PUMS data for Olmsted County shows a strong correlation between housing characteristics such as tenure and housing value and the percentage of persons with incomes below poverty. The table below presents bivariate correlation coefficients and their significance levels for variables at the block group level for all block groups in Olmsted County under 5,500 in population. (Census Tract 17, which had only one block group in 1990, is excluded from the analysis reflected in the table because including it unreliably inflates the correlation coefficients.) All of the relationships are significant at better than a .01 level. Many of the relationships are quite strong and provide a basis for estimating median income and poverty levels at the level of Census blocks or groups of blocks more representative of neighborhoods than Census block groups.

Table EJ 1: 1990 CENSUS BLOCK GROUP DATA CORRELATIONS AMONG HOUSING VALUE, TENURE, RACE AND INCOME VARIABLES

		Percent persons under 2 times poverty level	Ratio to county median household income	Percent of persons with incomes below poverty
Ratio of median owner housing value to County median	Pearson Correlation	-.575	.844	-.410
	Sig. (2-tailed)	.000	.000	.000
Percent Nonwhite	Pearson Correlation	.358	-.210	.485
	Sig. (2-tailed)	.000	.000	.000
Percent Renters	Pearson Correlation	.632	-.567	.728
	Sig. (2-tailed)	.000	.000	.000
Median Rent	Pearson Correlation	-.460	.438	-.296
	Sig. (2-tailed)	.000	.000	.000

These relationships could have been used to identify clusters of blocks with similar attributes and to estimate their median income and levels of poverty. The accuracy of such estimates can be determined based on the strength of relationship with the independent variables contributing to the estimate. A multiple regression equation developed by the Rochester-Olmsted Planning Department accounts for over 60% of the variance in the percentage of persons with incomes below poverty at the block group level, relying only on housing, race, and tenure characteristics available at the block level. Another equation with the number (instead of the percentage) of persons below poverty as the independent variable and with race, housing, and tenure characteristics as the dependent variables accounts for 75% of the variance in block group numbers of impoverished persons. Possibly, other better equations could be developed. Using these

estimates at the block level results in a higher level of accuracy by avoiding the aggregation errors identified above.

Data from the 1990 PUMS confirm the relationships between tenure and housing value and income. Renter households had an average household income in 1989 of $29,937, as compared to $55,536 for owner households. For 3,725 owner household records, there is a bivariate correlation coefficient of .606 between housing value and household income. The relationships between tenure and housing value (both of which are available at the block level) and income attributes provide a sound basis for identifying clusters of blocks with similar income attributes with better accuracy and fewer aggregation problems than simple reliance on block group data.

3. RELIANCE ON DATA THAT IS OUT OF DATE:

The 1990 Census data is out of date. Olmsted County and the City of Rochester have changed considerably since 1990 in terms of racial makeup and the incidence of low income. School enrollment data for the Rochester School District shows a tripling of nonwhite enrollment and almost double the enrollment in the Free and Reduced Price Lunch program (FARPL). Children qualify for free or reduced price lunch when their family income falls below 135 percent or 180 percent, respectively, of the poverty level. 1990 Census block group data for Olmsted County indicates (as would be expected) a very strong correlation between the number of people with incomes below poverty and the number with incomes below twice poverty. The FARPL program therefore should provide a sound basis for more up to date income data. Such data at the level of

individual schools is available for all Minnesota school districts at an Internet web site maintained by the Minnesota Department of Children, Families, and Learning[2].

The elementary school serving the neighborhood closest to the current alignment is Holmes Elementary, which itself is located one block from the DM&E tracks. Holmes Elementary School's Fall 1999 enrollment had 71% of students eligible for free and reduced price lunch, compared to a community average for all students of 21% and for elementary students of 27.5%.

Data on changes in minority enrollment are also available for all school districts within Minnesota from the same web site. For the Rochester School District, Black student enrollment has grown the most rapidly of any racial group, growing by almost ten times from an enrollment of 107 in 1989-90 to 1,040 in 1999-2000. The elementary school serving the neighborhood closest to the current alignment, Holmes Elementary, has an enrollment that is 44% minority as of Fall, 1999.

Similar data provides a basis for estimating the number and location of populations of households with limited English proficiency. Census data from 1990 and current information from across Minnesota demonstrate a strong relationship between linguistic isolation and poverty.[3] As the result of a recent court case in Minnesota, the Minnesota Department of Human Services is required to use enrollment data as the basis for identifying such populations.

School district records provide another source of updated income data. Examining only the population of students living within 400 feet of the railroad tracks across the

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[2] Data Management Team, Office of Information Technologies, Minnesota Department of Children, Families & Learning, http://cfl.state.mn.us/datactr/dtc_xls.htm.

[3] "Report on Census and Statistical Estimates of Persons Who Do Not Speak English in Minnesota," Dr. Will Craig, University of Minnesota Center for Urban Affairs, September 6, 2000.

City of Rochester, 55% are eligible for free and reduced price lunch, or almost three times the average for the Rochester school district.[4] Of students within 400 feet of the current line, 36% are racial minorities, more than twice the average for the school district.

Assessor's tax records provide another more up-to-date data source for indicators of income derived from housing value and tenure. Our analysis of 1999 property values for single family and 2 to 3 – unit residences in the City of Rochester shows that the average residential building value within 400 feet of the railroad corridor is $59,763, 30% lower than the average of values in the balance of Olmsted County. Based on homestead classification and multifamily housing characteristics, 53% of the housing units are rental units. Given the strong association between tenure and housing value data and the presence of low-income populations, it is very likely that the population immediately adjacent to the railroad tracks is part of an environmental justice community.

Outside the City of Rochester, the Village of Chester includes a subdivision with an average value of $45,867 located immediately uphill from the tracks. The average 1999 building value of single family and duplex homes in Dover is $61,711 and in Eyota is $61,283. By contrast, the County's average 1999 home building value is $85,898.

Local records on rental units, especially subsidized apartments, and on structures such as rooming houses and other group quarters units would also provide better information on where persons of low income reside. In fact, in 1990 there were (and still are) 616 housing units in low income apartment complexes located within 2,230 feet of

[4] The distance of 400 feet was chosen to match the DEIS distance to the 65 L_{dn} noise contour (Table F-6, page F-16) for 37 trains reflecting wayside noise. The distance is also a close approximation of the 65L_{dn} contour (417 feet) at crossings for three trains, the current level of train traffic, based on the relationship between train numbers and contour distances summarized in Table F-6.

the railroad tracks. Data on locations and characteristics of subsidized housing is available from the U.S. Department of Housing and Urban Development.

4. ADVERSE IMPACTS ON PROPERTY VALUES:

The DEIS pays inadequate attention to adverse property value impacts on EJ populations, thereby understating cumulative impacts. It also makes the groundless assertion of a beneficial effect from increased housing demand generated by the railroad project. The DEIS should have examined historical data from comparable situations representing a significant increase in traffic along an existing little-used rail corridor to determine what impact on property values could be reasonably anticipated. It is likely based on experience in other communities (such as those cited in the Chaddick Institute study of transportation noise impacts on property values[5]) that the proposed dramatic increase in rail traffic will devalue properties adjacent to the tracks.

The DEIS acknowledges that "... real estate values may be affected by the increased number of trains resulting in residences adjacent to the rail line becoming less desirable to potential buyers (page 3.2-8)." However, it also asserts (page 3.2-8) that "... some of these impacts could be off-set [sic] by the potential increases in population resulting from ... construction workers ... and the long term increase in the number of railroad related jobs (approximately 210 at 100MNT level of operation)."[6] Olmsted County's employment has increased by over 14,000 jobs over the past five years. It is highly unlikely that 210 jobs spread over all of Minnesota and over all of the years

[5] Alternatives to the Whistle: Economic Perspectives on Public Education and Enforcement in Promoting Highway-Rail Grade Safety in Metropolitan Chicago, Chaddick Institute Working Paper 09-00, Schwieterman and Baden, November 1, 2000.

[6] This is estimated for all of Minnesota. DEIS Appendix M, pages 24 and 25, provide estimates of direct employment increases ranging from 45 to 720. In either case, the estimated employment growth spread over the time period involved in increasing to the 100MNT level of operation and spread over all of the corridor in Minnesota would amount to a trivial share of employment growth in Olmsted County alone.

between startup and attainment of 100MNT will create increased residential property values.

Elsewhere, the DEIS asserts that "it is not likely that real estate values [for property adjacent to the line] will permanently decline as a result of the expansion of railroad traffic" (Appendix M, page 12). This assertion is based on the sales experience of seven properties in Brookings, South Dakota, which sold in the year since the DM&E's public announcement of the project "... at a price above both the seller's purchase price and the property's taxable value (ibid.)." If sales data is to be used to substantiate this assertion, appraisal practice and customary standards of statistics require that a larger and more representative sample be used. Determining the impact on property values across the corridor based on seven sales in one community taking place before the project's inception is absurd. In recent years, due to low interest rates and rapid employment growth, real estate values in Olmsted County have been growing rapidly. Assessed values generally have not kept pace with sales values, and properties have sometimes sold at higher than their "taxable values." To determine if such a project has an impact on residential property values will require study of an adequate sample of residential properties in communities that have experienced dramatic increases in rail traffic, involving both properties affected and not affected by expanded rail traffic.

It might be asserted that the rail project will result in increased opportunities to convert residential uses to industrial uses along the corridor. However, Olmsted County does not have the locational attributes and labor force characteristics associated with industries that rely on rail transportation. None of the available employment forecasts prepared by state or federal agencies or private forecasting firms has projected significant

growth in durable goods manufacturing employment except in electronics manufacturing, which does not rely significantly on rail for shipment.

Even were it to be the case that the demand for commercial and industrial property would increase as a result of rail improvements, it is unlikely that residential property values would appreciate. Most of the property along the DME tracks that is now residential has little potential for industrial use due to street access conditions (which are likely to get worse with the railroad project) and due to the limited demand for industrial land in constrained neighborhood settings. All of the industrial development that has taken place in the past two decades has been on undeveloped land on the fringe of the community. Given the ample supply of this land, it is very unlikely that residential land along the rail corridor will see an increase in value related to demand to convert land uses to industrial use.

The DEIS should have included a more thorough analysis of the project's impact on property values and the potential for a disproportionate impact on households of lower income. Considering the high share of income spent on housing by low-income owner households (available for the study area from 1990 PUMS data), it should be clear that the home owners among the EJ populations along the corridor are particularly vulnerable to losses in property value. Because they lack sufficient wealth to invest in other ways than in housing, the loss of property value represents a substantial if not complete loss of wealth for this group. Property value impacts are potentially very important for this reason, and deserve much more careful study than they have received in the DEIS.

5. NOISE AND OTHER IMPACTS:

The DEIS underestimates the increase in noise levels and other impacts that will result from the increase in rail traffic in several ways. One of the significant flaws in several analyses is reliance on mistaken information on current train traffic levels. There are three through train trips per day in Olmsted County (as stated on page 3.3-62, and elsewhere), not twelve (as stated on page F-15 and elsewhere). Adding the train trips resulting from hauling 20 million tons of coal per day will increase noise levels, not reduce them as projected in Tables FA-1, FA-2, and FA-3. Using the relationships derived from Table F-6, three trains per day generate 65 L_{dn} noise levels at a distance of 65 to 70 feet for wayside noise.[7] Even if whistle-free operation mitigates crossing noise, the residences within 400 feet of the current line will be adversely affected by increased noise resulting from increased train traffic. A high proportion of this population are members of EJ communities.

In general, any analysis which understates impacts along the line or in the core area of Rochester also understates the level of impact on EJ communities, because it is in these areas that EJ communities reside. All of the analyses that rely on mistaken base conditions of train traffic (traffic congestion, air quality, and so on) therefore understate impacts on EJ communities.

6. IDENTIFYING DISPROPORTIONATE IMPACT:

The DEIS errs in its identification of environmental justice populations by relying on outdated data, by using that data incompletely, and by diluting the environmental justice population within large geographic analysis areas. It compounds these analysis errors by comparing the environmental justice population experience NOT to the

[7] The values in Table F-6 do not appear to take account of obstacles along the line which may affect noise levels.

experience of the non-EJ community, but to the whole community, including the low income/minority community. Finally, it compares the environmental justice populations along the route NOT to the community as a whole and NOT to the populations along alternative routes, but to the average of the population along the route. Under this approach, if all of the population along the route were members of environmental justice populations, then they would not be more at risk than the population along the route in general, and there would not be an environmental justice concern. This conclusion does not appear to be consistent with the intent of the National Environmental Policy Act.

7. BYPASS ALTERNATIVES:

Because the bypass route was deliberately designed to avoid impacting concentrations of population, we do not believe that the bypass route triggers environmental justice concerns. The nearest likely concentration of low income persons we have identified (based on housing values) is roughly 4,000 feet from the proposed bypass route, in the unincorporated settlement of Simpson. Because of their distance from the bypass, we do not believe that the residents of Simpson are adversely affected by the bypass route.

To understand the relative impact on EJ populations that may be present along the route of alternative R-4, the DEIS should rely on a smaller scale of analysis. Serious consideration of the bypass route should entail a thorough examination of potential EJ populations along the bypass route as well as an improved analysis of EJ concerns along the current route.

CONCLUSION

The Section on Environmental Analysis should conduct a more serious investigation of environmental justice in the Final Environmental Impact Analysis, including

1. Relying on more up to date data that is more focussed on the areas of impact;

2. Developing more accurate estimates of current conditions with regard to noise, vibration, air quality, property value, access, safety, and so on;

3. Developing careful, well-researched estimates of future conditions with regard to these same impacts;

4. Making more effective efforts to involve EJ communities in evaluating mitigation alternatives; and

5. Recommending thorough, effective mitigation for those impacts that cannot be avoided.

II. NOISE

The following are among the issues related to the inadequacy of the noise impact analysis in the DEIS. Both of these errors in noise impact analysis understate noise impacts significantly. The first is the failure adequately to account for the close proximity of at-grade crossing in Rochester, the resulting share of time that horn noise will be created, and the improper modeling of the resulting nearly continuous horn noise. The second relates to the planned variable maintenance period and the resulting variability in the share of train traffic occurring in night time hours.

A. Calculation of Horn Noise SEL

According to page F-2, train horns are "... assumed to start ¼ mile before all grade crossings and continue until the locomotive is through the grade crossing." A west-bound train would sound its horn 1,320 feet east of 15th Avenue NE, 11th Avenue NE, 9th Avenue NE, 7th Avenue NE, 2nd Avenue NE, Broadway, 1st Avenue NW, 4th Avenue NW, 6th Avenue NW, and 11th Avenue NW. The distances between these crossings, shown in the table below, is such that the horn would be sounding virtually continuously.

Table N1: Distances Between Rochester At-Grade Railroad Crossings

Crossing	Distance to Next Crossing (Westbound)	Distance to Next Crossing (Eastbound)
15th Avenue NE	1,330 feet	5,320 feet
11th Avenue NE	570 feet	1,330 feet
9th Avenue NE	760 feet	570 feet
7th Avenue NE	1,660 feet	760 feet
2nd Avenue NE	760 feet	1,660 feet
North Broadway	380 feet	760 feet

Crossing	Distance to Next Crossing (Westbound)	Distance to Next Crossing (Eastbound)
1st Avenue NW	950 feet	380 feet
4th Avenue NW	740 feet	950 feet
6th Avenue NW	2,090 feet	740 feet
11th Avenue NW	6,400 feet	2,090 feet

The horn would be sounding for more than two minutes, and would be silent for less than half a minute. Except for short breaks after 7th Avenue NE and 6th Avenue NW , the west bound train horn would sound almost continuously (for 9,440 feet over a distance of approximately 11,000 feet) traversed in a time of about two and a half minutes (if the train actually maintains a speed of 49 mph, as the DEIS alleges). The horn would not be sounding for about 500 to 1,000 feet during this stretch. The east bound train would start sounding its horn 1,320 feet west of 11th Avenue West and would have a slightly higher proportion of horn-sounding with a slightly longer traverse time (2.8 minutes at 45 mph versus 2.6 minutes at 49 mph).

Horn sounding periods, with the impact area mapped as any area within 2,230 feet of a point at which a horn is being sounded (based on Table F-6, assuming 37 trains per day), are shown in the map below.

Figure 1

AREAS IMPACTED BY TRAIN WHISTLES BLOWN 20 SECONDS PRIOR TO APPROACHING AT-GRADE INTERSECTIONS



The DEIS horn noise calculations, based on measurements in a rural location in South Dakota, reflect passing events of 13 seconds and 20 seconds duration (Table F-2, page F-6). Because these are short duration events, the DEIS evidently relies on a single-pole model for horn noise, in contrast to the locomotive and car noise models, which account for velocity. These are in the range for the train speeds that the DEIS relies on. Thus, a train sounding its horn for ¼ miles makes a horn noise for 18.36 seconds at 49 mph and for 20 seconds at 45 mph.

Since the close spacing of crossings in Rochester dramatically increases the length of continuous horn-sounding events, it is possible that the noise impact of train horns will also increase. If the distance of impact calculated in the DEIS validly applies in rural locations affected by only one crossing, it seems likely that closely spaced crossings with longer periods of horn noise will have a more severe impact. The SEA may need to consider using a different model to represent horn noise over a two-minute time frame.

The FEIS should be revised to reflect the impact on horn noise of crossings in close proximity. It is likely that this will significantly alter the findings on the number of sensitive noise receptors affected by horn noise in Rochester and possibly in other cities along the current DME route.

B. Variable Maintenance Periods

The DEIS fails adequately to account for the impact of the DME's proposed variable window of maintenance time. The correct version of Equation 7 on page F-8 is as follows:

$$L_{dn}\ (100\ \text{feet}) = SEL_{mean}\ (100\ \text{ft}) + 10\ \log[N_d + 10N_n] - 49.4$$

Where

SEL_{mean} is obtained from Equation 3 if the horn is sounded at the location of interest or from Equations 2, 4, 5, and 6 if the horn is not sounded.
N_d is the number of daytime operations, and
N_n is the number of night time operations.

If night-time operations were always proportional to the number of night-time hours in the 24 – hour day, then the approach used on pages F-11 through F-13 for rail yards and evidently used as reflected in Tables FA-1 through FA-7 would consistently represent real as opposed to average conditions. However, because of the moving window of maintenance operations (Operating Plan at http://www.dmerail.com/exd.htm – paragraph 24 and elsewhere), some hours are unavailable for train traffic. As a result, some nights receive a higher proportion of train traffic than the average of all nights. When more than usual train traffic occurs at night, the multiplier applied to night-time train traffic magnifies the noise impact.

1. Wayside Noise Averages and Modes: On average, for 37 trains of 7,400 feet in length traveling at a speed of 49 miles per hour, the wayside noise (without horns) is calculated as follows:

Equation 6: $T = .68\ (X/V) = .68 * 7400 / 49 = 102.694$
Equation 5: $SEL_{cars}\ (100\ \text{ft})$
$= 48.5 + 18.2\ \text{LOG}\ V + 10\ \text{LOG}\ T = 48.5 + 30.76 + 20.12$
$= 99.38.$
Equation 4: $SEL_{loc} = 98.3$
Equation 2: $SEL_{total} = 10\ \log\ \{10^{SEL(loc)/10} + 10^{SEL(cars)/10}\}$
$= 101.88.$
Equation 7: $L_{dn}\ (100\ \text{feet}) = SEL_{mean}\ (100\ \text{ft}) + 10\ \log[N_d + 10N_n] - 49.4$
$= 101.88 + 10\ \log\ ((37*15/24) + 10*(37*9/24)) - 49.4$
$= 101.88 + 10\ \log\ (23.125 + 138.75) - 49.4$
$= 74.6.$

From Equation 9, the distance to the 65Ldn contour is calculated as
$D = 100 * [10^{(Ldn(100ft)-65)/15}]$
$= 100 * [10^{(74.6-65)/15}] = 435.$

This is the value reflected in Table FA-7 for 37 trains operating at 49 miles per hour between Owatonna and Lewiston. The DEIS may use 420 feet (see Table F-6, page F-16) because when maintenance takes place at night, a higher proportion of the train traffic occurs during daytime hours. The average of the L_{dn} calculations accounting for the variable proportion of daytime traffic is in fact 74.3, which results in a distance to the $65L_{dn}$ contour of 420 feet.

What this averaging approach fails to reflect, however, is that of 24 possible maintenance time distributions, 14 result in higher than average night-time traffic. During that 58% of the time, L_{dn}'s reach 75.6 on 10 of the distributions, with a distance to the $65L_{dn}$ contour of 506 feet. That extra distance (86 feet), on both sides of the tracks (and therefore totaling 172 feet), is sufficient in older neighborhoods to result in a substantially higher population affected by severe noise levels. The DEIS therefore inappropriately uses a formula that understates noise impact 58% of the time.

The range of all possible distributions of maintenance periods over a 24 hour period is illustrated in Figure 2 (assuming a six-hour maintenance window). It can be seen from Figure 2 that 14 of 24 possible maintenance period distributions result in night-time train traffic exceeding 37.5% of daily traffic, and (because of the weighting of night time train traffic by a factor of ten times) result in higher than "average" Ldn levels.

2. Wayside Noise Levels in Excess of 70 L_{dn}: It is possible using the formulas presented in Appendix F to identify the contours for noise levels in excess of the 70 L_{dn} levels reported in Table F-6 (page F-16). For train traffic levels pertaining to Rochester, Minnesota, the noise contours for wayside noise without horns (which have not been but should be adjusted for ambient noise levels representative of urban settings) are shown below.

Table N2: Wayside Noise Accounting for Maintenance Variability

Train Traffic	Distance to 65Ldn (feet)	Distance to 70Ldn (feet)	Distance to 75Ldn (feet)
3 Trains			
DEIS Value (F-6)	Not provided	Not provided	Not provided
Mean	81	37	17
Median	86	40	19
Mode	95	44	20
11 Trains			
DEIS Value (F-6)	200	95	Not provided
Mean	192	89	41
Median	205	95	44
Mode	226	105	49
21 Trains			
DEIS Value (F-6)	300	145	Not provided
Mean	295	137	64
Median	315	146	68
Mode	347	161	75
37 Trains			
DEIS Value (F-6)	420	210	Not provided
Mean	429	199	92
Median	459	213	99
Mode	506	235	109

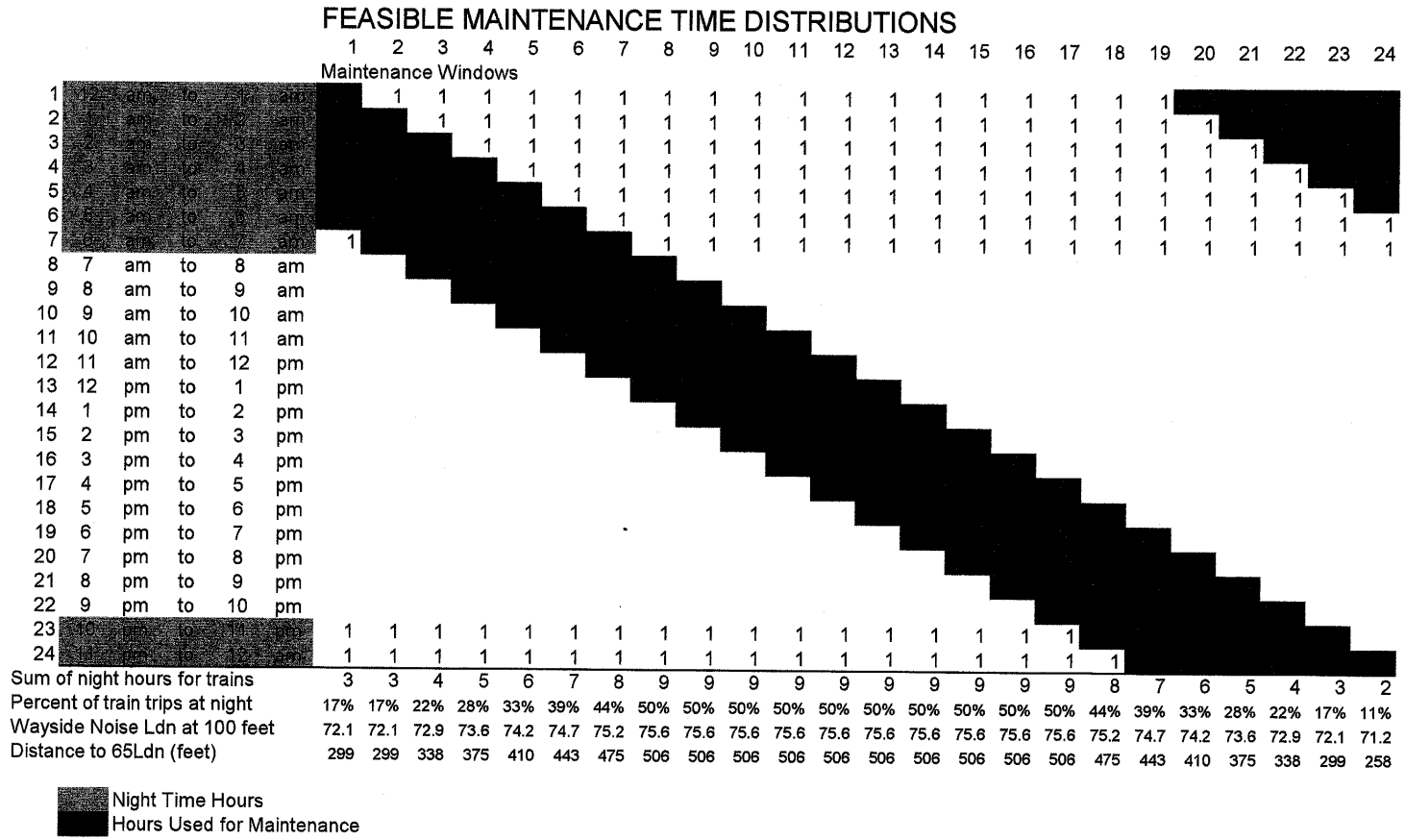


Figure 2: Impact of Variable Maintenance Windows and Night Time Train Operation Assuming 37 Trains of 7,400 foot length traveling 49 mph

In all of these cases, the value for the mode occurs 42% of the time, the median is exceeded 50% of the time (by definition), and the mean value is exceeded 58% of the time. To reflect impacts appropriately, the FEIS should use the value for the mode, after adjusting appropriately for ambient noise levels.

3. Horn Noise Adjusting for Maintenance Periods

The same rationale reflected above applies to horn noise. Assuming single-point horn noise sources (as is evidently the case in the DEIS), horn noise exposure experience is reflected in the following table, calculated using Equation 9, page F-8.

Table N3: Horn Noise Accounting for Maintenance Variability

Train Traffic	Distance to 65Ldn (feet)	Distance to 70Ldn (feet)	Distance to 75Ldn (feet)
3 Trains			
DEIS Value (F-6)	Not provided	Not provided	Not provided
Mean	412	191	89
Median	439	204	95
Mode	484	225	104
11 Trains			
DEIS Value (F-6)	1,000	500	Not provided
Mean	980	455	211
Median	1,044	485	225
Mode	1,151	534	248
21 Trains			
DEIS Value (F-6)	1,600	770	Not provided
Mean	1,508	700	325
Median	1,606	746	346
Mode	1,772	822	382
37 Trains			
DEIS Value (F-6)	2,230	1,120	Not provided
Mean	2,199	1,021	474
Median	2,343	1,088	505
Mode	2,584	1,200	557

In all of these cases, the value for the mode occurs 42% of the time, the median is exceeded 50% of the time (by definition), and the mean value is exceeded 58% of the

time. The FEIS should reflect the modal condition in its crossing contour tables. The value of 2,230 feet (at 37 trains per day, for example) is exceeded 58% of the time after adjusting for maintenance periods, and not adjusting for ambient noise conditions.

4. Both Crossing and Wayside Noise

Appendix F, page F-7, states that the "horn noise, when present, dominates the passing event" and accordingly uses the SEL_{mean} for horn noise (112.5) when calculating noise impact. In fact, using Equation 2, page F-7, and factoring in horn noise with locomotive and car noise, results in an SEL_{total} of 112.86, instead of 112.5. This apparently small increase has the effect of increasing the modal distance to the 65 L_{dn} contour for 37 trains from 2,584 feet to 2,732 feet.

The table below shows the noise contours that result, calculated using Equation 9, page F-8.

Table N4: Horn and Wayside Noise Accounting for Maintenance Variability and Equation 2

Train Traffic	Distance to 65Ldn (feet)	Distance to 70Ldn (feet)	Distance to 75Ldn (feet)	Distance to 80Ldn (feet)	Distance to 85Ldn (feet)
3 Trains					
DEIS Value (F-6)	Not provided	Not provided	Not provided	Not provided	Not provided
Mean	434	201	93	43	20
Median	464	215	100	46	22
Mode	512	238	110	51	24
11 Trains					
DEIS Value (F-6)	1,000	500	Not provided	Not provided	Not provided
Mean	1,031	479	222	103	48
Median	1,103	512	238	110	51
Mode	1,217	565	262	122	56
21 Trains					
DEIS Value (F-6)	1,600	770	Not provided	Not provided	Not provided
Mean	1,587	737	342	159	74
Median	1,698	788	366	170	79
Mode	1,873	869	403	187	87
37 Trains					
DEIS Value (F-6)	2,230	1,120	Not provided	Not provided	Not provided
Mean	2,315	1,075	499	232	107

Train Traffic	Distance to 65Ldn (feet)	Distance to 70Ldn (feet)	Distance to 75Ldn (feet)	Distance to 80Ldn (feet)	Distance to 85Ldn (feet)
Median	2,477	1,150	534	248	115
Mode	2,732	1,268	589	273	127

It is apparent from the table that households with the misfortune of living within the areas affected by both horn noise and wayside noise will suffer from truly intolerable noise impacts. The magnitude of these impacts has been insufficiently addressed in the DEIS.

C. The Number of Structures and Residences Likely to be Affected by Noise

The tables below present local information for the City of Rochester verified from property records of the Olmsted County Assessor and the Rochester Olmsted Planning Department Geographic Information Division. The values for parcels partly within specified distances relate to parcels any part of which are within the specified distance. The values for structures completely within the specified distances are derived from digital aerial orthophotographs linked to parcel data through the Geographic information System of the Rochester Olmsted Planning Department. A structure is included in the distance indicated if the perpendicular distance from the center of the structure to the center of the track is less than or equal to the indicated distance. Because the center of the structure is the point of measurement, it is certain that parts of large structures extend significantly closer to the tracks than the indicated distances.

Even with this conservative approach, however, it is clear from the table that the number of dwelling units significantly exceeds the numbers of sensitive receptors identified on page 3.3-66, Table 3.3-13 and 14. At 37 trains per day using the $65L_{dn}$ level for wayside noise, for example, the number of residences alone (not counting other sensitive receptors) is not 14 as in Table 3.3-14 but 411 (at the 420 foot distance cited in Table F-6, page F-16).

Table N5: Wayside Noise Impacts in Rochester (Compare with tables 3.3-13 and 3.3-14, page 3.3-66)

# of Trains	Distance in feet	parcels at least partly within distance	all structures on parcels at least partly within distance	all structures completely within distance	residential structures on parcels partly within distance	residential structures completely within distance	dwelling units on parcels partly within distance	dwelling units completely within distance
< 3 (existing)	65* (interpolated from Table F-6, page F-16)	NA	NA	3	NA	0	NA	0
	100**	214	128	22	56	5	64	8
11	226* (mode distance Table 2, above)	NA	NA	146	NA	98	NA	146
	200**	357	226	121	117	77	146	119
21	347* mode distance Table 2, above	NA	NA	274	NA	191	NA	308
	400**	670	477	370	316	269	744	390
37	420* DEIS value from Table F-6, page F-16	NA	NA	396	NA	290	NA	411
37	506* mode distance Table 2, above	NA	NA	504	NA	*374*	NA	510

* Distance is to the 65 dBA Ldn contour at the specified number of trains. For the existing condition, the value interpolated between two and four trains on Table F-6, page F-16 is used. Confirming the reasonableness of this approach, if speed is assumed to be 20 mph and length is assumed to be 6,400 feet, the median distance to 65 dBA L_{dn} is 66 feet.
** These distances correspond to DEIS vibration impact distances at Table 3.2-21, page 3.2-64.

The number of dwelling units is not a complete count of sensitive receptors, since there are a number of other uses within noise impact areas that are also sensitive. Among these in the City of Rochester are the Federal Medical Center, with an inmate population some of whom are residents due to illness; a nursing home complex, Town Hall Estates, with a capacity for 60 residents; Holmes Elementary School; 320 acres of community parkland in Rochester, and the 40 acre Oakwood Cemetery in Rochester; hotels and hospitals; and several other noise sensitive uses.

Table N6: Horn Noise (Compare with tables 3.1-10, 3.3-13 and 3.3-14, page 3.3-66)

# of Trains	Distance in feet	all structures completely within distance	residential structures completely within distance	dwelling units completely within distance
< 3 (existing)	417 (interpolated from Table F-6, page F-16)	393	289	410
11	1,217 (mode distance, Table 4, above)	1,650	1,387	2,293
11	1,151 (mode distance Table 3, above)	1,537	1,292	2,024
11	1,000 (Table F-6, page F-16)	1,279	1,063	1,691
21	1,873 (mode distance, Table 4, above)	2,870	2,501	4,141
21	1,772 (mode distance Table 3, above)	2,643	2,285	3,878
21	1,600 (Table F-6, page F-16)	2,306	1,976	3,296
37	2,732 (mode distance, Table 4, above)	5,129	4,597	8,174
37	2.584 (mode distance Table 3, above)	4,703	4,211	7,762
37	2,230 (Table F-6, page F-16)	3,784	3,357	5,933

It is clear that the values in Tables 3.3-14 significantly understate the number of sensitive receptors impacted by train noise. The values in both Table 3.1-10 and Table 3.3-13 (which are slightly different from each other, although they both purport to reflect

existing conditions) appear to reflect the mistaken notion that Rochester has an existing train traffic level of 12 trains per day, and thus overstate current 3-train-per-day conditions. At future projected levels of train traffic, the errors become increasingly large. For example, the figure of 5,933 dwellings affected by horn noise from 37 trains, at the 65 L_{dn} noise distance of 2,230 feet (from Table F-6, page F-16) is 2.5 times as high as the total number of sensitive receptors identified by the DEIS in Table 3.3-14. The number of residential structures alone is 44% higher than the DEIS figure for all sensitive receptors. Within this distance there are also six public school structures, eight private school structures, three post-secondary education structures, ten churches, two cemeteries, six hospital structures (excluding the Federal Medical Center, which is of course also affected), and 28 charitable institutions. (This is by no means a complete count of sensitive receptors within 2,230 feet of the current track.)

It is not clear how SEA arrived at the number of sensitive receptors presented in Tables 3.3-14, but clearly the method is flawed. According to the discussion on page F-3, "... 65dBA L_{dn} contours were drawn on aerial photographs and USGS 7.5 minute maps. Approximate counts were made of the number of sensitive noise receptors, including residences, schools, and churches within the 65dBA L_{dn} contour for both the pre- and post- construction train volumes using maps and aerial photographs. The final result of this analysis is an estimate of the total number of sensitive receptors likely to be affected by noise exposure above the 65dBA L_{dn} levels due to proposed DM&E operation." This methodology resulted in huge errors in Rochester, and there is no reason to assume that it did not also result in errors of similar magnitude in other developed parts of the project area.

The values in Table 5.1-10 in the section applying to Alternative R-2 appear to be intended to reflect conditions in all of Olmsted County. Since the table indicates that it applies to the increase in noise receptors, it is important that it rely on accurate counts of existing noise receptors. This is not possible, given the error that results from the use of 12 trains per day as the current level of train traffic. Table N7 presents the correct existing information. The distance of 65 feet applies to wayside noise based on three trains per day at 20 mph, using the DEIS train length of 6,400 feet. The information for each higher distance is cumulative, so that 400 feet includes the values for 200 feet , and so on.

Table N7: Noise and Vibration Receptors in Byron, Chester, Dover, Eyota, and Rochester

Receptor	Within 65 Feet	Within 100 Feet	Within 200 Feet	Within 400 Feet
residential structures	0	11	178	591
commercial	8	33	69	162
other	0	7	9	25
all structures	5	51	256	778
dwelling units	0	17	229	752

It should be clear that the errors in calculating the distances affected by train noise, although they do not account for the errors in the tables, add significantly to the impact. The 100 additional dwelling units affected by wayside noise at 506 feet versus 411 feet (see table 5, above) amount to almost a 25% increase in affected dwellings. Similarly, the number of dwellings at 2,732 feet versus 2,230 feet amounts to a 38% increase in affected residences. While the magnitude of these errors is small compared to the errors resulting from the reliance on aerial photographs to identify sensitive receptors, the Final EIS should make both types of corrections.

III. LAND USE

The information presented in the sections in which land use is discussed includes errors both of omission and commission. These errors are discussed by reference to the paragraphs in Chapter 3.

At 3.1.4.1, in the discussion of agriculture, it is asserted that "farming is the principal enterprise in the project area." It is true that agriculture is the land use accounting for the largest land area. In Olmsted County, services and manufacturing account for a larger share of the regional economy than agriculture in terms of the number of firms, the number of employees, the dollar value of commodities sold, and the value of payroll. Establishing the relative importance of agriculture for the area served by the railroad should entail an analysis of these factors. It may be that the description of agricultural land use does not matter to the assessment of environmental impact. If that is the case, it is difficult to discern an analytical purpose for the statement.

Table 3.1-5 on page 3.1-15 provides data from the 1992 Census of Agriculture. Data from the 1997 Census of Agriculture was released in May, 1999, and should have been relied on instead as more up-to-date. Olmsted County farmland acres declined from 318,748 acres in 1987 to 303,665 acres in 1997, roughly 1,500 acres per year.[8] Total acreage in farmland for the State of Minnesota declined by 579,198 acres over the same period, or about 58,000 acres per year.

A more purposeful discussion of farming land uses would list the numbers and types of farms, their proximity to the railroad, any land use incompatibilities that now exist between farm uses and the railroad, how these incompatibilities have affected farm

[8] US Department of Agriculture National Agriculture Statistics Service, 1999. Accessed at http://govinfo.kerr.orst.edu/ag-stateis.html

operations (if they have), and how these relationships may change if the project is approved. It may be that increased train traffic will affect the productivity of dairy herds, turkey hatcheries, hog farrowing operations, and other farm uses in which livestock animals are sensitive to stress from noise and vibration. Alternatively, it may be that improved rail conditions will reduce transportation costs for commodity shippers and increase prices received by area farmers. Confirming or refuting either hypothesis requires information about agricultural operations not provided in the DEIS. However, the fact that all of the noise and air quality impact analyses assume that coal traffic will be added only to existing, and not to expanded, agricultural and industrial traffic may indicate that only very limited expansion of agricultural shipping is anticipated. If improved service is to be provided to area agricultural interests, some indication of the increased rail traffic that would result will need to be provided in order to evaluate the total impact of the proposed project.

The analysis of residential land use presented at 3.1.4.2 appears to describe the area immediately adjacent to the railroad, but it does not specify the depth used to detect residential land uses. Without this information, the statement on page 3.1-15 that the "... existing DM&E rail line is adjacent to approximately 12.0 miles of land classified as residential" is meaningless. If a residential neighborhood is separated from the railroad by a commercial use and a public street with a total depth of 100 feet, is the residential neighborhood considered "adjacent"? What if the separation is created by a bikeway corridor with a total depth of 50 feet? Without this sort of simple definitional information, the discussion is devoid of meaningful content. A more purposeful discussion of residential land uses would list the numbers and types housing within a

specified distance, land use incompatibilities that now exist between residential uses and the railroad (if any), how these incompatibilities have affected property values (if they have), and how these relationships may change if the project is approved. None of the subsequent discussions of noise and vibration or property value impacts relies on data presented in this section. Providing a single source for the residential land use data relied upon in subsequent sections of the DEIS would have been of value. It is asserted that "some residential areas are in close proximity to the rail line." A detailed discussion of the residences and the impacts of "close proximity" is necessary for this statement to be useful.

At 3.1.4.3, in the discussion of business and industrial uses, it is asserted that "small business and industrial areas occur adjacent to the existing rail line in nearly every community along the rail line. Many of these facilities utilize the rail line to ship and receive material." While the truth of this statement depends on the interpretation of the term "many," it is at least misleading in its implication that rail shipment is a significant factor for businesses in communities along the rail line at least in Olmsted County. There are 3,125 establishments with payrolls in Olmsted County[9]. Of these, only a handful (nine, according to the list on page 3.3-53 of the DEIS) use rail to ship or receive material. Nine establishments represent less than half of one percent of the employers in Olmsted County.

Establishing the significance of rail shipment to businesses and industries in the counties through which the rail line passes would require identifying the number of firms

[9] Minnesota Department of Economic Security Research and Statistics Office, Minnesota Covered Employment and Wage Data, 1999 Annual Averages, at http://www.mnworkforcecenter.org/lmi/es/ann-summ.htm.

relying on the rail line to ship and receive materials and detailing their economic importance in the region. That data is not provided in the DEIS. The FEIS should provide this information. However, given that total shipments amounted to 58,000 rail car loads in 1998, and that of these 50% were grain or grain products, the total number of rail carloads shipped or received by non-agriculture related establishments could not exceed 29,000. Of the 9,496 establishments in counties along the line in Minnesota (1994 Minnesota County Business Patterns, U.S. Bureau of the Census), 145 were agricultural services, leaving 9,351 other establishments. Dividing the 29,000 carloads among these establishments results in roughly three carloads per year per establishment divided among all establishments and 58 carloads per year per establishment divided among all manufacturing establishments. While rail shipment is clearly important to some shippers and some communities, it appears unlikely that this represents a significant share of all materials shipping in the region. Finally, since the number of trains used in projections of impact for noise and air quality is simply the sum of current traffic plus projected coal traffic, it does not appear that the DEIS projects expanded service to area agricultural and non-agricultural interests. This should be clarified in the FEIS.

At 3.1.4.5, in the discussion of public facilities, the DEIS addresses the presence of schools, hospitals, ambulance, fire, and police services in communities affected by the proposed project. Unfortunately, it does not discuss how these facilities are presently affected by the railroad and how they might be affected by increased rail traffic. In the case of public facilities in the City of Rochester, proximity to the railroad has been a minor inconvenience for the most part. Increased rail traffic would seriously affect the schools and other public facilities that are sensitive receptors of noise, disrupt

recreational and cultural events in the parks and civic center adjacent to the rail line, interfere with emergency response by the ambulance service and the police and fire departments, and jeopardize security at the Federal Medical Center. These problems are the results of land uses in close proximity to a rail line that is compatible with these land uses at the present level of use but would be incompatible at the projected twelve-fold increase in train traffic.

On page 3.1-18, the Federal Medical Center, operated by the Federal Bureau of Prisons, is erroneously characterized as a state prison medical facility.

Table 3.1-7, on page 3.1-20, characterizes the East Side State WMA as having hunting and hiking opportunities. This area is a large wetland with shallow water and emergent vegetation. Hiking opportunities are not provided at this site. During most seasons of the year, the recreational opportunities provided by this site consist of spectacular bird watching and bird- and frog-listening. The auditory experience at present is affected minimally by traffic noises along County State Aid Highway (CSAH) 9 and further away along Trunk Highway 14. With at-grade crossings in close proximity at CSAH 9 and CSAH 11, horn and wayside noise increases may adversely affect human enjoyment (at least) of the site. The question of whether the waterfowl, shoreland birds, and amphibians present at the site are sensitive to noise and vibration impacts from increased train traffic should be examined and addressed in the FEIS.

Beginning on page 3.1-39 is a profile of land uses in Olmsted County provided in connection with a discussion of noise receptors. For all communities, the 1990 Census population is provided, which for reasons addressed above should be replaced with updated information. The first paragraph discusses the City of Dover, which is

characterized as including "... high schools, middle schools, elementary schools, churches, and parks." There is a small alternative high school in the City of Dover operated as part of the Dover-Eyota School system. There are no middle schools or elementary schools. The last sentence of the first paragraph identifies 80 existing noise receptors, based on twelve trains per day. The current level of train traffic through the City of Dover is less than three trains per day, with correspondingly lower wayside and horn noise impacts. With a wayside noise distance at the 65 dBA L_{dn} level of 65 feet (interpolating from Table F-6, page F-16, as above in Table N5 of this verified statement), there are no churches or parks affected by wayside noise currently. With a horn noise distance at the 65 dBA Ldn level of 417 feet (interpolating from Table F-6, page F-16, as above in Table N6 of this verified statement), there are no churches or parks affected by horn noise currently in the City of Dover. There are 54 properties with structures for which at least part of the parcel is within 400 feet of the rail line. Of these, 36 have residential structures[10].

With a 65 dBA Ldn distance of either 2,230 feet (Table F-6, page F-16) or 2,732 feet (Table 4, above), essentially all of Dover will be in a serious noise impact condition. A good share of Dover will be affected by wayside noise, as well. Fourteen residences are within 200 feet of the line and would experience noise levels above 80 dBA $L_{dn,}$ not accounting for cumulative vibration impacts on noise perception.

The second paragraph on page 3.1-39 describes the City of Eyota. It is asserted that "the community includes high schools, middle schools, elementary schools, churches and parks." The Dover-Eyota School District does not have a middle school. Both the primary school and the high school are located in the City. There is only one of each. It is

[10] This data is derived from real property information from the office of the Olmsted County Assessor.

stated that "existing noise sensitive receptors in the 65 dBA L_{dn} contour, due to wayside and horn noise, total 238 based on twelve trains per day." This is in error. The current level of train traffic through the City of Eyota is less than three trains per day, with correspondingly lower wayside and horn noise impacts. One single family residence and one multifamily structure are on parcels at least part of which are within 100 feet of the line and may be affected by wayside noise. There are 94 structures on parcels at least partly within 400 feet of the rail line. Of these, 59 include dwellings. Three of these structures are multi-family residences, two of which are within 200 feet of the track. As noted above in the section of this verified statement discussing environmental justice, there is a significant potential for serious noise impact for the seven single-family dwellings and the multi-family dwellings and manufactured homes in close proximity to the track. At 37 trains per day, all of these will experience noise levels exceeding 80 dBA L_{dn}, not accounting for cumulative vibration impacts on noise perception.

Chester: The third paragraph on page 3.1-39 discusses land uses in Chester. It is asserted that "existing noise sensitive receptors in the 65 dBA L_{dn} contour, due to wayside and horn noise, total 99 based on twelve trains per day." This is in error. The current level of train traffic through Chester area is less than three trains per day, with correspondingly lower wayside and horn noise impacts. There are 37 structures on parcels at least partly within 100 feet of the line, of which 26 include residences. Some of these residences may be close enough to the line to be affected by wayside noise. There are 62 structures on parcels at least part of which are within 400 feet of the line. These structures could be affected currently by horn noise. Of these, 44 are residences (all are single family residences). The 26 residences within 100 feet of the line will experience

noise levels higher than 85 dBA L_{dn} , not accounting for cumulative vibration impacts on noise perception, at a train traffic level of 37 trains.

The fourth paragraph on page 3.1-39 discusses land uses in Rochester. This information is incomplete and the tables in the noise comment (Tables N5 and N6) should be relied on to provide more complete information. The number of sensitive receptors is inflated based on an erroneous number of trains per day. Fewer than three trains per day currently pass through the City of Rochester, as reflected in the information in Tables N5 and N6.

The final paragraph on page 3.1-39 discusses the City of Byron. It is asserted that "existing noise sensitive receptors in the 65 dBA L_{dn} contour, due to wayside and horn noise, total 469 based on twelve trains per day." This is in error. The current level of train traffic through Byron is less than three trains per day, with correspondingly lower wayside and horn noise impacts. Again, the number of existing noise receptors is inflated by reliance on a train traffic number that is more than four times as high as the actual train traffic. There are 114 structures on parcels at least part of which lies within 100 feet of the track, some of which structures may be within 65 feet of the track and be subject to wayside noise impacts exceeding 65 dBA L_{dn}. Of these, one is a multi-family structure, one is a church, and 103 are single family dwellings. There are 298 structures (184 additional structures) on parcels at least partly within a 400 foot distance from the track. Of these, 276 are residential structures (172 additional residential structures), one is a church, and one is a school. The residential structures include one duplex, four multifamily dwellings (three additional multifamily structures, one of which is within 200 feet of the line), and four townhouse units. The two multifamily structures within two

hundred feet of the line and the 130 single family units within 200 feet of the line may experience noise levels in excess of 80 dBA L_{dn} , not accounting for cumulative vibration impacts on noise perception, at 37 trains per day. Those within 100 feet of the line may experience noise levels in excess of 85 dBA L_{dn}, not accounting for cumulative vibration impacts on noise perception. As the map shown in the noise comment indicates, nearly all of the City of Byron will be affected by high noise levels at 37 trains per day.

Absent from the discussion is any detailed mention of unincorporated areas outside the Chester area. The most significant noise-sensitive public facility in the unincorporated areas along the railroad line is Chester Woods Park, which provides overnight camping, picnicking, hiking, horseback riding, swimming, and boating opportunities and which includes some of the largest undisturbed prairie and woodland plant communities in Olmsted County. Excluding Chester Woods Park, there are 77 structures on parcels at least part of which lie within 400 feet of the rail line in other unincorporated areas, of which 37 are located on parcels at least part of which lie within 100 feet of the line. Of these structures, 61 are residences (all single-family), of which 30 are located on parcels at least part of which lie within 100 feet of the line. These 30 residences may experience noise levels in excess of 85 dBA L_{dn}, not accounting for cumulative vibration impacts on noise perception.

Land uses along the proposed bypass route are discussed in 3.3.2.4 beginning on page 3.3-50. As with the discussion of land use addressed above, the information provided is general in nature and insufficiently quantified to identify or compare environmental impacts. The figures cited for agricultural land (loss of 727.3 acres) and prime farmland (loss of 606.0 acres) need to be clarified in order to provide for

verification. It appears from the figures in the last paragraph on page 3.3-50 that the DEIS assumes a 200 foot right-of-way width in its calculations of land use impact. Applying that width to local GIS information based on recent aerial photography, there are 565 acres of cultivated land within 100 feet on either side of the version of the bypass route R-4 for which maps are provided in Volume 5 and 577 acres of cultivated land within 100 feet on either side of the version of the bypass route provided by the City of Rochester in its June, 1999 submittal. The figure of 606 acres of prime farmland (3.3-49 and 3.3-50) may be based on older land cover information or on soils information. Verifying its accuracy requires that the FEIS reveal the source of the information. For purposes of comparison, as noted above, between 1987 and 1997, 15,083 acres of farmland were converted to other uses in Olmsted County. In addition, the figures developed by the City of Rochester (Mike Nigbur Verified Statement) indicate a total land area needed for right of way of 547 acres with a net land area (including land acquisition related to mitigation) of 646 acres. Of this area, approximately 473 acres would be "prime farmland" as defined by the DEIS.

We are unable to determine whether the DEIS uses the proposed bypass route submitted by the City of Rochester in the Verified Statement prepared by Leif Thorson in June of 1999, or the earlier version of the bypass route submitted by the city of Rochester in January of 1999. The June, 1999 version should be used. Unfortunately, the maps provided in DEIS Volume 5 present the January, 1999 version. It appears that the description of the bypass alternative in Chapter 2 (at 2-59 to 2-60) also reflects the original as opposed to the corrected submittal. Assuming an average right of way width of 200 feet, the total land area in the bypass route is 857.6 acres in the January version

and 814.3 acres in the June, 1999 submittal. As indicated in the Verified Statement of Mike Nigbur, actual land area needed for the bypass is only 547 acres. The City of Rochester is confident that a narrower right of way will suffice. The FEIS should analyze the correct proposal (the proposal described in the verified statement of Leif Thorson), define the terms it is using, clarify the measurements it makes, and quantify the impacts it identifies.

IV. GEOLOGY AND SOILS

At 3.3.2.3.1, in the description of Alternatives R-1 and R-2, it is asserted that "no geological hazards are known to be present on the existing rail line." In fact, building contractors working in the City of Rochester often encounter solution cavities and caverns during foundation excavations. Evidence of these conditions are the sinkholes that lie in close proximity on both sides of the DM&E rail line in Rochester.

Even were there no sinkholes in the vicinity of the current line, the fractured limestone bedrock underlying portions of the current route in Olmsted County and western Winona County should be considered geologic hazards from the standpoint of groundwater pollution potential. The ground water pollution sensitivity map prepared by the Minnesota Geological Survey (MGS) maps the time it would be expected to take for pollutants at the surface to reach the underlying aquifers. The two map designations with the highest sensitivity to groundwater pollution are described as

> Very High – Contaminants will almost certainly reach the water table in hours to months and
> High – Contaminants will probably reach the water table in weeks to years; little natural protection exists to retard the vertical movement of liquids.

Wherever these map designations occur, there is a risk that a hazardous waste spill may end up in the first aquifer encountered below the surface. Where that aquifer is relied on

as a drinking water supply, there would exist a potentially significant health risk. Figure 3, below, shows areas classified as having high or very high susceptibility to groundwater contamination.[11] The map shows the January submittal version of the bypass route, following the error in the DEIS.

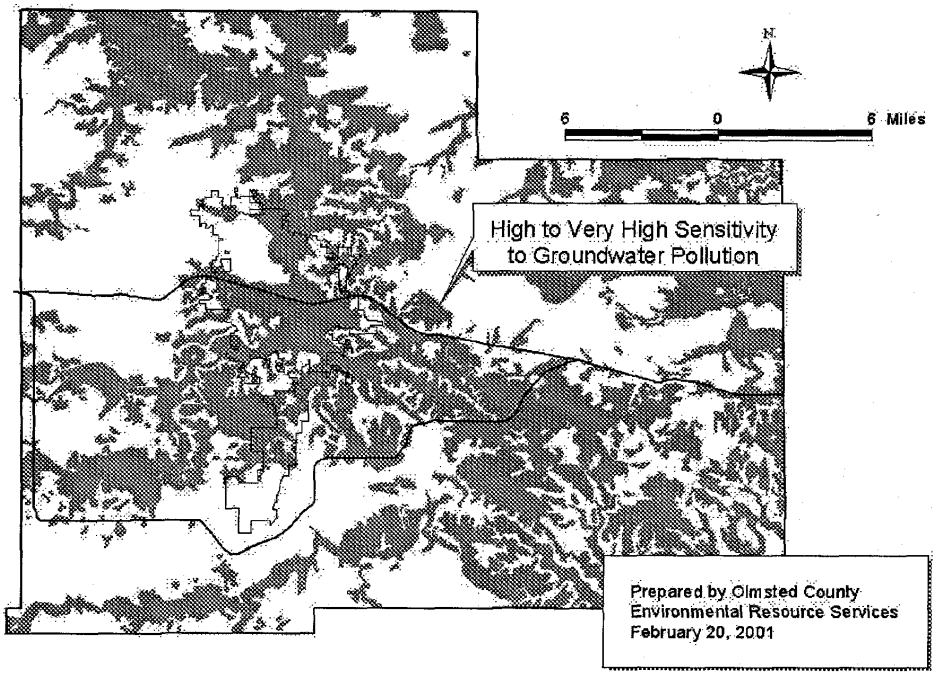


Figure 3 Sensitivity of the Water Table Aquifer to Pollution in Olmsted County.

Portions of the current route as well as the bypass route are mapped as having high or very high sensitivity to groundwater contamination.

Figure 4 shows the implications of geologic sensitivity on the drinking water resource. In Olmsted County, drinking water is derived from the St. Peter-Prairie du

[11] Source: Adapted by Olmsted County Environmental Resource Services staff from Geologic Atlas of Olmsted County, Minnesota, County Atlas Series Atlas C-3, Plate 6 of 9, Pollution Sensitivity, Minnesota Geological Survey, (Balaban,. 1988).

Chien-Jordan aquifer, which lies under the Decorah Shale. Where the Decorah Shale is intact, there is a significant level of protection provided to drinking water. The shallower aquifer above the Decorah Shale (the Galena formation) is too contaminated to supply drinking water reliably.

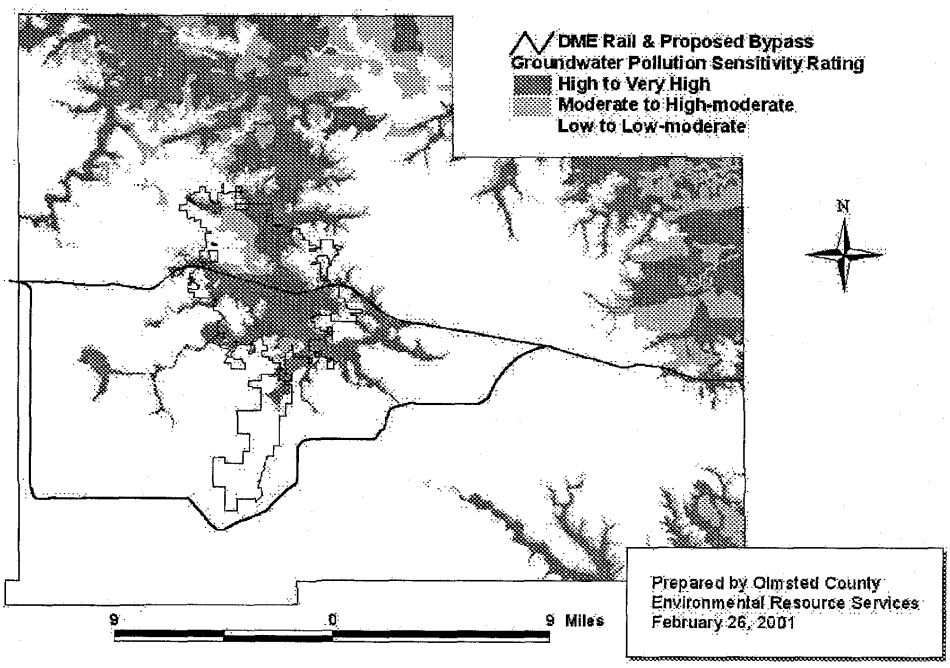


Figure 4: The sensitivity of the St. Peter-Prairie du Chien and Jordan Aquifers in Olmsted County.

All of the aquifers and surface waters of Olmsted County are interconnected, so that both the Galena and the surface waters of the County recharge deeper aquifers eventually. However, a spill onto a land surface above the Galena where the Decorah

Shale is intact will generally take much longer to reach a drinking water supply than a spill onto a land surface above the St. Peter, Prairie du Chien, or Jordan formations.[12]

The conclusion that the current route is absent any geologic hazards is clearly misleading or erroneous. The FEIS should present a more thorough study of the geology and groundwater sensitivity of Olmsted County (and Winona County).

The discussion of soils on page 3.3-48 ignores the significant construction problems presented by the soils derived from the Decorah Shale. The Decorah Shale forms soils that are high in clay content and in shrink-swell potential and present difficulties for building site development. In addition, because these soils form at the edge of the Decorah Shale, they receive the aquifer discharge from aquifers above the Decorah Shale (as a result, many of these soils occur in wetland complexes known as "hillside seeps"). A recently completed but not yet published study by the US Geological Survey (USGS) estimates the water spilling over the Decorah shale in the Chester area to be about 18,000 gals/ft/year. This compares to about 18 gals/ft/year for a typical upland site. MGS staff note that the St. Lawrence and Franconia formations in Winona County appear to have hydrogeologic characteristics similar to those found at the terminal edge of the Decorah Shale.

The DEIS asserts at 3.3-48 that "for the area of Alternative R-3, much of the soil types within the proposed right-of-way contain severe limitations for development of buildings and roadways" and raises concerns about soil loss, mixing, and compaction. While the bypass route for the most part avoids the problems associated with the edge of the Decorah Shale, it crosses an area of soils formed in glacial till of varying thickness

[12] Source: Adapted by Olmsted County Environmental Resource Services staff from Geologic Atlas of Olmsted County, Minnesota, County Atlas Series Atlas C-3, Plate 6 of 9, Pollution Sensitivity, Minnesota

and composition. Where the till soils contain high amounts of clay, construction problems may be encountered. Similar problems would have been surmounted in the construction of Minnesota Highway 30 and Interstate 90, which pass through the area of the bypass, as well as in the construction of railroad lines in Dodge and Mower Counties, both of which have significant areas of soils formed in glacial tills. The construction-related erosion and other soil problems discussed 3.3-48 and 3.3-49 can be addressed by stockpiling topsoil, seeding and mulching disturbed areas, erecting silt fences and other soil movement controls as needed, and other conventional construction-related erosion control methods. These practices are customary when constructing roads or buildings in this area. Similar problems are encountered and should be dealt with by the DM&E along their current route. As an example, the DM&E's maintenance activities along the right of way in Eyota Township have left an extensive exposed slope that should have been mulched and seeded to prevent erosion.

In 3.3.2.5.2, in the discussion of wetlands, it is asserted that "25.5 acres of wetlands occur within the existing rail line through Rochester" of which 22.5 are emergent. As noted in the comments submitted by Olmsted County, the classification system used in the DEIS is improper and the current standard classification system should be used in its place. As noted above, the current route traverses a number of areas at which the Decorah Shale is outcropping. These areas are characterized by significant wetland features similar to and in some cases including calcareous fens, and are some of the most biologically diverse and important wetlands in the County. These features are located in or adjacent to the DM&E right of way. Reconstruction activities in the right of way could impact these adjacent wetlands significantly by altering drainage patterns and

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Geological Survey, (Balaban,. 1988).

by sedimentation. Limiting the discussion of wetland impacts to the area of the right of way ignores the potential for these impacts and does not acceptably address the wetland impact issue (see, for example, the discussion in Part 6 of the US Army Corps of Engineers 404 Permit Application report, where it is stated the "impacts on wetlands were calculated using GIS to determine the area of overlap between the construction footprint and delineated wetlands"). The area of affected wetlands would extend much beyond the construction footprint. The FEIS should acknowledge the existence of these wetlands adjacent to the right of way and provide for their protection. The wetland features along the current line are shown in Figure 5.[13]

[13] Linear wetlands mapped in the 404 Permit Application to the Army Corps of Engineers; map produced by Olmsted County Environmental Resource Services from Geologic Atlas of Olmsted County Minnesota, County Atlas Series Atlas C-3, Plate 2 of 9, Bedrock Geology, Minnesota Geological Survey, (Balaban,. 1988).

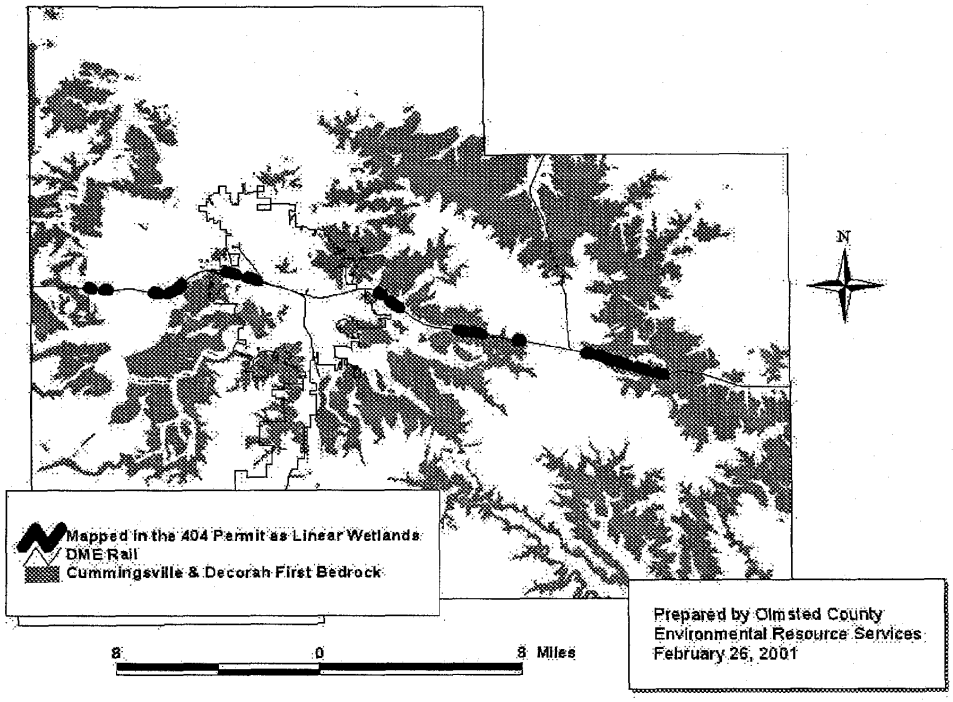


Figure 5: Linear Wetlands Mapped in the 404 Permit Application to the Army Corps of Engineers.

It is not clear from the discussion of wetland impacts related to the bypass whether the bypass being referred to is the modified proposal presented in the Leif Thorson Verified Statement of June, 1999, or the original proposal, but based on the acres of wetlands involved and the types of concern expressed about calcareous fens it appears likely that the original January 1999 proposal is the subject of the analysis. The Thorson Verified Statement describes the bypass proposal as avoiding potential calcareous fens along the bypass route. In fact, the proposed bypass route is designed to be down-gradient from known fens in order to avoid disrupting groundwater flows that discharge into the fen. In general, because the hydrology of glacial till wetlands and

Decorah Shale edge wetlands is similar, the strategies used to avoid damage to Decorah Shale edge wetlands and fens immediately adjacent to the existing line in eastern Olmsted County should be applicable to the potential fens up-gradient from the proposed bypass route.

VERIFICATION

STATE OF MINNESOTA

COUNTY OF OLMSTED

I, Philip H. Wheeler, first being duly sworn, depose and say that I have read the foregoing statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

Philip H. Wheeler

Subscribed and sworn before me this 18 day of January 2001



Notary Public

My Commission expires

VERIFIED STATEMENT OF MICHAEL J. LAPLANTE
EASTSIDE PIONEERS NEIGHBORHOOD ASSOCIATION
COMMENTS ON THE DRAFT EIS

My name is Michael Joseph LaPlante. I am President of the Eastside Pioneers Neighborhood Association located in Rochester, Minnesota. I have been in this position for 2 years. Prior to this I worked on a number of committees, within our association, to improve the neighborhood where I grew up. I am submitting these written comments on behalf of our neighborhood association. I formally reserve the right to comment further on the DEIS and related documents in the future.

The Eastside Pioneers Neighborhood Association (ESPNA) is located on Rochester's east side next to downtown. Our northern boundary is Silver Creek, our western boundary is the Zumbro River, the southern boundary is Fourth Street Southeast and the eastern boundary runs along the western edge of the Federal Medical Center. We represent approximately 1600 residents, businesses, landlords and tenants.

Within our association boundaries there are 2 heavily used parks, Mayo Ball Park and East Park located next to the DM&E railroad corridor. There is a large very popular educational park, where Quarry Hill Nature Center is located, on the northeast boundary of our neighborhood association. There are 2 public trails, Zumbro River Trail and Quarry Hill Trail, that cut through our neighborhood association, that are located next to the DM&E railroad corridor. The Quarry Hill Trail passes under the DM&E railroad corridor into Quarry Hill Park. These trails are used primarily for exercise, commuting and public recreation.

We are an economically diverse neighborhood, whose older affordable homes are ideal for first time home-buyers and those with lower income levels. Our neighborhood is home to a number of elderly, retired people as well as to beginning families, single parent families, minorities, multiple-job working class families, and the disabled.

Current school enrollment statistics on students and their families within the ESPNA area indicates a significant Environmental Justice area with a number at or below poverty level. South of the DM&E railroad corridor, in Census Tract 2, 53% of the students in block group 2 were eligible for free and reduced price lunch (twice the poverty level). In block group 4, the percentage, was 76%. In Census Tract 7 (north of the tracks), 50%of the students in block group 1, 58% in block group 2, and 75% in block group 3 were at or below twice the poverty level. The community average is 21%. Overall, out of 91 students in the Eastside Pioneers Neighborhood Association who live within 400 feet of the tracks, 30 lived in families with incomes higher than twice the poverty level and 61 in families with incomes below twice the poverty level.

1990 census data showed Block group 4 in Census Tract 2 had over 10% Asian Pacific Islander population, over 3 times the community average. All 94 Asian families in Tract 2 had over 10% Asian Pacific Islander population, over 3 times the community average.

All 94 Asian families in Tract 2 were renters; the median ratio of rent to income was over 50%, indicating very low income.

Many of our neighbors have invested a great deal of time, money, hopes and dreams in homes and property. Recent crime and over-development negatively impacting those investments were met with a collaborative effort between determined neighbors and churches, as well as local government and service agencies to make our neighborhood a safe and attractive place to live once again.

But now after all our efforts the proposed DM&E coal train expansion project will rip a gapping hole through the heart of our neighborhood association, torpedoing all that we have struggled physically and financially to accomplish. Moreover neighbors hopes have turned to anger and resentment as it has become evident that a number of impacts in the Draft Environmental Impact Statement (DEIS), seem to be rationalized away by a distant governmental agency hell-bent on promoting the DM&E.

Volume II Chapter 3 Section 3.2.6.2 Residential, and Volume II Chapter 3 Section 3.2.9.2 Vibration. STB's acknowledgements of the many impacts on neighborhoods, including noise, vibration, diesel fumes and property devaluation fade to inane suggestions. Neighbors were insulted by the STB's cavalier suggestion that construction workers may buy housing or seek temporary lodging in neighborhoods close to the new DM&E corridor as a possible solution to depressed property values. We found your discussion on ground vibration to be both contradictory and circuitous.

Volume IV Chapter 7 Mitigation. There's only 28 pages out of 5000 dedicated to mitigation. Our initial impression based on this fact alone led us to believe that the STB was not serious about seeking solutions to neighbors very real concerns. Our initial impressions were confirmed upon reading this small portion of the document. It is loaded full of "weasel words" such as " to the extent possible" or where practicable" or "where appropriate" or "shall attempt"or "shall consult" or "shall work with" that lets DME off the responsibility hook. There is no criteria, no accountability, our neighborhood would be left virtually powerless against this Goliath railroad.

Volume IV Chapter 6 Section 6.2.1.1 and 6.2.1.2 Rail Line Extension Alternatives into the Powder River Basin: Alternatives B, C, and D and The No-Action Alternative: Alternative A . The STB states a number of times in this document that they are seeking further comments on the No Action or No Build alternative. It seems that it is not seriously considered rather every time it is mentioned it is used as an opportunity to tout the economic merits, as espoused by DM&E, of their proposed coal train project. Is the STB serious about how this coal train project will impact both the human and natural environments from Wyoming to Minnesota, or is this just another economic impact statement geared toward ensuring the railroads advantage over objections?

Volume II Chapter 3 Section 3.2.8 Air Quality and 3.1.7 Noise.

Neighbors felt that the SEA was trying to explain away construction and operation related fugitive dust, fugitive coal dust and diesel emissions. In fact it is stated that during reconstruction people in and near the construction area could expect to see short-term fugitive dust whipped up by construction vehicles and the wind. Neighbors were shocked to learn that the SEA says not to worry it will be for a short duration and the wind will disperse it.

Regarding fugitive coal dust, the SEA goes into a litany of explanations why we won't see any, the high moisture content of PRB coal, the cold weather in Minnesota, the rainy, muggy weather of Minnesota but then they state that you could see some in the drier months. They go on further to state that we haven't heard any stories or complaints about fugitive coal dust therefore they don't think it poses a significant environmental concern. However, the SEA does acknowledge that some fugitive coal dust may be noticed along the line potentially causing inconvenience to nearby residents and businesses requiring periodic washings of buildings, vehicles and other outside surfaces.

The SEA's section on diesel emissions from the locomotives due to increased coal train traffic was a rather complicated section of tables and figures indecipherable to the layman. However, the SEA states that the "EPA announced in December 1997 a rule to reduce locomotive diesel emissions in an attempt to further protect human health and welfare." The SEA then says that there would be a tiered implementation of these rules one in 2000 and the other in 2005.

However, recent information from such prestigious institutions as Johns Hopkins University School of Public Health indicates that for every cubic meter of air, an increase of 20 micrograms of airborne particulate matter (that's a scant 70 millionths of an ounce) brought about a 1 percent rise in the death rate. Hospital admissions for elderly people exposed to the increased pollution rose between 2 and 4 percent.

Of greatest concern are particles 10 microns or less in diameter, about the size of dust motes that spin in the air when the sun pours in your windows. In 1999, British researchers exposed 15 volunteers to air mixed with diesel exhaust particles for the period of one hour-about the level one would inhale on a smoggy day in Los Angeles. Six hours later, the scientists found signs of inflammation in the lungs.

Researchers think that inhaled particles can cause asthmatic attacks and may pose a serious threat to elderly patients whose lungs are already weakened by age and illness. Babies and young children are also at increased risk; per pound of body weight, they inhale more particles than adults.

Furthermore researchers at Harvard Medical School and EPA representative Vandenberg point out that there is new evidence that tiny particles-from diesel trucks, cars, industrial plants and even windblown dust-can alter heart rhythm and rate.

Based on this information, neighbors found little comfort in SEA's statements that the wind will disperse fugitive dust, fugitive coal dust, diesel emissions from increased train

traffic, and car and truck traffic exhaust. We are also aware that, given the accumulating evidence of the health threat from fine particulates, the EPA is currently drafting revised clean air standards, due to be released in 2002.

Given the previously stated information in the section on air quality, neighbors felt that exposure to fugitive dust (possibly ladened with years of accumulated toxic chemicals from beneath the old rail bed), fugitive coal dust, diesel fumes from increased train traffic and exhaust from delayed vehicular traffic should be dealt with as a significant environmental justice issue. It was our feeling that the those that live in our neighborhood, the elderly, the single parent families, the minorities, the low-income, the starter families etc. did so because of our large pool of affordable housing. It was all we could afford. Now we are trapped here, forced in to exposure to all the health and life threatening pollutants that will surely follow in the wake of DM&E's coal train project.

Neighbors were also confused by your inconsistent figures throughout the DEIS regarding train traffic on the DM&E line through Rochester. For example in your section on noise for Olmsted County it is stated that "existing noise sensitive receptors in the 65dBA Ldn contour, due to wayside and horn noise, total 80 based on 12 trains per day." Yet in your section on air quality it is stated "At present, the occupants of these residents are exposed to diesel emissions from locomotives hauling DM&E's current rail traffic- an average of 3 trains per day.

This is a glaring fourfold discrepancy that alters calculations of impact of train traffic. It is common knowledge amongst neighbors in our area that it is on average 3 per day. DM&E seems to be trying to raise the level of train traffic to lessen the cumulative environmental impacts of noise, vibration, pollution etc. on communities and neighborhoods and in particular environmental justice neighborhoods, along DM&E's corridor.

Volume VII-A Appendices D-G Environmental Justice

It became readily apparent as we attempted analysis of this section that ordinary citizens did not have the resources to adequately interpret the data therein. However, as we read through the methodology used to determine Environmental Justice communities, it became obvious that there was not a serious attempt to seek out these areas and to determine impact or aid. We are aware that 1990 census data was used in compiling statistics on Environmental Justice areas along DM&E's corridor. Much has changed over the past decade including the low income and minority population of our neighborhood, as evidenced by the statistics presented earlier in this document. We are also keenly aware that the year 2000 census data will soon be available. It is the expectation of our neighborhood association that any analysis of Environmental Justice areas located near the DME railroad corridor be based on census 2000 data. We request that the FEIS be based on current census 2000 data rather than old outdated information.

We are alarmed by statements made by the SEA in this section on pages D-15 and D-16. SEA says that it is difficult to mitigate noise but them seems to put the burden of coming up with the solutions and alternatives on the disadvantaged in the Environmental Justice areas. SEA seems to indicate that it is preferable for Environmental Justice areas and the DM&E to arrive at independent agreements rather than rely on imposed mitigation from the STB. We are concerned that Environmental Justice areas will be taken advantage of as they are no match against the resources, money and power of the railroad.

It is the profound hope of this neighborhood association that the Surface Transportation Board (STB) rewrite the DEIS transforming it from just another economic impact statement to an environmental impact statement, based on the most current available data, with real considerations and solutions given to all alternatives including the no-build.

Michael J LaPlante
President
Eastside Pioneers Neighborhood Association
1143 3 ½ St. SE
Rochester, MN 55904
507 282-2667
mlaplante@aol.com

VERIFICATION

STATE OF MINNESOTA

COUNTY OF OLMSTED

I, Michael LaPlante, first being duly sworn, depose and say that I have read the forgoing statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

Subscribed and sworn to before me this 28th day of February, 2001.

Michael LaPlante

Notary Public

My Commission Expires _____

BECKY D. GRUBB
Notary Public
Minnesota
My Commission Expires Jan. 31, 2005

To: Steve Kalish 202-393-5721
McCarthy Sweeney & Harkaway

From: Steve Thornhill

pages = 7

Train # stuff as requested. Train #'s calculated as marked.

Steve

DM&E
Dakota, Minnesota & Eastern Railroad
337 22nd Ave. S
PO Box 178
Brookings, SD 57006

HARRIS Hatch Mott MacDonald CANAC
PRB Transportation Project

TO: Steve Thornhill

FROM: Bill Otter WRO

SUBJECT: DM&E Train Traffic By Rail Segment (Existing & Projected)
Modification of November 13, 1998 information.

DATE: December 14, 1998

Steve:

This will confirm our telephone conversation today revising the freight train activity contained in my letter of November 13, 1998 to David Levy.

On the second bullet point, I inadvertently omitted the Rochester Way Freight. So here are the way freights and their normal operating territories for your information:

- **Rapid City** — Usually works in the yard and up to Blackhawk and return.
- **Huron** — Usually works in the Huron yard and goes to Wolsey and return.
- **Brookings** — Works between Arlington and Tracy. More frequent movements between Brookings and Volga.
- **New Ulm** — Works between Walnut Grove and Judson. Sometimes there is a second train that works New Ulm to Waseca including Mankato and return to New Ulm.
- **Waseca** — Usually works in the yard and may operate to Owatonna and return.
- **Rochester** — Works in the city of Rochester and from Waseca to Lewiston.

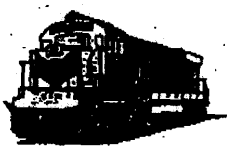
(1)

There are other way freight movements but they operate over other sectors of the DM&E not included in the planned coal operation. Again, the way freights listed above operate on an on-demand basis serving individual customer tracks in the territories shown.

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Attachment- November 13, 1998 Memorandum

cc: **Ray Gigear**
Vern Colbert
David Levy
David D'Amico
Louise Baglio



DM&E
DAKOTA, MINNESOTA & EASTERN
RAILROAD CORPORATION
PRB TRANSPORTATION PROJECT

HARRIS

TO: David Levy
David D'Amico
Louise Baglio

FROM: Bill Otter WRO

SUBJECT: DM&E Train Traffic by Rail Segment (Existing & Projected)
For STB EIS Consultant

DATE: November 13, 1998

The DM&E now operates the following train traffic by rail segment:

(2)
- Between Rapid City and Winona - One commercial train each day in each direction all year long.
- At Rapid City, Huron, Brookings, New Ulm, and Waseca, one local train based at these locations which moves to and from surrounding communities providing service on an as-needed basis.
- Over all lines, on an irregular, as-needed basis, occasional extra trains to support maintenance of way activities or to handle surges in freight traffic.
- During the grain harvest season, or when market conditions at other times cause grain to move to market in large volumes, the following extra train service is operated frequently (and tailored to the traffic needs):
  - (3) One extra grain train from the Midland-Pierre-Blunt-Onida area east to Mankato, Waseca or Winona.
  - (4) One extra grain train beginning at Huron and also operating east to Mankato, Waseca or Winona.
  - (5) One extra grain train beginning at or near Sioux Valley (Brookings) and picking up cars enroute to the Tracy area and operating east to Mankato, Waseca or Winona.
  - (6) One extra grain train beginning at or near Walnut Grove and operating east to Mankato, Waseca or Winona.

12 = 12

The DM&E's projected train traffic level will include the traffic listed above as well as the coal train traffic identified in the DM&E Operating Plan documents previously submitted.

Please let me know if you have any questions about any of this information.

377 22nd Avenue S. PO Box 178
Brookings, SD 57006
605-697-2300 Fax 605-697-2399

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10/30/2000 13:43 3073586251 BEST WESTERN DOUGLAS PAGE 04

ATTACHMENT B

Burns & McDonnell
100
1898 - 1998

ENVIRONMENTAL STUDIES AND PERMITTING

P.O. Box 419173
Kansas City, MO
64141-6173

9400 Ward Parkway
Kansas City, MO 64114

Fax: 816-333-3690

FAX TRANSMITTAL

Date: February 23, 1999 **Time:**

To: David Levy **Fax No.:** (605) 697-2399

Representing: Federick R. Harris **Info. Acct.:** 7014

From: Steve Thornhill **Tel No.:** (816) 822-3851

Number of Pages (including this cover sheet): 2

Project Name and No.: DMERR 97-304-4

Subject: Train Traffic

David - based on information provided by Bill Otter, we have developed the attached rail line segments along DM&E's existing system. These segements are established based on traffic volume. The existing train traffic is included with each segment. This traffic includes wayfreight movements and extra grain trains, providing the maximum anticipated train traffic. Please confirm these numbers and indicated the anticipated traffic for each segment following implementation of the project at the 20, 50, and 100 million ton levels. We need this information as soon as possible to complete our transportation and noise analysis. If you have any questions, please call me at (816) 822-3851.

Signed: _____

Dakota, Minnesota Eastern Railroad Corporation
Powder River Basin Expansion Project
Existing and Projected Rail Traffic

Rail Segment	Existing Rail Traffic	Projected Traffic 20 Million Tons	Projected Traffic 50 Million Tons	Projected Traffic 100 Million Tons
Wasta to Midland	1 train/day each way			
Midland to Wolsey	2 trains/day each way			
Wolsey to Huron	3 trains/day each way			
Huron to Arlington	3 trains/day each way			
Arlington to Brookings	4 trains/day each way			
Brookings to Tracy	5 trains/day each way			
Tracy to Walnut Grove	4 trains/day each way			
Walnut Grove to Waseca	5 trains/day each way			
Waseca to Owatonna	7 trains/day each way			
Owatonna to Lewiston	6 trains/day each way			
Lewiston to Winona	5 trains/day each way			

VERIFIED STATEMENT

OF

GARY NEUMANN

My name is Gary Neumann. I have been the Assistant City Administrator in the City of Rochester since 1982.

I. VIDEOTAPING OF DM&E SERVICE – COMMENTS ON LOCAL SERVICE

In an effort to identify how much actual train traffic was occurring within the City of Rochester, we began 24-hour per day videotaping of train traffic in Rochester on 10/17/00.

The taping from 10/17 through 10/28 was placed in a location to view the North Broadway (Highway 63) intersection with the DM&E rail line and also provided a view of the SE spur line that crosses North Broadway (Highway 63) two blocks south of the DM&E main line. The location afforded a view of the traffic on the DM&E main line and traffic on the SE spur line as well.

On 11/01 we moved the taping to a location that provided a view of the DM&E office area which is located between 1st Avenue NW and 4th Avenue NW on the DM&E main line. This location also provides a view of the activity on the SE spur line. Videotaping at this location continued until 11/13/00 when the camera was moved back to the Broadway location. Videotaping at the Broadway location continued through 11/17/00.

The number of through trains and switching movements on the DM&E main line and the SE spur line is detailed in the verified statement, with attachments, provided by Kim Hanson of the City Administrator's office. As is identified in the verified statement of Kim Hanson, there were 70 through trains for an average number of through trains per day for the 29 days of taping that occurred between 10/17/00 and 11/17/00 of 2.4 trains per day. Train consists that were less than 25 cars long were assumed to be local switching or wayfreight trains because virtually all of these trains had paired easterly and westerly movements. The average number of cars in the 70 through trains that were recorded on those days was 83.6 cars per train.

The time period during which we videotaped coincides with the busiest time period of 2000 for out-going barge activity at the Winona harbor. The information that I obtained from the City of Winona indicates that November was the highest month for barge activity with 322 barges. October was the second highest month with 262 barges. While there may not be an absolute direct correlation between the number of DM&E trains passing through Rochester and the barge activity in Winona, it does appear that we were videotaping during the busiest time of the year for the shipment of bulk products out of the Winona harbor and that there may be some implied correlation of a

high level of DM&E train traffic during these same months. Records could be obtained from the DM&E by SEA to confirm or deny this correlation. In any event, the number of DM&E through trains passing through Rochester even during the busiest months for the Winona harbor was 2.4 through trains per day.

The following are the monthly barge activity figures for the Winona harbor for 2000:

January	0
February	0
March	49
April	222
May	223
June	257
July	155
August	93
September	105
October	262
November	322
December	0

A separate verified statement has been provided by Terry Spaeth of this office to provide information that was obtained from a telephone survey of local rail shippers that this office completed. The following information and comments is provided as information on local switching movements based on the information from the survey and the data from the videotaping.

SE Spur Line

This spur line leaves the DM&E main line adjacent to the DM&E office area between 4th Avenue NW and 1st Avenue NW. The spur line proceeds southeasterly and curves to the south until the line reaches 1st Avenue NE. The spur line proceeds to the south parallel to 1st Avenue East.

The SE spur line crosses 1st Avenue NW and Broadway (Highway 63) intersections that are referenced and discussed in the DM&E DEIS. The remaining intersections that the SE spur line crosses are not discussed or considered in the DEIS. Thus, the only impact of the SE spur line movements under the DEIS would be limited impacts on the 1st Avenue NW and Broadway intersections.

The information that is contained in the verified statement and attachments from Terry Spaeth relating to the survey of local shippers indicates that the following local shippers receive service on the SE spur line.

Seneca Foods - estimated 500 cars per year, served 3 days per week.
Rochester Iron - no estimate provided on cars, served 5 days per week.
Tamarack - estimated 260 cars per year, served 5 days per week.

From 10/17 to 11/17 on the 29 days that taping occurred, there were 13 days on which no local service trains was observed using the SE spur line. On most of the remaining days, one round trip (2 train passages of the camera) occurred. There were 2 days on which there were 2 round trips, which represents the maximum usage of the SE spur line on any recorded day. The average usage for the period of taping was 1.28 switching trains per day (less than one round trip). Given the estimates of service being utilized on almost every working day obtained from the local shippers, it would appear that the switching train using the SE spur line is serving several of the local shippers on the SE spur line with a single train hauling multiple cars to serve different local shippers. This would explain the visual evidence of less than one round trip per day occurring on the SE spur line.

NW Spur Line

The NW spur line runs westerly parallel to the DM&E main line until it crosses under Highway 52. It then proceeds in a northwesterly direction.

The local shippers on the NW spur line include:

IBM - serviced one time each 3 to 5 years.
General Warehouse - estimated 100 to 150 cars annually, service 2 to 3 times per week. However, there has been no service on this spur since last fall due to the need to repair some portions of the spur line.

Traffic on this spur line would cross the 4th Avenue NW, 6th Avenue NW, 11th Avenue NW and 7th Street NW intersections with the main line. The only significant volume local shipper traffic on this spur would be to General Warehouse. It should be noted that this line has been out of service since last fall. No service has been provided for several months. The comments from General Warehouse, attached to the verified statement of Terry Spaeth, indicate that this spur line may not be repaired until the spring of 2001 at the earliest.

Rochester Public Utilities (RPU) Spur Line.

Rochester Public Utilities receives service about 3 days per week totaling about 834 cars annually from a short spur line that extends northerly off of the main line near 2nd Avenue NE. Local service to RPU from the DM&E office location would cross the 1st Avenue NW and Broadway intersections on the main line. Switching movements to enter the RPU spur line from the main line would also affect the 2nd Avenue NE intersection.

United Building Centers (UBC)

UBC is located west of Highway 52 along the DM&E main line. They received one carload of lumber in 1999. They did not take any local service from the DM&E in 2000.

II. INFORMATION ON THE CITY OF CLEVELAND, OHIO TRAIN NOISE MITIGATION.

Some recent news articles referenced train noise mitigation measures being considered in the City of Cleveland, Ohio. The following is a summary of Cleveland's mitigation plans:

- Cleveland is starting to implement their train noise reduction plan.
- In the FEIS, there were areas that were identified for noise mitigation. However, the City reached a negotiated settlement with the railroad.
- The criteria used by the STB in the FEIS for residential noise concern areas was 70 decibels.
- Consultants are designing the walls. To date they have determined that the 70-decibel area and a desired noise reduction of at least 5 decibels will impact the height of the walls. Their noise wall designs show a range of 10 to 15 feet in height.
- They are looking at materials other than concrete to construct the sound walls. They are considering lighter materials such as fiberglass plank walls. These would be easier to construct in areas where there is limited access.
- The STB in the FEIS required only the mitigation of wheel rail noise. Thus, the proposed Cleveland noise walls are at a height to mitigate wheel rail noise. These walls are not designed to mitigate the whistle noise.
- They are also doing some home sound insulation. This generally consists of triple pane windows, storm windows, prime and storm doors, and through wall air conditioning and in some cases central air conditioning upgrades. They have started on some sound insulation.
- The average cost for basic home insulation (not including central air) was budgeted at $18,000. Their goal is to obtain a 5-decibel reduction for both the home insulation and noise walls programs. Pre and Post construction sound testing will be completed to determine effectiveness of the improvements.
- They remain concerned about train horn noise. They are monitoring the FRA rules that are being considered. They have not identified any funding that would be available for train horn noise improvements following the proposed FRA whistle free rules.
- They have approximately $16 million available for the noise mitigation program. Approximate funding areas are as follows:
  - Home sound insulation - $7 million roughly

- Noise barriers - $7 million roughly, approximately 22,000 feet of walls are planned
- Landscaping
- Fencing - safety fence

➢ Consultant studies determined how many homes would be in areas with over 70 decibels.

➢ Some general comments were provided as follows:
a) Where there are rows of homes it may be more cost effective to install barriers.
b) At 75 decibels, both insulation and noise barriers are proposed to try to get to 65 decibels.
c) Landscaping provides a minimal amount of noise reduction.

➢ Walls - estimated cost of $375 per lineal foot.

➢ Walls - using fiberglass material stated in article. To be used due to limited access between railroad right-of-way and homes. Concrete runs about the same price.

➢ There are areas of berm/wall combination - $415 lineal foot was budgeted for building a wall on top of existing berms.

➢ Fiberglass walls have been installed on highway projects and can be more visually appealing, wear better, as well as provide color options.

➢ Residents are not happy with starting, stopping, train noise that has resulted from the merger.

➢ Sound mitigation helps, but there is significantly increased railroad noise.

➢ As part of their negotiated agreement, both railroads are to attend community advisory committee meetings quarterly.

VERIFICATION

STATE OF MINNESOTA

COUNTY OF OLMSTED

I, Gary Neumann, first being duly sworn, depose and say that I have read the forgoing statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

Subscribed and sworn to before me this 28th day of February, 2001.

Gary Neumann

Notary Public

My Commission Expires 1-31-2005

KIM M. HANSON
Notary Public
Minnesota
My Commission Expires Jan. 31, 2005

Verified Statement of
Edward J. Walter, Jr.

My name is Edward J. Walter, Jr. I am Vice-President and Chief Executive Officer of Dr. Edward J. Walter & Associates, Inc., 9241 Ravenna Road, C-6, Twinsburg, Ohio 44087. A statement of my qualifications is attached as EJW-1.

Our firm has been engaged by the City of Rochester, Minnesota to examine the Draft EIS (DEIS) and the noise related data provided by Wm. H.O. Kroll & Associates (Kroll) regarding the impact of the proposed increase of the number, speed, and length of trains through Rochester, Minnesota. Our firm has performed this type of study and evaluation before.

Prior to discussing our findings, I wish to unequivocally state our conclusions. The DEIS is based upon "poor" science. It comes to conclusions based upon an apples and oranges scenario. The Kroll study is significantly more accurate by several orders of magnitude although it is overly conservative in its conclusions. The reasons for these findings are as follows:

DEIS

The DEIS, by performing their noise study in a rural area, substantially understates the projections as to what the noise increase in the Rochester area will be.

- It does not take into consideration the difference in ambient noise levels – rural versus urban areas.
- It does not take into consideration reflective surfaces in the urban area versus the unimpeded omnidirectional disbursement of sound in a rural area.

- It does not take into consideration the additive nature of a high urban ambient noise level coupled with increased railroad traffic versus a low rural ambient noise level coupled with increased railroad traffic.

- The DEIS does not break down the receptor noise exposure numbers other than in a greater than 65 and 70 d.b.A. contour. It should have broken it down into 5 dB increments from 65 dB through 85 dB or more. This would give a much truer picture of what will happen.

- The DEIS expansively discusses ramifications for communities where all receptors fall in the 65dB noise contour which is not relevant to Rochester.

- The DEIS virtually discounts horn noise as a safety issue and apparently recommends the utilization of quiet zones at community expense. Both the horn usage and community financed quiet zones are unacceptable solutions.

- The discussion of vibration damage to structures is a minimalistic discussion. Per the DEIS, increased railroad traffic through Rochester will damage existing structures not owned by the railroad.

Kroll

The study performed by Kroll and Associates, although performed in an urban area incorporates into it some extremely conservative assumptions:

- It tends to discount horn noise when horn noise is a significant component of the increase in noise levels due to increased traffic.

- It does not and cannot completely take into account the changes in noise levels associated with increased train speeds and frequency. The Kroll study attempts to

project the results of 3 trains per day into the realm of 37 trains per day at a much higher speed. This is a significant statistical reach. It would be better to locate a high speed train of similar characteristics in another similar urban situation and measure it. It further presumes the day-night scheduling of the trains.

Recommendations

The following are our recommendations to correct the acoustical studies to date:

- The study should be repeated in an urban area (areas) that closely models the conditions in Rochester, Minnesota.
- Trains should be run at the same speed as trains are currently run in Rochester. The conditions that should be watched closely are speed, length, number of motors, horn duration, track conditions, etc.
- The distance from the monitoring equipment to the track should be adjusted until noise levels equal to those in Rochester are experienced.
- Once noise levels are equalized to those in Rochester, the train should be run at the high speed projected for Rochester. This will provide a reasonable basis for computations in the case of Rochester, Minnesota.
- The railroad should schedule the train traffic through Rochester to minimize adverse reaction, even if it means adjusting traffic patterns through the use of sidings.

Conclusions

Ultimately, I would like to point out that increased railroad traffic through Rochester would impact a substantially higher number of sensitive receptors than are currently affected, as well as increase current noise levels at existing receptors. It would limit property usage in the vicinity of the rail line and, per the DEIS, would damage existing structures as well as new structures on properties not owned by the railroad. The 18 dB increase in noise levels projected by Kroll, although conservative, is an extremely high number.

VERIFICATION

State of Ohio

S.S.

County of Cuyahoga

I, Edward J. Walter, Jr., being duly sworn, depose and say that I have read the foregoing, know the content thereof, and the same is true and correct.

Edward J. Walter, Jr.

Subscribed and sworn to before me this 1st day of March, 2001.

Notary Public
My appt. expires _____

MEITRA FEREK, Notary Public
Residence - Summit County
Statewide Jurisdiction, Ohio
My Commission Expires Aug. 26, 2002

Dr. Edward J. Walter & Associates, Inc.
Vibration and Sound Consultants

EDWARD J. WALTER, JR.

Education

A.B., John Carroll University, Cleveland, Ohio 1968

Penn State University - Continuing Education

Professional Experience

1974-	Dr. Edward J. Walter & Associates, Inc., Twinsburg, Ohio, Vice President, General Manager
1973-1974	Vibra-Tech Engineers, Inc., Indianapolis, Indiana, Seismologist-Midwestern Area Manager
1971-1973	Philip R. Berger & Associates, (Geosonics, Inc.) Pittsburgh, PA, Seismologist
1968-1971	Dr. Edward J. Walter & Associates, Chesterland, Ohio, Supervisor of Field Operations
1964-1968	Seismological Observatory, John Carroll University, Technician
1964-1968	Dr. Edward J. Walter & Associates, Chesterland, Ohio, Field Seismologist

Society and Association Memberships

The Seismological Society of America

The Eastern Section, Seismological Society of America

The American Geological Institute

The American Institute of Mining Engineers

Society of Explosives Engineers

The Ohio Contractors Association

The Associated General Contractors of America

Ohio Mining and Reclamation Association

9241 Ravenna Road, C-6 • Twinsburg, Ohio 44087 • Telephone: (330) 963-0540
(800) 964-0540 USA • Fax: (330) 963-0533 • www.drwalter.com

Licenses

Pennsylvania Blaster's License - 3130-A

Ohio State Fire Marshal's Permit

Federal permits to purchase & use explosives

Multiple municipal contractors licenses

Michigan State Permit – A21581

Technical Papers

"The Responsibility of the Consultant in the Promulgation of Adequate Explosives Noise Legislation", Proceedings of the First Conference on Explosives and Blasting Techniques, Society of Explosives Engineers, 1975.

"Some Aspects of Small Scale Slant Hole Drilling", Proceedings of the Second Conference on Explosives and Blasting Techniques, Society of Explosives Engineers, 1976.

"Low Level Continuous Vibration and Potential Damage", Walter, Dr. Edward J. and Edward J. Walter, Jr.; Proceedings of the Fifth Conference on Explosives and Blasting Techniques, Society of Explosives Engineers, 1979.

"Pre-Blast Surveys, A Public Relations And Claim Reduction Tool", Harrison, D., Walter, Jr., E., Ferek, M., and Harrison, B. A.; Proceedings of the Twenty-First Annual Conference on Explosives and Blasting Technique, International Society of Explosives Engineers, 1995.

Duties and Responsibilities

Blasting program design and implementation.

Contract drilling and blasting.

Consulting to reduce noise and vibration produced by industrial, mining, traffic, and construction sources

Evaluation of damage resulting from noise and vibration.

Design of laws and ordinances to limit noise and vibration.

Design of laws and ordinances to regulate the use of explosives.

Instrumentation design to measure noise and vibration.

Evaluation of existing environmental regulations to determine their effect upon industry and residences.

Duties and Responsibilities (continued)

Measurement of noise and vibration to determine its effects upon communities.

Measurement of noise and vibration to determine employee exposures and reduction procedures.

Training seminars on the use of explosives--blast design and safety.

Statistical studies to determine best technology methods in the use of explosives.

Expert legal testimony regarding the aforementioned.

Design evaluation of construction specifications.

Evaluation of damage claims associated with mining, construction, and other heavy industry.

Site development consultation.

Safety Program development, evaluation, and implementation for construction demolition, mining, and explosives applications.

Representative Clients and Agencies Served Personally

The Austin Company

Aetna Life and Casualty

The American Bridge Company

The B. F. Goodrich Company

Buffalo Testing Laboratories, Inc.

The City of Cleveland

Cleveland Electric Illuminating Co. (Perry Nuclear)

Commonwealth of Pennsylvania

Controlled Demolition, Inc.

Crucible Steel Company

DiGioia Brothers Excavating, Inc.

The East Ohio Gas Company

Representative Clients (continued)

Goodyear Aerospace

The Hartford Insurance Company

Herron Testing Laboratories

K M & M, A Joint Venture

Kajima-Marra/Majestic-Jay Dee, Joint Venture

The Kassouf Company

Lake County, Ohio

The Murray Hill Construction Co., Inc.

The Ohio National Guard

Pennsylvania Glass Sand Corporation

Solar Testing Laboratories

The Peabody Coal Company

Picker X-Ray Corporation

State of Michigan

State of New York

State of Ohio

Steel Improvement and Forge

The Travelers Insurance Company

The City of Twinsburg

The Town of Leesburg, VA

TRW, Inc.

U. S. Army, Corps of Engineers

The United States Bureau of Mines

VERIFIED STATEMENT

OF

CHARLOTTE SPRAGUE

My name is Charlotte Sprague, retired nurse, living at Northgate Plaza, a senior high-rise. My address is 902 11th Avenue NW #712, Rochester, Minnesota, 55901. I am serving as a spokesperson for the 172 residents of Northgate Plaza.

The purpose of my testimony is to verify my presentation during the DM&E meeting at Mayo Civic Theater on November 11, 2000.

In my presentation, I stated that the noise from the train traffic and whistle blasts at each railroad crossing was most disturbing, especially at night. The question was asked, "What will this concern be like when 35 speeding trains blast their whistles as they pass through our area?" With the help of our seven floor counselors, all residents were contacted to identify their feelings regarding the train whistle blasts and the DM&E project. Of the 172 residents, 104 signed the comment form to show their concerns regarding the train noise and the DM&E project. These signed forms are filed with this testimony.

The other issue that I raised at the above mentioned meeting, was the traffic delays by the trains at the 11th Avenue NW railroad crossing, one block south of our high-rise. I mentioned that ambulance service was located

on the south side of the railroad tracks and our high-rise was located on the north side. The prompt ambulance service needed by the residents of Northgate Plaza would be crippled due to traffic delays which would put our health in jeopardy. I contacted Mr. Glen Lyden of Gold Cross Ambulance Service to ask him to provide me with an estimate of the number of times Gold Cross was called to our high-rise during a typical month. Mr. Lyden stated he could not break that information down from the total number of ambulance calls for the area around Northgate Plaza. I then asked the manager of our high-rise, Verlaine Williams, if she could make an estimate of the average number of ambulance calls for one month. Her estimate was 1.5 calls per month over a one year period.

The average age of our residents at Northgate Plaza is 84.5 years. About 80% of our residents have health problems and the majority of these problems are serious. This illustrates the vulnerability of our residents. Train whistle blasts at night which disturb needed rest along with the prompt ambulance service to our residents are just two of our many concerns at Northgate Plaza regarding the DM&E project.

VERIFICATION

STATE OF MINNESOTA

COUNTY OF OLMSTED

I, Charlotte Sprague, first being duly sworn, depose and say that I have read the forgoing statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

Subscribed and sworn to before me this 31 day of January, 2001.

VERLAINE LOUISE WILLIAMS
NOTARY PUBLIC – MINNESOTA
My Commission Expires 1-31-2005

Charlotte Sprague

Notary Public

My Commission Expires 1-31-2005

1st Floor

D M & E RAILROAD NOISE CONCERNS FOR RESIDENTS FROM NORTHGATE PLAZA 902 11TH AVE. NW ROCHESTER, MINN. 55901

NAME	NORTH/SOUTH EXPOSURE	COMMENTS
1. Gladys Krystad	North side	Not in favor of the train on a by-pass
2. Marjorie Neville	North	Not in favor
3. Melrose Petersen	North	not in favor.
4. Irene Kaul	South	not in favor of train
5. Leanora Kreinbring	North	
6. Kathleen Simonett	South	Not in favor of.
7. Marie Myers	South	Not in favor
8. Nora Keller	North	Not in favor.
9. Beatrice Brecht	South	stop the trains noise
10. Viola Fenske	S	Noise

Further Comments

2nd Floor

D M & E RAILROAD NOISE CONCERNS FOR RESIDENTS FROM NORTHGATE PLAZA 902 11TH AVE. NW ROCHESTER, MINN. 55901

NAME	NORTH/SOUTH EXPOSURE	COMMENTS
1. Agnes Finnegan	South side	I don't want this lowe to occur
2. Angie Remick	S. side	
3. Deborah Segne	South side	The noise effects my health.
4. Edwin Nagel	South	
5. Eileen Hatle	N. side	
6. Bernice Karau	South	
7. Vivian Widdel	North	Noise Traffic Holiday
8. Irene Gauthier	South	noise & Traffic Holiday
9. Miriam Ferguson	South	
10. Beverly Holden	South	noise + Traffic

Further Comments

D M & E RAILROAD NOISE CONCERNS FOR RESIDENTS FROM NORTHGATE PLAZA 902 11TH AVE. NW ROCHESTER, MINN. 55901

NAME	NORTH/SOUTH EXPOSURE	COMMENTS
1. Vicki Tvelen gale	South	Traffic hold up.
2. Verna Peterson	North	
3. Deona Dreiling	South	
4. [illegible]	North	
5. Lois Jordan	South	Emergencies
6. Carroll Hall	North	Traffic problem
7. Evelyn Zell	South	
8. Dorse Ingstad	North	
9. Lethone Slaughter	South	Noise & Traffic
10. Isabel Bradbury	North	Emergency & traffic holdups

Further Comments

3rd. Floor

D M & E RAILROAD NOISE CONCERNS FOR RESIDENTS FROM NORTHGATE PLAZA 902 11TH AVE. NW ROCHESTER, MINN. 55901

NAME	NORTH/SOUTH EXPOSURE	COMMENTS
1. Doris Dickerson	North	Opposed
2. Agnes Jansen	North	opposed
3. Toni Jansen	North	opposed
4. Eugene Leeder	North	against
5. Helen Laursen	South	opposed
6. Lydia Doerber	South	Opposed
7. Norman Waage	North	Opposed
8. Margaret Walsh	South	opposed
9. Carol Healey	South	opposed
10. Doris Hankins	north	opposed

Further Comments

Construct a Spur around Rochester

Go around Rochester

Go around Rochester

D M & E RAILROAD NOISE CONCERNS FOR RESIDENTS FROM NORTHGATE PLAZA 902 11TH AVE. NW ROCHESTER, MINN. 55901

NAME	NORTH/SOUTH EXPOSURE	COMMENTS
1. Irene Lee	South	There must be other routes No Need of a Coal train in R.
2. M. H. Lee	So.	No Train.
3. Doris E Ramm	North	Opposed
4. Dary Nelson	North	Opposed
5. Eldora Austad	north	Opposed
6. Rud Rubo	South	opposed
7. Darl Skyles	N.	Opposed
8. Under Staff	South	Opposed
9.		
10.		

Further Comments

Dust spoil and Town Go around Rochester

4th Floor

D M & E RAILROAD NOISE CONCERNS FOR RESIDENTS FROM NORTHGATE PLAZA 902 11TH AVE. NW ROCHESTER, MINN. 55901

NAME	NORTH/SOUTH EXPOSURE	COMMENTS
1. Ray & Alice		Against
2. Anderson		"
3. Lyla Butcher		Against
4. Eleanor Jaquith		against
5. Marion B. Grande		Against
6. Virginia Kiker		against
7. Hazel Goodenough		against
8. Florence E. Garwick		against
9. Glen C. Garwick		against
10. Robin Owens		against

Further Comments

Marion Lundquist Against

Judy Langehaug Against

D M & E RAILROAD NOISE CONCERNS FOR RESIDENTS FROM NORTHGATE PLAZA 902 11TH AVE. NW ROCHESTER, MINN. 55901

NAME	NORTH/SOUTH EXPOSURE	COMMENTS
1. Vivian H. Jefferson		Concerned against it
2. Esther Kuhlmann		against it
3. Deb McConachie		against it
4. Jean Kinlin		against it
5. Caroline Winter		against
6. Genevieve Chambers		against
7. Madeline Griffin		against.
8. Marjorie Pfannkuch		against
9. Mary Klemmer		against
10. Delbert Sizer		against it

Further Comments

5th Floor

D M & E RAILROAD NOISE CONCERNS FOR RESIDENTS FROM NORTHGATE PLAZA 902 11TH AVE. NW ROCHESTER, MINN. 55901

NAME	NORTH/SOUTH EXPOSURE	COMMENTS
1. Hazel Rubsam	N	Concern for ambulance transportation
2. Edna Frese	N	No Comment
3. Donna Bernhart	S	noise
4. Bud Knaut	N	
5. Loretta Eckhardt	N	stops ambulance etc.
6. Marion Engelmann	S	Noise
7. Donna Bergh	N	Noise
8. Margaret E Fee	S	Noise
9. Elson E. Hamrick	N	against
10.		

Further Comments

There are at least 150 seniors living at Northgate Plaza and if ambulances calls are held up even a few minutes it could pose problems, also pollution from engines exhaust etc.

D M & E RAILROAD NOISE CONCERNS FOR RESIDENTS FROM NORTHGATE PLAZA 902 11TH AVE. NW ROCHESTER, MINN. 55901

	NAME	NORTH/SOUTH EXPOSURE	COMMENTS
1.	Dorothy Johnson	South	Noise bad horn
2.	ants Lehn Gehrke	S	
3.	Helen Rethmann	N	" "
4.	Gladys Ruggott	S	" "
5.			
6.			
7.			
8.			
9.			
10.			

Further Comments

I am against holding up the ambulance, police cars we have on 11 ave NW. that is a busy street also the noise keeps us awake at nite stop the train we do not want it!

6th Floor

D M & E RAILROAD NOISE CONCERNS FOR RESIDENTS FROM NORTHGATE PLAZA 902 11TH AVE. NW ROCHESTER, MINN. 55901

NAME	NORTH/SOUTH EXPOSURE	COMMENTS
1. JoAnne Glynn	S.	Eleanor Stoppel - N
2. Marge Lieberman	S.	Carolyn Bagley - South
3. Maldon Nelson	S	John Peterson - self
4. Mabel Dittmann	S	
5. Mary Spitzer	N	
6. Mardella Ihde	N	
7. Ellen Reick	N	
8. Edna Woods	S	
9. Agnes Patrie	N	
10. Florence Catalds	S	

Further Comments

1. - Would be to much noise + traffic stopping to often, emergency Vechiles would have to long delays.

2. - The D M & E going thru Rochester has no benefit for us here. it would just be a hazzard to us We love our town just the way it is with out worrying about air polution & getten our emergency Vehicles here in time to save lives.

7th Floor

D M & E RAILROAD NOISE CONCERNS FOR RESIDENTS FROM NORTHGATE PLAZA 902 11TH AVE. NW ROCHESTER, MINN. 55901

NAME	NORTH/SOUTH EXPOSURE	COMMENTS
1. Katherine Theel	South	No Comments
2. Rose Krueger	South	Keeps me awake
3. La Ronne Murphy	North	Not home
4. K Nelson	North	did not answer door
5. Mildred Music	South	Concern for Emergency Vec.
6. Gary Sorenson	North	Just don't want it because ambulance service
7. Evelyn Nystrom	North	Noisey @ Night
8. Ardis Kircher	South	Have ambulance & fire trucks get to us
9. Linda C. Kuyna	South	Not Necessary - NO God for Rochester
10. Stella Meyers	South	Not a good for the city

Further Comments

Mildred Hawkins North Most of us at Northgate Plaza are very unhappy about it because of noise, ambulance service & Fires, would really delay our service

D M & E RAILROAD NOISE CONCERNS FOR RESIDENTS FROM NORTHGATE PLAZA 902 11TH AVE. NW ROCHESTER, MINN. 55901

	NAME	NORTH/SOUTH EXPOSURE	COMMENTS
1.	Kathy Fastr	apt 708 North	people are late for work
2.	Margaret Larson	North	I object to the nearness to a Swimming pool + Elementary school
3.	Wynetta London	710 South	Noisy interference with going to Clinic + interference with Medical
4.	M D Lewis		G Business
5.			
6.	[illegible]	719 North	
7.	Charlotte Sprague	South	Voice @ Night + Traffic delays
8.	Lucile Johnson	North	Gone
9.	Geo. Seeley	North	/
10.			

Yes! I want to help stop the coal trains. Signature George L Seeley

Print Name George Leslie Seeley It's OK to use my name in our print advertisements: yes X no

Address 902-11th Ave. N.W. #713 City Rochester State MN Zip 55901

E-mail address Phone (H) 507-282-0255 (W) Retired + Safety

X I say NO to the DM&E's coal trains proposal. Please send my concerns to the federal STB and my elected officials. My concerns include: Time lost & delays getting to our Medical Facilities especially in Emergencies & also for regular Medical Care & Treatments. Noise level to high & alarming. Air Pollution from Diesel exhaust. Vibrations from trains - not as severe as Cars or City Traffic. Property Values. Will they insure all the profits from this go to our community like

☐ I am willing to:

- ___ Place a lawn sign in my yard
- ___ Invite 4 to 6 friends to my home to view the "Stop the Coal Trains" video
- ___ Distribute literature, petitions and buttons at events
- ___ Phone a list to generate attendance at events
- ___ Schedule a presentation about the coal trains with my civic group or church
- ___ Write, e-mail or phone my state and federal elected officials
- ___ Contribute money: ___ $250; ___ $100; ___ $50; ___ $25; ___ Other $_____

Your name will not be sold or distributed without your c

Table 5-OH-11
Ohio
Highway/Rail At-Grade Crossing Vehicle Delay and Queues

						Pre Acquisition								*Post Acquisition*								
County	Seg. No.	Crossing FRA ID	Roadway Name	Number of Roadway Lanes	ADT	Trains per day	Train Speed (mph)	Train Length (feet)	No. of Veh. Delayed per day	Max. No. of Veh. in Queue per lane	Crossing Delay per stopped veh (min./veh)	Avg. Delay per Vehicle (All vehicles) (sec/veh)	Level of Service	Trains per day	Train Speed (mph)	Train Length (feet)	No. of Veh. Delayed per day	Max. No. of Veh. in Queue per lane	Crossing Delay per stopped veh (min./veh)	Avg. Delay per Vehicle (All vehicles) (sec/veh)	Level of Service	Level of Service with Mitigation
Allen	C-062	532707Y	N. JACKSON ST	2	6,200	5.9	35	5,600	59	14	2.69	3.07	A	13.9	35	6,200	150	16	2.92	8.50	B	
Allen	C-062	532710G	MAIN ST.	4	8,860	5.9	35	5,600	84	10	2.57	2.93	A	13.9	35	6,200	215	11	2.79	8.12	B	
Allen	C-062	532714J	N. METCALF ST.	2	7,850	5.9	35	5,600	75	18	2.82	3.21	A	13.9	35	6,200	190	20	3.05	8.88	B	
Allen	C-062	532719T	COLE ST	2	7,300	5.9	35	5,600	69	17	2.77	3.16	A	13.9	35	6,200	177	18	3.01	8.75	B	
Allen	C-062	532720M	CABLE RD	5	18,680	5.9	40	5,600	160	16	2.51	2.58	A	13.9	40	6,200	408	17	2.72	7.12	B	
Allen	C-062	532722B	EASTTOWN RD	2	12,300	5.9	50	5,600	89	22	2.45	2.14	A	13.9	50	6,200	227	23	2.64	5.84	B	
Allen	C-062	532703W	ROUSH CROSSING	5	7,260	5.9	40	5,600	62	6	2.24	2.30	A	13.9	40	6,200	158	7	2.42	6.34	B	
Ashtabula	C-060	523885L	BROADWAY AVE	2	6,140	48.3	50	5,600	365	11	2.06	14.67	B	54.2	50	6,200	441	12	2.22	19.09	C	
Ashtabula	N-070	471972T	LAKE ST.	2	5,500	13.0	50	4,869	80	9	1.83	3.19	A	25.2	50	5,000	158	9	1.87	6.42	B	
Ashtabula	N-070	471983Y	MAIN AVE.	4	5,350	13.0	35	4,869	101	6	2.21	4.99	A	25.2	35	5,000	199	6	2.26	10.07	B	
Ashtabula	N-075	471989W	WEST AVE.	2	8,000	13.0	35	4,869	150	17	2.54	5.72	B	36.6	35	5,000	432	17	2.59	16.77	C	
Ashtabula	N-075	472008G	BROADWAY AVE.	2	7,320	13.0	50	4,869	106	12	1.92	3.35	A	36.6	50	5,000	304	12	1.96	9.77	B	
Butler	C-063	152382S	MUHLHAUSER	2	7,030	28.2	40	6,000	304	15	2.62	13.56	B	31.2	40	6,200	344	16	2.69	15.79	C	
Butler	C-063	152389P	SYMMES RD	2	6,210	28.2	40	6,000	268	14	2.56	13.27	B	31.2	40	6,200	304	14	2.63	15.45	C	
Butler	C-063	152392X	LAUREL ST	2	6,860	28.2	35	6,000	329	17	2.90	16.65	C	31.2	35	6,200	374	17	2.97	19.41	C	
Butler	C-063	152394L	CENTRAL	2	5,890	28.2	35	6,000	282	14	2.82	16.23	C	31.2	35	6,200	321	15	2.90	18.92	C	
Butler	C-063	152407K	VINE ST.	2	7,030	28.2	20	6,000	538	27	4.64	42.65	E	31.2	20	6,200	613	28	4.78	49.97	E	E (b)
Butler	N-078	524698G	TYLERSVILLE RD	2	11,590	11.7	40	5,600	197	24	2.83	5.77	B	18.9	40	5,000	292	22	2.60	7.86	B	
Butler	N-078	524677N	CENTRAL	2	8,740	11.7	25	5,600	216	27	3.79	11.25	B	18.9	25	5,000	318	24	3.45	15.07	C	
Butler	N-078	524678V	FIRST ST	2	7,430	11.7	25	5,600	184	23	3.66	10.86	B	18.9	25	5,000	270	21	3.33	14.54	B	
Crawford	C-062	532583H	N SANDUSKY AVE	2	9,710	5.9	35	5,600	92	23	2.97	3.38	A	13.9	35	6,200	236	24	3.22	9.36	B	
Crawford	C-062	532588S	MANSFIELD ST	2	8,480	5.9	35	5,600	81	20	2.87	3.26	A	13.9	35	6,200	206	21	3.11	9.04	B	
Crawford	C-067	518443W	MAIN ST	2	12,030	14.5	40	5,600	253	25	2.87	7.24	B	31.3	40	6,200	591	27	3.10	18.29	C	
Crawford	N-073	481561P	HOPLEY	2	6,030	26.0	50	4,869	175	10	1.86	6.47	B	34.3	45	5,000	253	11	2.04	10.27	B	
Cuyahoga	C-061	524363S	BAGLEY RD.	4	10,950	14.5	50	5,600	195	10	2.02	4.33	A	54.2	50	6,200	787	10	2.18	18.77	C	
Cuyahoga	C-061	524367U	COLUMBIA RD	2	7,240	14.5	50	5,600	129	13	2.12	4.53	A	54.2	50	6,200	520	14	2.28	19.66	C	
Cuyahoga	C-074	523971H	HUMMEL RD	2	5,560	13.4	35	5,600	120	13	2.65	6.86	B	47.3	35	6,200	459	14	2.87	28.44	D	C (d)
Cuyahoga	C-074	523973W	ENGLE RD	4	15,100	13.4	35	5,600	326	18	2.79	7.23	B	47.3	35	6,200	1246	19	3.03	29.98	D	C (d)
Cuyahoga	N-075	472098H	LONDON RD	2	5,310	13.0	35	4,869	100	11	2.36	5.33	B	36.6	35	5,000	287	11	2.41	15.61	C	
Cuyahoga	N-075	472093Y	DILLE RD	2	15,430	13.0	50	4,869	224	25	2.46	4.28	A	36.6	50	5,000	642	25	2.51	12.51	B	
Cuyahoga	N-080	472187A	WEST 110 ST.	2	5,970	13.5	35	4,869	116	12	2.40	5.63	B	34.1	35	5,000	300	13	2.45	14.80	B	
Cuyahoga	N-080	472192W	WEST 117 ST.	4	15,610	13.5	35	4,869	305	16	2.52	5.91	B	34.1	35	5,000	785	17	2.58	15.54	C	E163
Cuyahoga	N-080	472201T	BUNTS RD	2	5,300	13.5	35	4,869	103	11	2.36	5.53	B	34.1	35	5,000	266	11	2.41	14.54	B	163
Cuyahoga	N-080	472245T	COLUMBIA RD	2	11,320	13.5	50	4,869	170	18	2.16	3.90	A	34.1	50	5,000	439	19	2.20	10.21	B	162
Cuyahoga	N-080	472248N	DOVER CENTER RD	2	7,630	13.5	50	4,869	115	12	1.94	3.50	A	34.1	50	5,000	296	12	1.98	9.18	B	162
Cuyahoga	N-080	472252D	BRADLEY RD	2	5,670	13.5	50	4,869	85	9	1.84	3.33	A	34.1	50	5,000	220	9	1.88	8.72	B	162
Defiance	C-066	142356A	OTTAWA AVE	2	10,120	21.4	50	6,000	280	19	2.41	8.02	B	47.7	50	6,200	640	19	2.47	18.75	C	
Defiance	C-066	142375E	U.S. 24	2	5,910	21.4	50	6,000	164	11	2.15	7.14	B	47.7	50	6,200	374	11	2.20	16.70	C	
Erie	N-072	472306G	WATER ST.	2	6,260	15.6	50	4,869	109	10	1.87	3.90	A	27.0	50	5,000	192	10	1.90	7.01	B	
Erie	N-072	472308V	STATE ST.	2	5,330	15.6	50	4,869	93	9	1.83	3.81	A	27.0	45	5,000	176	9	2.00	7.94	B	
Erie	N-085	481668S	SR 101 TIFFIN	2	5,950	1.4	15	4,869	24	25	4.84	2.36	A	11.7	15	5,000	207	26	4.95	20.69	C	
Franklin	N-073	481472X	LINCOLN	2	9,810	26.0	40	4,869	334	18	2.42	9.86	B	34.3	40	5,000	449	19	2.46	13.52	B	
Franklin	N-073	481467B	WEBER	2	8,678	26.0	40	4,869	295	16	2.34	9.55	B	34.3	35	5,000	439	18	2.64	16.01	C	
Franklin	N-073	481470J	COOK	2	11,424	26.0	40	4,869	388	22	2.54	10.34	B	34.3	40	5,000	523	22	2.59	14.19	B	
Hamilton	C-063	152346W	WINTON RD	4	21,820	28.2	20	6,000	1670	43	5.18	47.58	E	31.2	20	6,200	1902	44	5.33	55.75	E	E (b)
Hamilton	C-063	152347D	MITCHELL AVE.	2	14,930	28.2	20	6,000	1143	58	5.89	54.07	E	31.2	20	6,200	1301	60	6.06	63.35	F	F (b)
Hamilton	C-063	152355V	TOWNSHIP AVE	2	9,270	28.2	20	6,000	710	36	4.94	45.36	E	31.2	20	6,200	808	37	5.08	53.15	E	E (b)

US Patent Application

VERIFIED STATEMENT

OF

JEFF LELAND

My name is Jeff Leland, Administrative Services Manager for the Rochester Fire Department. My mailing address is: 201 Fourth Street SE, Room 10, Rochester Minnesota 55904.

The purpose of my testimony is to describe for the Board the impact on the Rochester Fire Department that the Dakota Minnesota & Eastern (DM&E) Railroad's proposal to add 30 plus coal trains through the City of Rochester will have on fire, rescue and emergency medical responses.

VERIFICATION

STATE OF MINNESOTA
COUNTY OF OLMSTED

I, Jeff Leland, first being duly sworn, depose and say that I have read the forgoing statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

Jeffrey R Leland

Jeff Leland

Subscribed and sworn to before me this 8TH day of DECEMBER, 2000

JUDY KAY SOMERS
Notary Public
Minnesota
My Commission Expires Jan. 31, 2005

Judy Kay Somers

Notary Public

VERIFIED STATEMENT

OF

RICK LOVETT

My name is Rick Lovett, Assistant Fire Chief of the Rochester Fire Department. My mailing address is: 201 Fourth Street SE, Room 10, Rochester Minnesota 55904.

The purpose of my testimony is to describe for the Board the impact on the Rochester Fire Department that the Dakota Minnesota & Eastern (DM&E) Railroad's proposal to add 30 plus coal trains through the City of Rochester will have on fire, rescue and emergency medical responses.

VERIFICATION

STATE OF MINNESOTA
COUNTY OF OLMSTED

I, Rick Lovett, first being duly sworn, depose and say that I have read the forgoing statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

R Lovett

Rick Lovett

Subscribed and sworn to before me this 8TH day of DECEMBER, 2000

JUDY KAY SCHERR
Notary Public
Minnesota
My Commission Expires Jan. 31, 2005

Judy Kay Scherr

Notary Public

Chapter 3 of the EIS discusses issues related to emergency vehicle response. On page 3.2-85, the EIS describes options emergency vehicles may use to decrease a delay as a result of encountering a train. According to the ESI, if an emergency vehicle arrives during a train crossing, "the emergency vehicle could utilize the oncoming traffic lane to approach the crossing, avoiding any vehicle queue. After the crossing cleared, it could proceed through the crossing ahead of the queued vehicles into the appropriate lane of traffic which would have cleared during the passing train." This option is physically not possible at the North Broadway crossing due to the presence of concrete medians, nor is it a safe practice at any of the other crossings. According to Policy number 2220 of the Rochester Fire Department, "driving in opposing lanes of traffic, while permitted by State law, should only be done in the most exigent of circumstances." This option not only represents a significant risk to members of the general public, it places members of our department at significant risk and can not be condoned as an acceptable vehicle operations methodology.

Chapter 3, page 3.2-85 of the EIS further states, "based on these scenarios and minimum train speeds of 40 mph (only applies to crossings with speed restrictions, other crossings would have train speeds of 45 to 49 mph), the most an emergency vehicle would be expected to be delayed would be 2.6 minutes." While this statement may be true, a delay of 2.6 minutes is clearly unacceptable.

In 1998, 1999 and year-to-date 2000 for example, the Rochester Fire Department responded to 3,699, 4540, 4116 emergency calls, respectively. This includes responding to fires, medical emergencies, personal injury accidents and fire alarms. According to the statistical analysis of these calls, we were required to use at-grade railroad crossings an average of 926 times each year while responding to these calls for emergency service. Stated another way, 8% of all emergency responses by the Rochester Fire Department require using at-grade railroad crossings for emergency vehicles. A delay of up to 2.6 minutes is simply unconscionable because of the detrimental impact to human lives in the City of Rochester. A fire in an average-size living room, for example, creates an Immediate Danger to Life and Health (IDLH) atmosphere in just 420 seconds from the on-set of the fire. Carbon monoxide and carbon dioxide levels in the room reach a point where the chance of survival for any victim is negligible. At 680 seconds into the fire, the phenomenon known as "flashover" occurs in the room. At this point, the room is entirely engulfed in flames, the room is inhabitable due to extreme temperatures and the chance of survival of any occupant is essentially zero. Rapid arrival of firefighters and equipment to the scene of a fire is paramount to the survivability our citizens. Our responding fire engines carry 400 gallons of water. A 1 3/4" hose (the smallest diameter hose available on the truck) will deliver 200 gallons per minute. Given this scenario, our first arriving unit would be out of water in approximately two minutes. A delay of up to 2.6 minutes for the next arriving engine company, who's job it is to establish a water supply will be extremely significant in terms of our ability to effectively intervene in these situations and ultimately save a fire victim. It is standard operating policy to send two engine companies, one ladder company and a chief officer to all reported fires in single family dwellings. In most cases the second engine company is forced to cross the tracks. A fire response to a commercial building requires a minimum of three engine company's, one ladder company and a chief officer, once again at least one of these engine company's will be forced to cross the tracks.

In addition, a delay of up to 2.6 minutes will significantly decrease the chances of survival for victims of medical emergencies. The Rochester fire department is an integral part of the City of Rochester's emergency medical response and is dispatched to all life threatening medical emergencies in the City of Rochester. All front line fire apparatus is equipped with complete emergency medical kits including semi-automatic external defibrillators and all fire fighters are Nationally Registered Emergency Medical Technicians.

A study published in the November 1996 edition of Annals of Emergency Medicine; Mayo Clinic physicians Roger White, Thomas Bugliosi and Daniel Hankins analyzed survival of cardiac arrest victims. They carried out a retrospective analysis of eighty-four adult cardiac arrest patients in the City of Rochester, MN between November 1990 through July 1995. The study concluded that, of the eighty-four people who suffered cardiac arrest in Rochester, forty-one (forty-nine percent) survived the incident to be discharged from the hospital. The "call to shock" time is the critical factor. This time is defined as the interval between when the 911 call is received to the time the person receives a life-saving shock by a cardiac defibrillator. According to the study, the "call to shock time for survivors was 5.8 minutes; it was 6.4 minutes for the non-survivors." These physicians concluded that "a high discharge-to-home survival rate was obtained with early defibrillation." This study clearly illustrates that even a slight delay in defibrillator-trained police officers and firefighters negatively impacts patient survivability. NOTE: Most cities in the United States experience a 5 to 10 percent survivability rate for people suffering the same emergency.

Clearly, a delay of up to 2.6 minutes will dramatically impact the mortality rate of medical emergency and fire victims in the City of Rochester.

If you need any additional information, please contact us at your convenience.

VERIFIED STATEMENT

OF

ROGER PETERSON

My name is Roger Peterson, Chief of the Rochester Police Department. My mailing address is 101 Fourth Street SE, Rochester, Minnesota 55904. I have been employed by the Rochester Police Department for the past 19 years and have been the Chief of Police since 1998.

The purpose of my testimony is to address the draft environmental impact statement of the Surface Transportation Board pertaining to the Dakota Minnesota & Eastern (DM&E) Railroad proposal, specifically as it relates to public safety emergency response.

While the report acknowledges that "where, when and what the emergency is cannot be predicted" it utilizes only studies of medical emergencies to determine the impact of the proposed rail line to emergency services.

Medical emergencies are only a small part of the calls we respond to. Assaults in progress, domestic violence, robberies and other crimes that have a high potential of personal harm make up a very substantial part of our emergency vehicle response. It is obviously our objective to get to these calls before they become medical emergencies. Therefore, the assumption that "only 5-10 percent" of emergency calls are actually life

threatening, as quoted in the statement, is based on a false assumption. The need for immediate police service extends far beyond only medical emergencies.

However, even if we accept the 'medical emergency' definition supplied by the report, it is extremely disappointing to find that the conclusions reached are based on reports that are 25 and 13 years old respectively. To suggest that police response and technology have remained static for the past 25 years is certainly not a valid assumption and does not in anyway reflect the reality the service that we provide.

Advances in technology have made us extremely effective in responding to medical emergencies, especially in regard to heart attacks. An immediate emergency response utilizing defibrillator technology available in emergency response vehicles is critical to saving the lives of heart attack victims. Immediate does not mean 15 or even 30 minutes as indicated in the draft environmental impact statement. Unless emergency assistance is available within four minutes of a heart attack, the patient's chances of survival drop precipitously. We currently provide the citizens of this community with the highest survival rate for heart attack victims of anywhere in the country. If response times are compromised as indicated in the environmental impact statement, people's lives will inevitably be lost as a result.

The statement also indicates that the problem with emergency response can be mitigated by such methods as utilizing the oncoming traffic lane while waiting for a train to clear a crossing and then crossing ahead of other vehicles into the appropriate lane of

traffic after the train has passed. Suggesting that emergency vehicles ignore state laws and proceed in such a dangerous manner is contrary to the role of a board of the federal government in such matters. Other suggestions, that "faster train speeds would require emergency vehicles to arrive at open crossings quickly" while perhaps rather obvious, would produce a type of emergency response that would jeopardize public safety by encouraging emergency vehicles to race trains to a crossing – exactly what we discourage other motorist from doing because of the dangers involved. These are not acceptable mitigation measures.

The impact statement goes on to suggest that the issue of public safety response will be mitigated by the proposed speed of the trains. While the trains will be much more frequent, they will be moving much faster so they will block streets for shorter period of time per individual train. The fact is that the chances of an emergency route being blocked will have more than doubled and will have done so on a completely unpredictable schedule. This will unquestionably compromise emergency response.

For example, in 2000, there was a total of 33,871 Rochester Police Department priority 1 and 2 calls for service logged into the Dispatch Center. A priority 1 call involves a situation where a known crisis exists that threatens the life of an individual. A priority 2 call involves situation where a threat to personal safety or property exists. Of those calls, an estimated 62% (21,000) required crossing the DM&E rail line in the City of Rochester. Based upon a model prepared by Mr. Charles Reiter (attached as part of Mr. Reiter's verified statement) of the hourly distribution of police service calls relative

to projected traffic delays experienced by hour, approximately 2,159 of these responses would be delayed due to closure of rail line crossings.

(The 62% figure was extrapolated from an average daily count of Rochester Police Department vehicle rail line crossings done on two separate days in 1998, where the average number of police rail crossings was 181 daily. This information was supplied in the verified statement of Ron Thompson, which is a part of Exhibit 9 of the July 10, 1998 City of Rochester submittal to the Surface Transportation Board. 181 daily crossings multiplied by 365 days totals approximately 66,000 crossings annually, or 62% of the estimated 106,000 calls for police service logged into the Dispatch Center in 2000. It is assumed that the percentage of rail line crossings is consistent between the number of rail crossings for priority 1 and 2 calls and the number of rail line crossings for all calls for police service.)

The report also indicates that the predicted increases for train related accidents are "below the criteria for significance" – this largely the result of the fact that Olmsted County experienced only one train accident at a grade crossing between 1993 and 1997. Such a projection denies the reality of the proposal's impact on a congested urban area. If a proposal was made to quadruple the number of trucks traveling through the heart of the City, we would reasonably expect the number of truck related accidents to increase. If the proposal also included quadrupling the speed of those trucks, it would be totally unrealistic to expect that there would not be a significant increase in accidents. Based on

my public safety experience, trucks are not significantly different than trains in this regard.

However, trains are different than trucks in regard to the disastrous consequences that an accident would produce in the highly populated area within the City of Rochester. The proximity of very large medical facilities along the rail line, in conjunction with a total inability to evacuate patients from these facilities, produce a circumstance that would make even one train related accident a catastrophe. That is an issue that is not subject to mitigation.

In conclusion, the draft environmental impact statement either does not address a number of significant issues related to emergency vehicle response, or does so in a way that does not take into account the realities of providing effective emergency response in the City of Rochester.

VERIFICATION

STATE OF MINNESOTA

COUNTY OF OLMSTED

I, Roger Peterson, first being duly sworn, depose and say that I have read the foregoing statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

Roger Peterson

Subscribed and sworn to before me this 22nd day of February, 2001.



Sandra K Schulz

Notary Public

My Commission Expires 1-31-05

VERIFIED STATEMENT

OF

ANTHONY J. KNAUER

My name is Anthony J. Knauer. As a Transportation Planner for the City of Rochester I administer the public transportation program for the City. I work in the Department of Public Works under the direction of the Transportation Engineer. This position includes overall administration, policy development, budgeting, service planning and capital acquisition. I have held this position for over 23 years. I am a certified Community Transit Manager by the Community Transportation Association of America.

The Rochester mass transit program provides both regular route and dial-a-ride service to over one million passengers annually. Ridership has been growing by 5% to 7% annually. The regular route system operates on a pulse system with routes meeting at a central transfer station located in the downtown area. The downtown is a major generator of employment trips served by the public transit system.

I reviewed an analysis of Transit Delay Data prepared by the Rochester–Olmsted Council of Governments planning staff that compared the local transit schedule with potential train traffic on the Dakota Minnesota Eastern (DME) Railroad. Eight out of 17 weekday routes cross the DME right of way at 5 different at grade crossings. Based on the current schedule these affected routes account for 225 bus trips per day. The analysis shows that the increased rail traffic will have a signifigant impact on the on-time performance of local transit service by disrupting and causing delay on 5% to 11% of the trips on these affected routes. This will result in inconvenience, loss of service dependability and missed transfers for riders.

You will find attached a copy of this analysis labeled "Transit Delays".

VERIFICATION

STATE OF MINNESOTA

COUNTY OF OLMSTED

I, Anthony J. Knauer, first being duly sworn, depose and say that I have read the forgoing statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

Subscribed and sworn to before me this 16th day of January, 2001.

Anthony J. Knauer

Notary Public

My Commission Expires 1-31-05

KIM M. HANSON
Notary Public
Minnesota
My Commission Expires Jan. 31, 2005

TRANSIT DELAYS

INDIVIDUAL TRAIN CROSSING EVENT DELAY VALUE
(taken from ROCOG analysis of expected traffic delay on corridors each hour of the day)

	11TH AVE W RT 9 - BOTH RT 10 - BOTH RT 18 - OUT/NB		6TH AVE W RT 11 - BOTH		11TH AVE NE		BROADWAY Rt 1 - both Rt 2 - AM NB / PM SB	
	SB	NB	SB	NB	SB	NB	SB	NB
5:00 AM	2.54	2.55	2.54	2.56	2.60	2.62	2.58	2.58
6:00 AM	2.61	2.61	2.57	2.61	2.69	2.80	2.71	2.62
7:00 AM	2.80	2.70	2.65	3.11	3.58	3.30	3.21	2.83
8:00 AM	3.10	2.83	2.86	5.17	6.45	5.51	3.87	3.20
9:00 AM	2.96	2.82	2.86	3.12	4.51	4.05	3.46	3.19
10:00 AM	2.95	2.79	2.88	2.96	4.27	3.92	3.42	3.36
11:00 AM	2.93	2.80	2.89	2.97	4.00	4.08	3.46	3.48
12:00 PM	3.03	2.93	3.16	3.07	4.57	4.62	3.61	3.93
1:00 PM	3.15	2.97	2.96	3.03	4.48	4.31	3.78	4.02
2:00 PM	3.08	2.94	2.93	3.13	4.32	3.95	3.66	3.78
3:00 PM	3.02	2.97	3.15	3.07	4.38	4.63	3.60	4.01
4:00 PM	3.31	3.09	3.41	3.09	6.38	6.11	3.86	4.45
5:00 PM	3.33	3.20	3.78	3.23	5.69	5.87	3.76	4.65
6:00 PM	3.16	3.11	3.84	2.98	6.74	8.02	3.61	4.58

ROUTE 1		
Delay Time during service hours	46.01	48.10
# of Runs	19	19
Hours of Service	13	13
Ave Delay Time (1/2 delay x 1.54 trains/hour)	35.43	37.04
Probability of Delay	6.6%	6.9%
Freq of Delay (1 delay/xx runs)	15	14
Times per day bus delayed	1.26	1.32
ROUTE 2		
Delay Time during service hours	22.27	18.68
# of Runs	10	9
Hours of Service	6	6
Ave Delay Time (1/2 delay x 1.54 trains/hour)	17.15	14.38
Probability of Delay	7.9%	6.0%
Freq of Delay (1 delay/xx runs)	13	17
Times per day bus delayed	0.79	0.54
ROUTE 9		
Delay Time	36.27	40.31
# of Runs	18	20
Hours of Se	12	14
Ave Delay T	27.93	31.04
Probability	5.8%	5.3%
Freq of Del	17	19

Times per d	1.05	1.06					
ROUTE 10							
Delay Time	38.81	37.76					
# of Runs	18	17					
Hours of Se	13	13					
Ave Delay T	29.88	29.08					
Probability	5.3%	4.9%					
Freq of Del	19	21					
Times per d	0.95	0.83					
ROUTE 11							
Delay Time during service hours			36.10	38.93			
# of Runs			18	17			
Hours of Service			12	12			
Ave Delay Time (1/2 delay x 1.54 t			27.80	29.98			
Probability of Delay			5.8%	5.9%			
Freq of Delay (1 delay/xx runs)			17	17			
Times per day bus delayed			1.04	1.00			
ROUTE 16							
Delay Time during service hours					31.61	30.74	
# of Runs					10	10	
Hours of Service					7	7	
Ave Delay Time (1/2 delay x 1.54 trains/hour)					24.34	23.67	
Probability of Delay					8.3%	8.1%	
Freq of Delay (1 delay/xx runs)					12	12	
Times per day bus delayed					0.83	0.81	
ROUTE 18							
Delay Time	9.66	10.69					
# of Runs	5	6					
Hours of Se	3	4					
Ave Delay T	7.44	8.23					
Probability	6.9%	5.1%					
Freq of Del	15	19					
Times per d	0.34	0.31					
ROUTE 55 (ONE DAY - DELAYED VEHICLES MULTIPLED BY 1/5)							
Delay Time during service hours						17.73	18.63
# of Runs						5	5
Hours of Service						5	5
Ave Delay Time (1/2 delay x 1.54 trains/hour)						13.65	14.35
Probability of Delay						4.6%	4.8%
Freq of Delay (1 delay/xx runs)						22	21
Times per day bus delayed						0.23	0.24

Number of Buses A
Total Numbe
Daily % of Bus Runs Affected (

15TH AVE NE

RT 2 - AM / IN PM / OUT

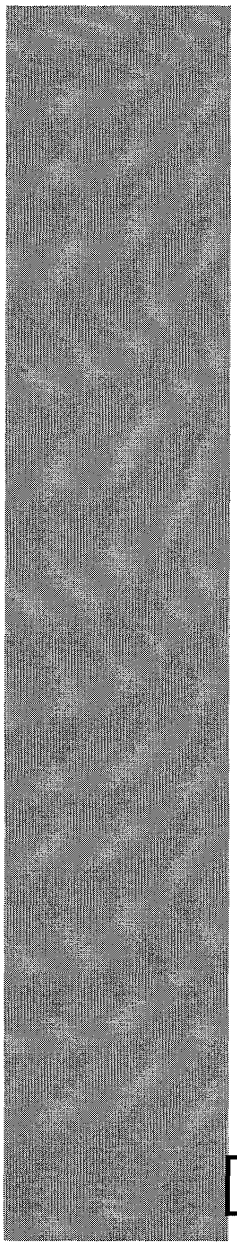
SB	NB
2.54	2.53
2.55	2.56
2.54	2.58
2.56	2.67
2.60	2.63
2.60	2.59
2.58	2.61
2.60	2.58
2.63	2.65
2.60	2.61
2.65	2.60
2.66	2.72
2.73	2.69
2.72	2.70

Results

Best Case Scenario calculated by simple rounding of the results (ie, round up if > .5, round down if < .5

Worst Case Scenario calculated by rounding up all fractional values.

Best Case Scenario		Worst Case Scenario		Total Runs
SB TOTAL	NB TOTAL	SB TOTAL	NB TOTAL	
				38
1.00	1.00	2.00	2.00	
				38
SB	NB			
1.00	1.00	2.00	2.00	
				38



	1.00	1.00	2.00	2.00	
					35
	1.00	1.00	1.00	1.00	
					35
	1.00	1.00	2.00	2.00	
					20
	1.00	1.00	1.00	1.00	
					11
	-	-	1.00	1.00	
					10
	-	-	1.00	1.00	

	Best Case Scen ario		Worst Case Scen ario		Total Runs
	SB TOTAL	NB TOTAL	SB TOTAL	NB TOTAL	*225.00*
ffected by Direction	6.00	6.00	12.00	12.00	
er of Buses Affected		12.00		24.00	
on Affected Routes)		5.3%		10.7%	

VERIFIED STATEMENT

OF

ROY SUTHERLAND

My name is Roy Sutherland. I am the Superintendent of the Rochester Park and Recreation Department. My mailing address is 201 Fourth Street SE, Room 150, Rochester Minnesota 55904.

The purpose of my testimony is to describe for the impact on the Rochester Park system of the Dakota Minnesota & Eastern (DM&E) Railroad proposal to add 30 or more daily trains through Rochester. The addition of these trains would affect the following City of Rochester Park facilities:

NAME	LOCATION
Cooke Park	7 Street NW and 6 Avenue NW
Zumbro Trail	Civic Center Drive & Zumbro River
Mayo Field	403 East Center Street
Park Mtce Hdqtrs	403 East Center Street
Quarry Hill Trail	DM&E ROW Zumbro River to Quarry Hill Park
East Park	15 Avenue and East Center Street
Quarry Hill Park	701 Silver Creek Road NE

COOKE PARK

This 7.0-acre neighborhood park is bordered on the south by the DM&E line. The Cascade Creek recreation trail crosses the railroad ROW with a below grade underpass. The trail accommodates an estimated 200,000 trail users per year.

A 230' youth baseball diamond is located adjacent to the ROW in the SW corner of the park. Approximately 40 organized youth baseball league games are played on the field in addition to daily in season youth practice sessions. These games attract an estimated 1,200 participants and 1,200 spectators.

A non-regulation practice soccer field is adjacent to the railroad ROW. No participation numbers are available for the soccer field area.

There is a playground area with playground equipment located 460' north of the DME&E line. No participation numbers are available for the playground.

There is a park shelter with restrooms located 460' from the DM&E ROW. The shelter is rented an estimated 85 times per year for private picnics and gatherings. Approximately 6,500 persons use the shelter during the 85 rentals.

The park includes a hockey rink and warming shelter in the winter. The rink is located 450' from the DM&E tracks. Approximately 1,300 skaters use the rink each season.

RECOMMENDATIONS:

The existing trail underpass should be preserved. If the RR crossing of the Cascade Creek needs to be improved, the trail underpass should be improved to eliminate the existing problem of poor sight lines while crossing under the tracks. The underpass should be kept open during the majority of the upgrade construction.

The significant increase in the number of trains and a potential increase in their speed will create safety concerns for children who use the park. The park should be separated from the RR via fence and the vegetative screening improved by plantings. The estimated costs for fencing and vegetative screening along the 700' of park frontage along the railroad is $14,000.

ZUMBRO RIVER TRAIL

The major north/south trail corridor through the City crosses the DM&E tracks at grade on the east side of the Zumbro River. This trail accommodates and estimated 265,000 trail users annually. Due to the low number and speed of current trains through the City, the current level of train traffic has not appeared to affect the use of the trail.

RECOMMENDATIONS

The significant increase in train traffic and in the speed of the trains will create a safety hazard for the 265,000 annual trail users. The trail crossing should be changed to a below grade crossing. The estimate for this below grade crossing is $125,000. The proposed increase in train traffic and train speed suggest that this recommendation receive top priority when evaluating the impact of the DM&E proposal on the park system.

PARK / FORESTRY MAINTENANCE FACILITY

The impact of the DM&E proposal to this facility is primarily the impact of having access to our facilities on the north side of the City blocked during those times that railroad traffic closes crossings. An estimated 40 Park Department work vehicles are based and dispatched from this facility. Over 1/3 of the City's 2500 acres of parkland are located north of the RR tracks. One of our concerns is the loss of efficiency and wasted time at RR crossings.

RECOMMENDATION

The day to day flow of Park Department work vehicles between job sites can best be accommodated by a minimum of delays at RR crossings. The construction of overpasses needed to handle normal city traffic and emergency vehicles should provide adequate facilities for the Department's operations.

MAYO FIELD

This facility is the site of approximately 150 baseball games during a day season. The field is used by all of the city high school teams, Legion and VFW teams, the local amateur and collegiate teams as well as the site for state wide tournaments. The concession and restrooms as well as the left field seating access are located less than 100' from the RR ROW. A majority of the balls fouled off back of home plate end up on the RR ROW. Ball shaggers are routinely found walking the brush in the RR ROW to retrieve foul balls.

RECOMMENDATIONS

It is suggested that the 1,000' right of way adjacent to the Mayo Field facility be fenced at an estimated cost of $10,000.

QUARRY HILL TRAIL

This trail currently runs parallel to the DM&E line on a portion of what was once RR ROW. No trail use surveys have been conducted for this trail. It is our staff's estimation that the trail use is significantly less than that of the Zumbro Trail and probably slightly less than that on the Cascade Creek Trail which would put the trail use at approximately 100,000 users / year. The trail begins at the Zumbro River on the west end and ends up in Quarry Hill Park--leaving the RR ROW north of the Federal Medical Center. The trail begins on the north side of the RR ROW and then crosses, via the existing street, the DM&E tracks at 9 Avenue NE and continues easterly on the south side of the tracks. The trail crosses under the tracks north of the Federal Medical and continues into Quarry Hill Park.

RECOMMENDATIONS

The trail section from the Zumbro River to 9 Avenue should be reconstructed on the south side of the RR ROW. This would eliminate the at grade crossing at 9 Avenue NE. The trail could continue easterly on the south of the tracks. The trail should connect to the suggested below grade crossing on the Zumbro River Trail. It is suggested that additional trail ROW be acquired on the south side of the tracks so that the trail could be relocated further from the tracks. The 1,800' trail should be relocated, fenced and be screened via vegetation from the tracks. The estimated cost for the relocated trail, fencing and vegetative screening is $50,000.

EAST PARK

This community park is the site of several youth soccer and youth football fields in addition to a youth baseball field and a linear corridor for the Quarry Hill trail. The proposed increase train traffic would effect the park use by the anticipated frequency of train related noise. While classified as a community park, East Park does provide neighborhood park facilities for the area north of the tracks. Access to the park for these people is currently at an at-grade street crossing at 15 Avenue NE. The increase in trains and train speed will create safety hazards for park users accessing East Park from 15 Avenue.

The youth football field complex is located immediately adjacent to the DM&E line. An estimated 160 football games are played at the complex during the 8 weeks fall season. It is estimated that this program attracts 6,500 players and 6,500 spectators to the park.

The park includes a youth baseball diamond that is located within 150' of the DM&E property. An estimated 35 games are played on the field each summer.

RECOMMENDATIONS

Relocating the trail further from the tracks and increasing the amount of vegetative screening (trees) along with fencing to separate the tracks from the 1,200' of trail and adjacent park and to reduce both the noise and visual would help minimize the effect of the proposal on the East Park users. The estimated cost for the fencing and screening is $24,000 while the trail relocation is estimated at $10,000.

The 15 Avenue NE crossing to the park should be controlled via traffic control device.

QUARRY HILL PARK

The 250 acre park is relatively undeveloped and serves as the site for the community's nature center. The south side of the park is bounded by the DM&E track. The primary impact on the park and park users will be the increase noise associated with more and faster moving trains. The attached memorandum from Greg Munson, Director of the Nature Center, identifies some of the potential problems associated with the proposed increase in rail traffic. The Nature Center provides outdoor and enviromental education for over 30,000 students each year and offers education programs for an additional 36,000 non-school attendees.

There is a current pedestrian / trail access to the park at Silver Creek Road that crosses the DM&E track at grade. This crossing is not as heavily used In comparison to other trail crossings.

RECOMMENDATIONS

Increase the vegetative screening adjacent to the ROW in Quarry Hill Park to minimize the visual and noise impact of increased train traffic. The Silver Creek pedestrian crossing should probably be controlled via a traffic arm or eliminated. The cost estimates for 2,500 of vegetative screening would be $25,000.

In conclusion, it is my opinion that the addition of 30 plus trains per day traveling through the City of Rochester at speeds in excess of 40 mph will impact the usability of several of our parks and will severely increase the threat of harm to park and trail users unless mitigation actions are undertaken.

VERIFICATION

STATE OF MINNESOTA

COUNTY OF OLMSTED

I, Roy Sutherland, first being duly sworn, depose and say that I have read the forgoing statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

Roy Sutherland

Subscribed and sworn to before me this 29 day of JAN., 2001

Notary Public

My Commission Expires 1/31/05

JANICE KOWALCZYK
NOTARY PUBLIC - MINNESOTA
My Commission Expires 1/31/2005

Quarry Hill Nature Center

701 Silver Creek Road N.E.
Rochester, Minnesota 55906-4504

Greg Munson, Teacher/Director

Telephone 507/281-6114
Fax 507/287-1345

June 9, 1998

To whom it may concern;

This letter is being written in an attempt to give some indication about the impact which the proposed DM&E expansion will have on Quarry Hill Park and the programs which are offered at Quarry Hill Nature Center. In order to understand possible impacts on Quarry Hill it is necessary to have some background on what Quarry Hill is and what the Quarry Hill program provides for Rochester area students and other residents.

Quarry Hill is a 270 acre City Park located on the east side of Rochester and bordered on the south by the existing DM&E line. Quarry Hill Nature Center, located within Quarry Hill Park, is a locally supported regional day use environmental education center which provides environmental education opportunities for more than 65,000 participants and visitors each year. About half of the participation involves elementary and middle school children who are bussed to Quarry Hill to do environmental education activities. Most of those students are bussed to Quarry Hill from schools located throughout Rochester, as well as surrounding communities. A normal day in spring and fall would include six to seven buses, while winter activity would usually be three to four buses per day. In addition, the Quarry Hill Summer Nature School program involves more than 2,500 children in week long programs which they are brought to and taken home by their parents. During summer months this i involves hundreds of vehicles arriving and departing Quarry Hill daily. Besides drawing visitors to Quarry Hill Nature Center, Quarry Hill Park is also used by many people as a passive recreational experience allowing them to get away from the stress of jobs or households. Within minutes of downtown Rochester, area residents and visitors may take a walk in a natural area which is home to a variety of plants and animals in their relatively natural habitats.

Current daily train traffic has two noticeable impacts on Quarry Hill programs. When trains are passing through, the noise is quite evident and often precludes hearing natural sounds or speaking easily with classes of students doing outdoor activities. This not only affects classes but also the quality of the experience for the

Quarry Hill Nature Center

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casual hiker. In addition, we occasionally have staff, volunteers, or bus loads of students detained at the nearby rail crossing on County #22 adjacent to the Silver Creek bridge. County #22 is the only vehicle access to Quarry Hill Nature Center. Because of the high program and participant numbers, class start and finish times are scheduled very tightly with school start, lunch, and finish times. When arrival of staff, volunteers, or buses is delayed by passing trains it has an impact on our schedule and ability to provide quality programs.

With only three trains passing through per day the above mentioned impacts are quite limited now. The addition of many more trains would undoubtedly have an adverse effect on our programs and could potentially necessitate looking for another location to site our Nature Center and environmental education program. With more than three hundred acres of naturally maintained park land, close to program participants, this would be a formidable task to find and purchase a suitable replacement location, as well as building a million dollar Nature Center. While constructing a sound and visibility barrier along the half mile of track which runs through the Park would be a partial solution, it would not help at all with the problems created by access delays to Quarry Hill.

I believe the above information represents one of many quality of life issues which need to be considered when evaluating the impact additional train traffic will have on the Rochester community. If the DM&E plan is adopted as proposed, I would expect DM&E officials, as well as local leaders, to work with us to mitigate the impact which the proposal will have on Quarry Hill. If further information is needed regarding any of the above, I may be contacted at the address or phone number on the letterhead above.

Greg Munson, Teacher/director

Joint Verified Statement

of

Ana G. Vargo, P.G. and Ronald B. Farmer, P.E.

My name is Ana G. Vargo. I am a professional Geologist within the state of Wyoming and am a geologist with the consulting firm of Short Elliot Hendrickson Inc. (SEH). I am a geologist for SEH and working for the City of Rochester, Minnesota. I have 10 years of professional experience. And my name is Ronald B. Farmer. I am a licensed Professional Engineer registered in the State of Minnesota with the consulting firm of Short, Elliott, Hendrickson, Inc. I am a senior geotechnical engineer for SEH and working for the City of Rochester, MN. I have 23 years experience as a geotechnical engineer. We are making this Joint Verified Statement for the City of Rochester, which has submitted comments to the Surface Transportation Board under Finance Docket No. 33047, Dakota, Minnesota & Eastern Railroad Corporation – Construction into the Powder River Basin.

Ana G. Vargo

I have a B.A. in geology from Colorado College and a M.S. in geology from Colorado State University. I worked as a geologist for the West Virginia Geological and Economic Survey for 4 years. I then worked for the consulting company's of Riverside Technology, inc. for 4½ years and SEH for 1½ years. With these consulting companies, I was responsible for writing and preparing several Environmental Impact Statements related to mining projects. This including preparing the geology section for the *Draft Supplemental Environmental Impact Statement for the Betze Project Barrick Goldstrike Mines Inc* and the *Cumulative Impact Analysis of Dewatering and Water Management Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project.* These geology sections included an analysis of karst development and areas susceptible to future sinkhole development related to these projects.

Ronald B. Farmer, P.E.

I have Bachelor's and Master's Degrees in Civil Engineering from Purdue University. I worked as a geotechnical engineer for the U.S. Army Corps of Engineers in New Orleans, San Francisco and St. Paul, and the private consulting firms; McClelland Engineers in New Orleans, Louisiana, and Warzyn Engineering in Minneapolis, MN prior to joining SEH in 1991. I have been in charge of SEH's Geotechnical Unit since joining the firm in 1991. As lead geotechnical engineer at SEH, I have been directly responsible for geotechnical foundation recommendations and foundation designs for several projects constructed in Karst rock formations. Those projects have included: water tower foundations in Elgin, Minnesota (Wabasha County) and Preston, Minnesota (Fillmore County), Trunk Highway 101 and associated Trunk Sewer line in Dakota County, Byllesby Dam Repairs in Dakota County, New Richmond Dam Reconstruction in St. Croix County, Wisconsin, and Trunk Highway 35 Reconstruction in River Falls, Wisconsin. The water tower project in Preston included an evaluation of the potential for karst feature development at the project site. The projects in St. Croix Countyand River Falls, Wisconsin included grouting designs to fill voids and cavities in the bedrock formations. In addition, while with the St. Paul District of the Army Corps of Engineers, I was the project engineer for geotechnical investigations and foundation designs for portions of the Rochester, Minnesota Flood Control Project.

Response to Section 3.1.3.3 – Geologic Hazards

We do not believe that the geologic hazards (karst and earthquake shaking) that exist along the Powder River Expansion Project are significant with respect to the Rochester Bypass Alternatives R-3 and R-4.

Specifically, the statement, "Areas associated with karst topography are not well suited for railroad construction activities", is a gross over simplification of karst topography and its influence on human activity. That is, construction, and specifically railroad construction, routinely occurs in areas of karst topography. Karst topography exists in thirteen counties in southeastern Minnesota including: Dakota, Dodge, Fairborn, Fillmore, Freeborn, Goodhue, Houston, Mower, Rice, Steele, Wabasha, Waseca and Winona (Kanivetsky 1979). Furthermore, railroad facilities already exist within portions of these thirteen counties and existing railroad lines traverse areas of high sinkhole probability ranging from 20 to more than 100 sinkholes per square mile, especially in Winona County (Dalgaleish and Alexander 1984). If karst is recognized to be a legitimate geologic hazard in specific areas then we propose the corrective and/or mitigative efforts described in our response to statements in paragraph 3.3.2.3.1.

Additionally, seismic activity within the project area should not produce strong enough shaking to cause structural damage to dwellings during a 50-yr, period. The information presented in the EIS is generalized for Minnesota and does not represent conditions in southeastern Minnesota and Olmsted County in particular.

Mooney (1979) reports that, "Algermissen and Perkins assigned damage probability for the United States in terms of severity of ground shaking and the frequency of occurrence

of damaging earthquakes. Minnesota lies outside their lowest contour interval, 0.04g, on their map of "horizontal acceleration in rock with 90 percent probability of not being exceeded in 50 years."

Additionally, Chandler (1994 & 1995), Chandler and Morey (1989) and Mooney (1979) have summarized earthquake activity in Minnesota. Figure 1 shows earthquake epicenter locations and Table 1 describes the events in terms of the intensity, magnitude and the area of influence (Area Felt). The majority of earthquakes in Minnesota are located near the Morris Fault and are related to the Great Lakes Tectonic Zone (Chandler 1989). There are no records of any of these quakes being felt in southeastern Minnesota. Three of the earthquakes, Rush City, Cottage Grove and New Prague, have been associated with the Mid-Continent Rift zone (Chandler 1989). The only earthquake within a reasonable distance from Rochester was the poorly documented New Prague event of approximately 1860, located approximately 65 miles from Rochester. To our knowledge there is no record of this quake being felt in Olmsted County.Therefore, mitigative measures are not necessary in Olmsted County for earthquake shaking relative to this project.

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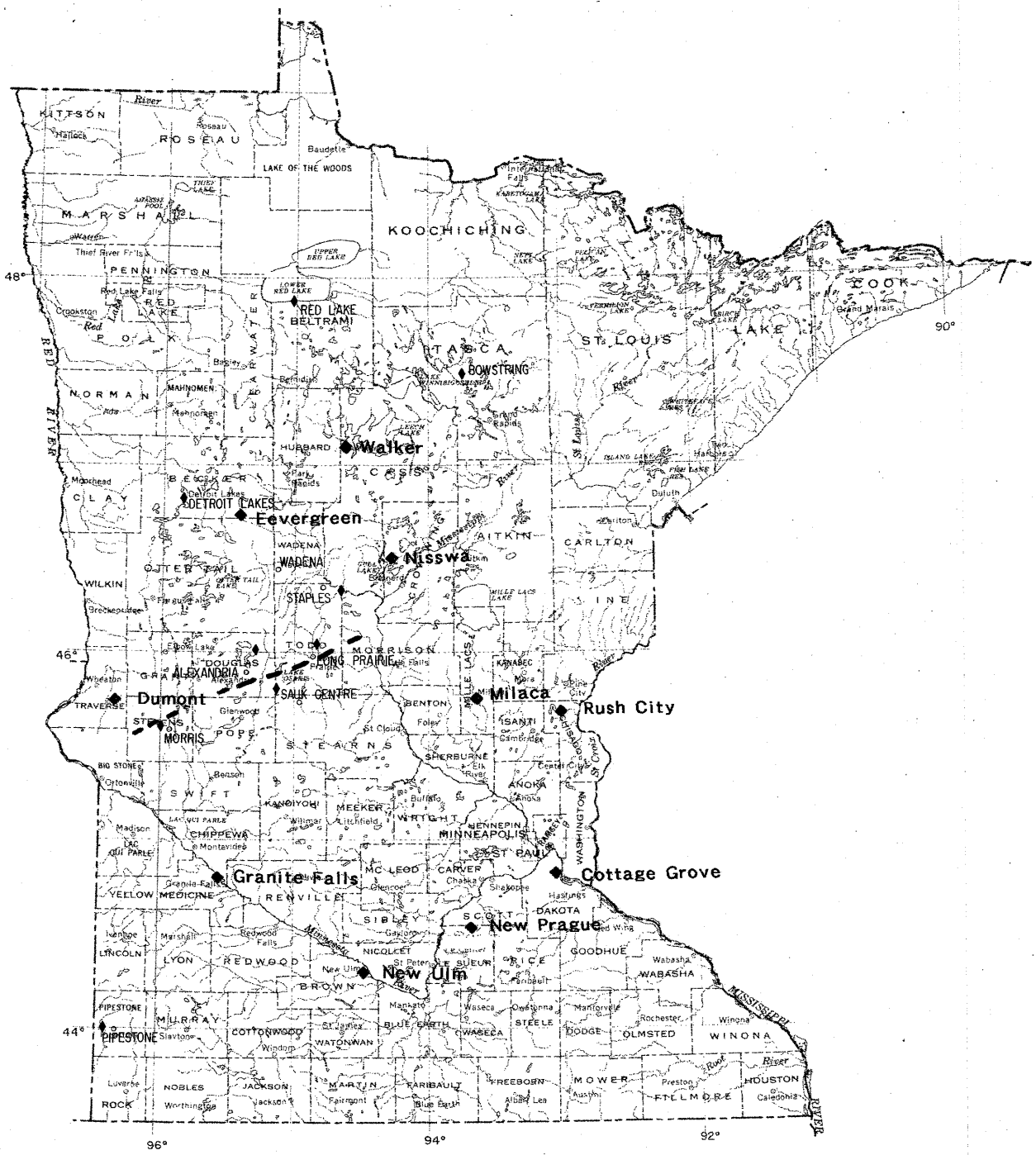


Figure 1 --Location map for Minnesota earthquakes. Diamonds represent earthquake epicenters.

TABLE 1
HISTORICAL SEISMICITY OF MINNESOTA
(Asterisks denote earthquakes that were recorded instrumentally.
All others and associated magnitudes based solely on intensity data from felt reports.)

Epicenter (nearest town)	Month/Day/Year	Latitude	Longitude	Felt Area (km2)	Maximum Intensity	Magnitude
1. Long Prairie	1860-61	46.1	94.9	---	VI-VII	5.0
2. New Prague	12/16/1860	44.6	93.5	---	VI	4.7
3. St. Vincent	12/28/1880	49.0	97.2	---	II-IV	3.6
4. New Ulm	2/5-2/12/1881	44.3	94.5	Very Local	VI	3.0-4.0?
5. Red Lake	2/6/1917	47.9	95.0	---	V	3.8
6. Staples	9/3/1917	46.34	94.63	48000	VI-VII	4.3
7. Bowstring	12/23/1928	47.5	93.8	---	IV	3.8
8. Detroit Lakes	1/28/1939	46.9	96.0	8000	IV	3.9-3
9. Alexandria	2/15/1950	46.1	95.2	3000	V	3.6
10. Pipestone	9/28/1964	44.0	96.4	---	---	3.4
11. Morris*	7/9/1975	45.50	96.10	82000	VI	4.8-4.6
12. Milaca*	3/5/1979	45.85	93.75	---	---	1.0
13. Evergreen*	4/16/1979	46.78	95.55	---	---	3.1
14. Rush City*	5/14/1979	45.72	92.9	---	---	0.1
15. Nisswa*	7/26/1979	46.50	94.33	Very Local	III	1.0
16. Cottage Grove	4/24/1981	44.84	92.93	Very Local	III-IV	3.6
17. Walker	9/27/1982	47.10	97.6	Very Local	II	2.0
18. Dumont*	6/4/1993	45.67	96.29	69500	V-VI	4.1
19. Granite Falls*	2/9/1994	44.86	95.56	11600	V	3.1

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Response to EIS Statement 3.3.2.3.1.

The DM & E Railroad crosses a karst geologic setting for approximately 140 miles in southeastern Minnesota from approximately 2 miles east of Lewiston in Winona County, through Olmsted, Dodge and Steele Counties and into Waseca County, (Kanivetsky 1979). Karst refers to solution features that occur in some areas underlain by limestone or carbonate rocks. Karst-type features include solution cavities and sinkholes that form with the dissolution of calcium carbonate. Several different processes can cause sinkhole or doline development. A doline is a basin or funnel-shaped depression in the ground and does not imply a specific genesis. The processes that cause dolines are shown schematically in Figure 1, (Ogden 1984). In general, the movement of water causes the formation of karst features. "*Percolation of water through fissures in the otherwise sound rock enlarges them, producing cavities of varying sizes, shapes, and extent in rock. This is followed by raveling and erosion of soil overburden into the rock cavities*" (Sowers 1996), if soil exists above the rock surface.

It is true that areas affected by dissolution processes in karst terrain can experience rapid (localized) subsidence. This subsidence is generally not associated with the collapse of bedrock in the roofs of caverns or caves however, Sowers notes, that the collapse of caverns in rock are infrequent during the life time of humans. *"The rate of new roof collapse sinkholes appears to be extremely slow. The author has investigated hundreds of newly reported sinkholes; of these, perhaps two or three appear to be the direct result of rock collapse, ... All three were in the Caribbean islands and none in the United States. Worldwide accounts of sinkhole development likewise indicate that new rock roof collapse sinkholes are rare. The reason is that the rate of rock solutioning is so very slow*", (Sowers 1996).

Rapid, localized subsidence in Karst terrain typically occurs when the roofs of soil caverns, formed above the bedrock surface, collapse. However, many of the sinkholes in Olmsted County are subsidence dolines, not collapse dolines, and are formed slowly as sediment subsides into large cracks and joints. Rapid settlement in these dolines, if it were to occur, is preceded by generalized subsidence and other surface features such as tension cracks, which provide an early warning to a catastrophic event.

The construction of the DM & E Railroad Alternative R-3/4 bypass of Rochester, Minnesota on karst topography will not create significant problems. Brill and Hussin (1993), in their paper regarding remediation of a railroad embankment through karst topography, note that; "*Throughout the history of the railroad, engineers have been confronted with the difficulties involved in maintaining rail traffic through difficult and complex geologic settings*", including tunnels, landslides, washouts and bridges on compressible or liquefaction prone sediments. Karst terrain offers no more difficult obstacles than those that have been successfully overcome by railroad companies and engineers in the past. Karst terrain does create unique engineering opportunities; however, and engineers have been building on karst terrain for years. If mitigation, in the form of proper geologic evaluation, engineering design, construction and maintenance, is followed, structures may be built safely in karst geologic settings (Fischer, et. al. 1993, Garlanger 1984, Moore 1984, Sitar 1988, Sowers 1984, Sowers 1996). If this particular karst terrain in the R-3/4 bypass area poses a significant hazard, then we propose the following mitigation measures.

Exploration

In exploration for karst hazards it is important to establish the geologic framework which is causing the topographic karst features, or which could cause karst features in the future. One key to prevention of doline formation is an effective, rational exploration program for the project being proposed, (Fischer & Green 1984, Fischer et al 1989, Fischer & Green & Fischer 1993, Henry 1989, Iqbal 1995, Moore 1984, and Sowers 1984 & 1996). The purpose of the exploration program is to identify the hazards and describe the subsurface conditions. Information would be gathered regarding, but not limited to, the following subsurface conditions:

1. Depths to bedrock,
2. Bedding and joint patterns in the bedrock,
3. The characteristics and strengths of the bedrock,
4. The characteristics and strengths of the soils,
5. Estimates of the permeability of the rock and soil units,
6. Ground water depths,
7. Ground water quality,
8. The location of doline throats and zones of soft soil,
9. The location of slots and cavities in soil and/or rock, and
10. The nature of subsurface defects.

An exploration program would include the following tasks:

1. Obtain and correlate readily available geologic information,

2. Plan and execute a geologic reconnaissance with experienced personnel including:
   a. Review existing regional and local literature on the site. This should include local and regional geology, fracture orientation, spacing, and existence of caves and sinkholes. Examine logs from local wells when available. This will tell you about subsurface conditions, existing caves, holes and fractures.
   b. aerial photographs - acquire recent aerial photographs of the site (the photos should be in stereo) and make interpretations. The interpretations should include lineaments and depressions observed. Then field check the interpretations to verify.
   c. satellite imagery
   d. field reconnaissance of office studies
   e. Complete a detailed inventory of the sinkholes and geologic mapping along the proposed route. The sinkhole inventory should include size (diameter and depth) of sinkholes. The size of the sinkholes inventoried will determine the spacing of the geophones for surface geophysics.

3. Plan and execute a phased field program with the following elements:
   a. Test borings, including rock coring. Continuous core drilling is recommended to determine fractures, fracture density, and voids.
   b. Field testing including
      Standard Penetration Testing
      Cone Penetration Testing
   c. Test pits
   d. Probes (auger and/or air-trac)

e. Install piezometers - hydrologic measurement from a well or a group of wells may be needed, along with downhole geophysics between wells depending on site-specific conditions.

f. Appropriate additional geophysical methods, which may include:

- Seismic refraction or reflection
- D.C. electrical resistivity
- Tri-potential electrical resistivity
- Ground penetrating radar
- Electromagnetic profiling

4. Plotting, correlating and synthesizing all information obtained in the exploration program.

All field investigations should be completed in the presence of a qualified geotechnical engineer and/or geologist familiar with the geology of the area, the project features and the project designs.

Once existing sinkholes and cavities, as well as areas of high sinkhole susceptibility, have been identified, then appropriate engineering will follow to accommodate the site-specific conditions and concerns.

The specific karst geologic setting in Olmsted County is identified by Alexander and Maki (1988). To date we know that the Olmsted County sinkholes are commonly cone-shaped depressions and that they range in size from less than 3 feet to more than 100 feet in diameter and from 1 to 30 feet in depth (Alexander and Maki 1988). They are predominantly subsidence dolines. Southwest of Eyota, Minnesota, the Alternative 3 & 4 Bypass crosses approximately 1.3 miles of karst topography where the density of

sinkholes ranges from 20 to several hundred per square mile (Alexander and Maki, 1988). In addition to this specific area, the proposed bypass crosses approximately 5.6 miles of an area considered to have a moderate to high probability of sinkholes. Alexander and Maki (1988) defined this area with an average sinkhole density of 1 to 5 sinkholes per square mile. The remainder of the bypass route crosses either low or low to moderate probability of sinkholes (the average sinkhole density being less than one sinkhole per square mile).

Significant karst terrain with a high potential of karst features occurs along the existing rail line and alternatives (East Yard Alternative B & C and Far East Alternative D) in Winona County. Dalgaleish and Alexander, 1984 identified high sinkhole probability from about one mile east of the town St. Charles to just east of Lewiston in Winona county. The existing rail line passes near identified sinkholes particularly near the town of Utica. The East Yard Alternative B & C and the Far East Alternative D has identified sinkholes along the proposed rail yard.

Design Approaches; Correction and Mitigation

Designs to correct or mitigate the effects of karst terrain include a number of approaches (Sowers, 1984). The approaches can be used singularly or in combination. The approaches include:

1. Optimize the location of project features within the site,
2. Correct or mitigate the karst features,
3. Use shallow foundations modified to overcome the karst features,

4. Use deep foundations modified to overcome the karst features, and
5. Minimize future activation of current and/or future defects.

In an effort to correct or mitigate karst featurescontrol of water is an essential element. This is because water (or other acidic liquid) is the key to activating karst features, (Moore 1984; Fischer, Greene and Fischer 1993, Sowers 1984 & 1996). Without water, karst features will typically cease their natural progression. For design of linear features such as roads and railroads, Moore (1984) recommends paving, or otherwise lining, all ditches and water collection features. It is also important to discharge surface water some distance from project features. Fischer, Greene and Fischer (1993) suggest that an impervious liner is used in the subgrade and the collected water be discharged at a location remote from the facility. All pipes used in the project should contain joints with gaskets to minimize the potential for leaks.

Correction or mitigation of the karst features along the Alternative 3 or 4 bypass route will be a function of the types of karst features identified in the exploration phase of the project. There are a number of design alternatives that have been used successfully to treat karst conditions. The alternatives that have been most successful and documented in the literature include one or a combination of the following techniques:

1. Excavate to bedrock, fill the throat of the rock cavity with concrete, and backfill the depression with controlled structural backfill, (Fischer, et al 1993, Sowers 1996)
2. Excavate to bedrock, clean the throat of soft soil and bridge the cavity with graded rock, stone and structural earth backfill, (Moore 1987, Parate 1984, Quabin, et al 1995, Stelmack, et al 1995)

3. Grout the cavity and/or loose soil zones above the cavity from the ground surface with slurry or compaction grouting, (Brill and Hussin 1993, Garlanger 1984, Quabin, et al 1995, Sowers 1984, 1996,)
4. Collapse the cavity and fill the depression with structural backfill, (Henry 1989, Sowers 1996)
5. Preload the depression to cause pre-construction settlement and fill the depression with structural backfill, (Sowers 1996)
6. Span the depression at the surface with a very stiff shallow foundation, (Sowers 1996, Tharp 1995)
7. Found the structure on a deep pile or caisson foundation that either spans the cavity or penetrates past the cavity(ies) into sound bedrock, (Parate 1984, Fischer, et al 1993, Sowers 1984 & 96)
8. Improve and/or otherwise reinforce the upper bedrock profile by bolting or pinning, (Sowers 1996).

Figures 2, 3 and 4 illustrate these techniques as provided by Sowers (1984).

Occasionally, one of the above correction techniques is used in conjunction with another. For example, Goehring and Sayed (1989) relate the repair of a sinkhole that developed beneath a 54-inch effluent transfer pipeline in Orange County, Florida. The sinkhole was backfilled with sand, followed by injection of cement grout at depth near the bedrock throat, and then up through the raveled soil column.

Grouting has not only been used to repair existing sinkholes; it has been used as a preventative measure to eliminate sinkhole formation in areas of high sinkhole probability. Compaction grouting was used to eliminate "drop-outs" (sudden sinkhole

formation) beneath a railroad line (Brill and Hussin 1993) in northern Georgia. Compaction grouting is the injection of low-slump grout under high pressure as the grout pipe is extracted. Grouting at a given depth is continued until a predetermined volume, pressure or surface deflection are achieved. The rail line had been plagued by sinkhole development along a portion of its route. Rather than continue a reactionary approach, the railroad decided on a pro-active grouting program along a 1500-foot long corridor. Figure 5 depicts the repair measures adopted for the railroad line. The rail line had not experienced any problems between the grouting application in 1988 and 1993 when Brill and Hussin's paper was published. This application of compaction grouting is important in this case because it documents the effectiveness of compaction grouting in clay soils. Previously compaction grouting had been used for sinkhole related problems in the sandy soils only.

With any correction technique, proper precautions and experience are required. For example, when injecting grout, care must be taken to monitor grout pressures so as not to hydrofracture the rock or soil and create additional cavities through which overburden soil can migrate. When collapsing a rock cavity, caution must be exercised not to induce damage to competent bedrock. When backfilling a throat area, care must be taken to select appropriate rock and soil gradations so that each layer acts as a filter for subsequent layers to eliminate piping of fines out of the newly placed backfill. Various precautions are required for the other sinkhole mitigation and correction measures as well.

Construction Techniques

"*It is common knowledge that water is the triggering mechanism in the majority of cases of distress on dolomite (limestone). It is thus essential that the concentrated ingress of water into the ground be avoided at all times and this also means during construction*", (Wagner and Day 1984). Iqbal (1995) notes that sites are most vulnerable to sinkhole development during construction due to the temporary interruption of drainage patterns and the loss of vegetation. In light of these observations it will be necessary to specify strict water quality and temporary erosion control during construction including, but not limited to, the following techniques:

1. Apply best management practices as published by the MPCA and augmented as necessary for karst conditions,
2. Install gabions (rock filled wire baskets), (Moore and Amari 1987), during construction to control contamination and clogging of swallets and other karst depressions to which surface water is being directed,
3. Complete grading, finishing, erosion control and turf establishment on a drainage area basis to prevent excessive infiltration and soil erosion,
4. Install planned drainage facilities concurrent with embankment operations,
5. Provide temporary drainage facilities to maintain existing drainage courses until permanent facilities are operative,
6. Grade the site for proper drainage at the end of each days work to eliminate ponding of water on the site,
7. Provide temporary drainage facilities to collect and dispose of excess water shed from the site as a result of construction operations,
8. Backfill trenches so that the degree of compaction is at least equal to and the permeability less than the surrounding soil (Wagner and Day 1984).

In addition to surface water control on the construction site, it is necessary to comply with strict quality control measures for karst correction and improvement techniques employed during construction, (Fischer, Greene & Fischer 1993). Those measures would include, but not be limited to the following:

1. Employ a qualified, full time geotechnical engineer or geologist to monitor construction,
2. Perform in situ testing of the corrected areas before and after construction to monitor the degree of improvement,
3. Predrill beneath each pile location to determine bedrock conditions,
4. Monitor items such as grout quantities, pile/caisson lengths, surface elevations and deflections, ground water levels and compare with the design quantities and predictions.

Some karst mitigation and correction techniques require excavation of the sinkhole to bedrock (Moore 1987). Excavation for remediation of karst features is not uncommon and can be accomplished safely with due caution. Sowers (1996) recommends the following precautions:

1. Explore each suspect sinkhole in detail and plan for any required pretreatment,
2. Determine safe excavation slopes using:
    a. local experience,
    b. stability analysis based on soil strengths,
    c. observation of slopes during excavation by a geotechnical engineer,

3. Control ground water during excavation using deep sumps or wells that do not induce upward gradients toward the excavation surface,
4. Maintain the stability of the bottom of the excavation against heave and/or boils,
5. Be prepared to backfill and pump grout should the excavation become unstable,
6. Be prepared to excavate wet horizon soils and soft-soil filled slots near the bedrock interface with backhoes,
7. Do not let rock pinnacles exposed in the excavation stand unsupported.

With proper exploration, design and construction precautions, there is no evidence in the literature to suggest that excavation of sinkhole areas is necessarily more dangerous than any other similar construction activity.

Maintenance of Facilities on Karst

The concern in karst regions is the continued erosion of soil into rock voids. It is therefore prudent to observe a maintenance protocol consisting of diligent monitoring and rapid response. For a railroad line, prudent monitoring would consist of:

1. Frequent observation of treated sinkhole areas,
2. Surveys of rail lines which extend through areas designated as having a high potential for karst feature development,
3. Inspection of pipes for joint distress and/or leakage,
4. Inspection of lined ditches and water impoundment's for cracks or leaks,
5. Inspection at surface water discharge points for ground surface distress,

6. Monitoring of any adjacent karst features which were left untreated during implementation of the project,
7. Protection of adjacent karst features such as swallets from clogging by removal of debris and/or construction of filtering structures such as gabions, (Goehring & Sayed 1989).

The monitoring program should be augmented with an emergency action plan to repair karst features that pose an immediate threat to project features such as the rail line or any yard facilities.

With regard to long term maintenance and railroad vibration induced sinkholes it should be noted that the likelihood of railroad induced sinkhole development due to vibration is somewhat remote. Brill and Hussin (1993) observed that the railroad line in northern Georgia had been operating through a significant karst area for some time without mishap. It was only due to the ground water changes initiated as a result of combined drought and mine dewatering in an adjacent mine that drop-outs were triggered. After the adjacent mine ceased operations no further karst related problems were observed. Iqbal (1995) notes the completion of successful foundations on karst terrain for vibration producing, reciprocating machinery such as a paper container maker and a precision stamping machine where differential settlement tolerances were limited to 0.1 inch. Lastly, it should also be noted that the existing DM & E line has been operating through an area of high karst potential in Winona County (Dalgaleish & Alexander 1984) for some time.

Summary

In summary, there is no evidence to suggest that facilities constructed on corrected/mitigated karst features in areas of high karst potential are likely to experience any more distress than features constructed on low to moderate karst areas for which no special precautions were observed. For projects where karst features have been identified and properly corrected during construction, there is every likelihood that the project will perform as intended, (Fischer & Greene 1984, Henry 1989, Kath et al 1995, Moore 1984, Quabin 1995, Sowers 1996), provided that continued observation for distress, prompt corrective action and continued maintenance are implemented.

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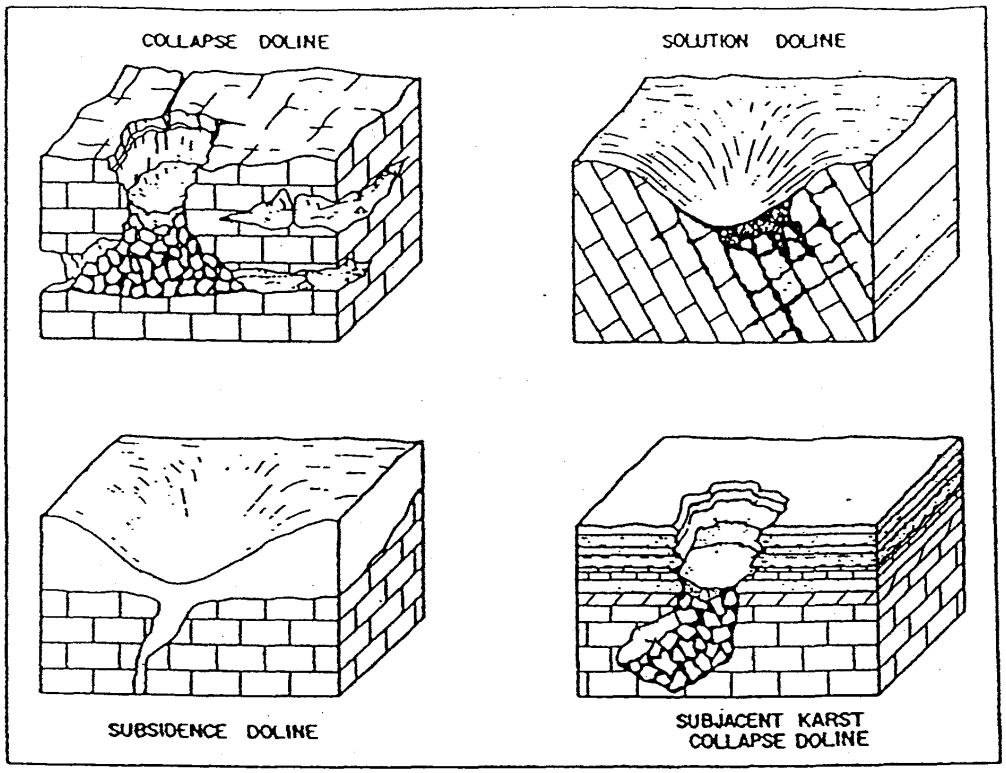


Figure 1

Block Diagrams of Sinkhole Development

From Ogden (84)

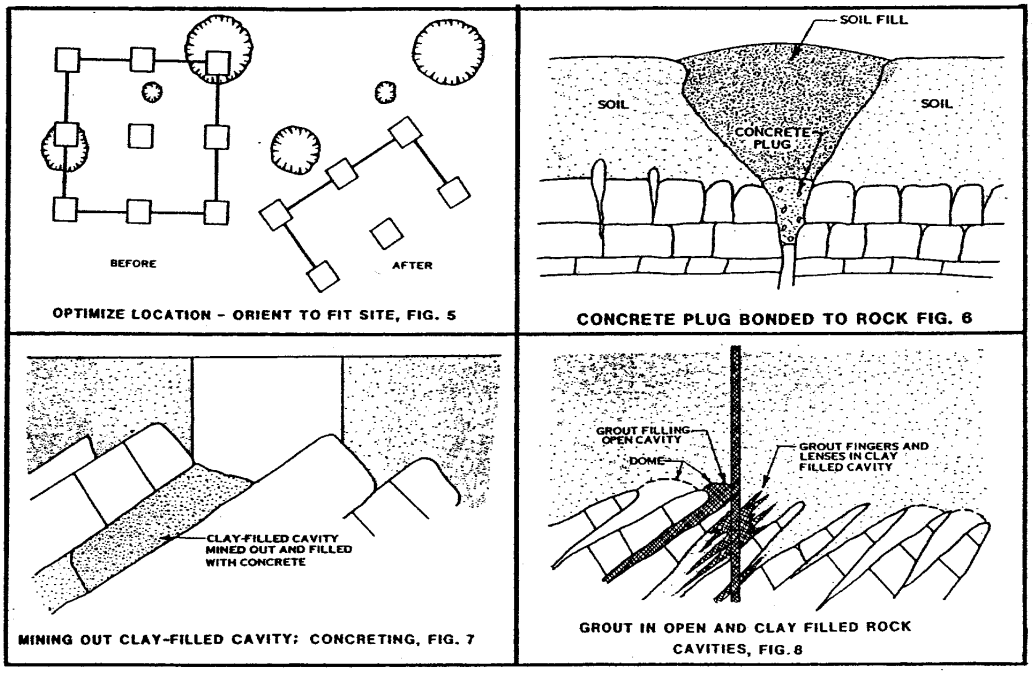
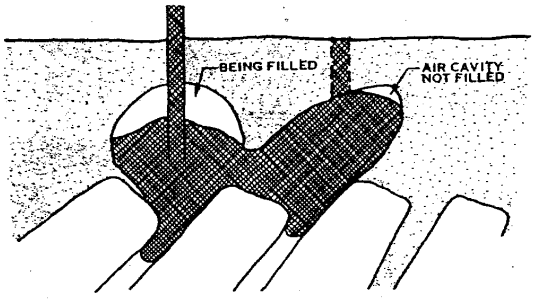


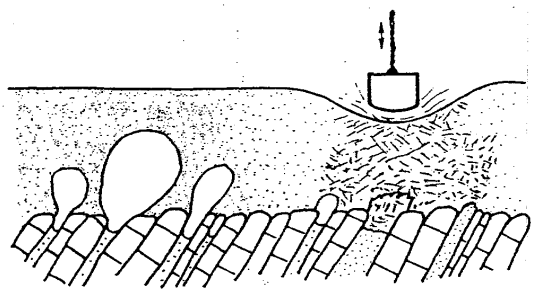
Figure 2

Karst Feature Correction

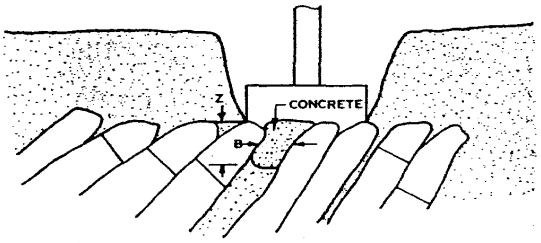
From Sowers (84)



GROUTING CAVITY OR DOME IN SOIL, FIG. 9

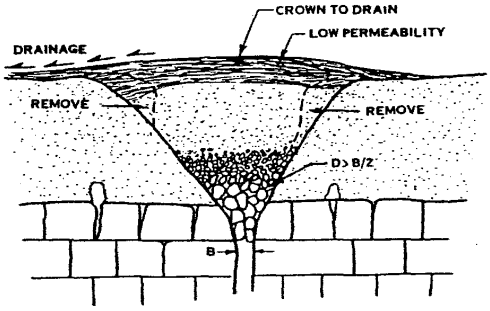


IMPACT COLLAPSING SOIL DOMES, FIG. 10

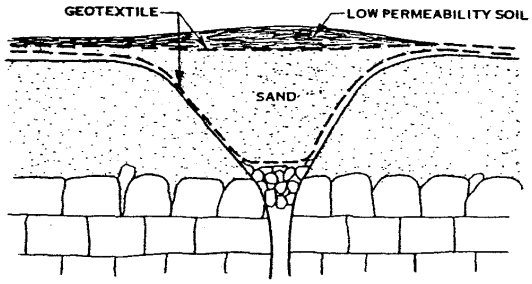


NOTE: GOOD ROCK CONCRETE BOND IS ESSENTIAL

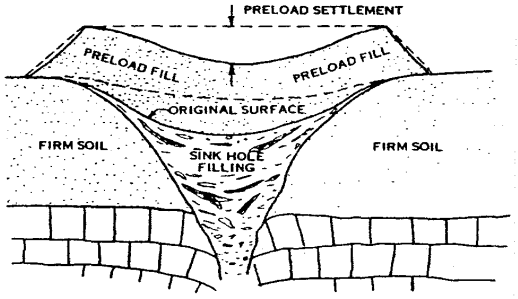
DENTAL FILLING, Z = 1.5 TO 2B, FIG. 11



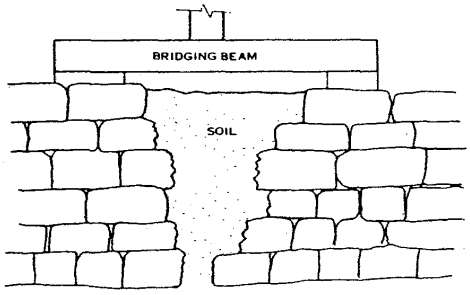
FILLING SINK WITH GRADED FILTER FILL, FIG. 12



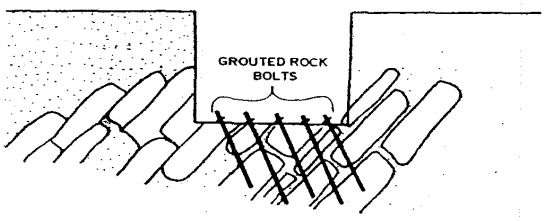
FILLING SINK WITH STONE PLUG, GEOTEXTILE AND SAND FIG. 12a



PRELOAD COMPRESSIBLE SINK HOLE FILLING, FIG. 13



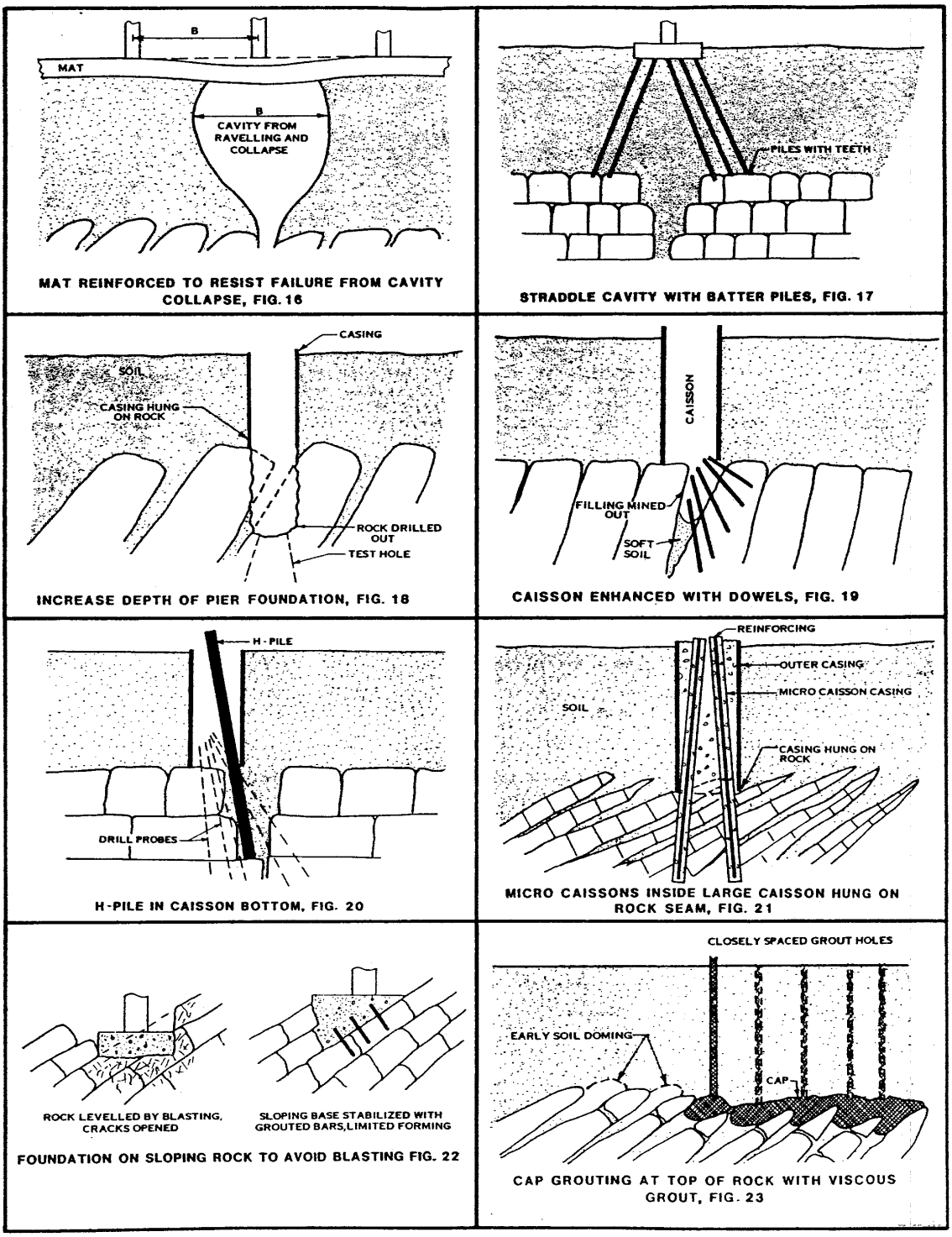
BRIDGE OVER OPENING, FIG. 14



ROCK REINFORCING BY ROCK BOLTS, FIG. 15

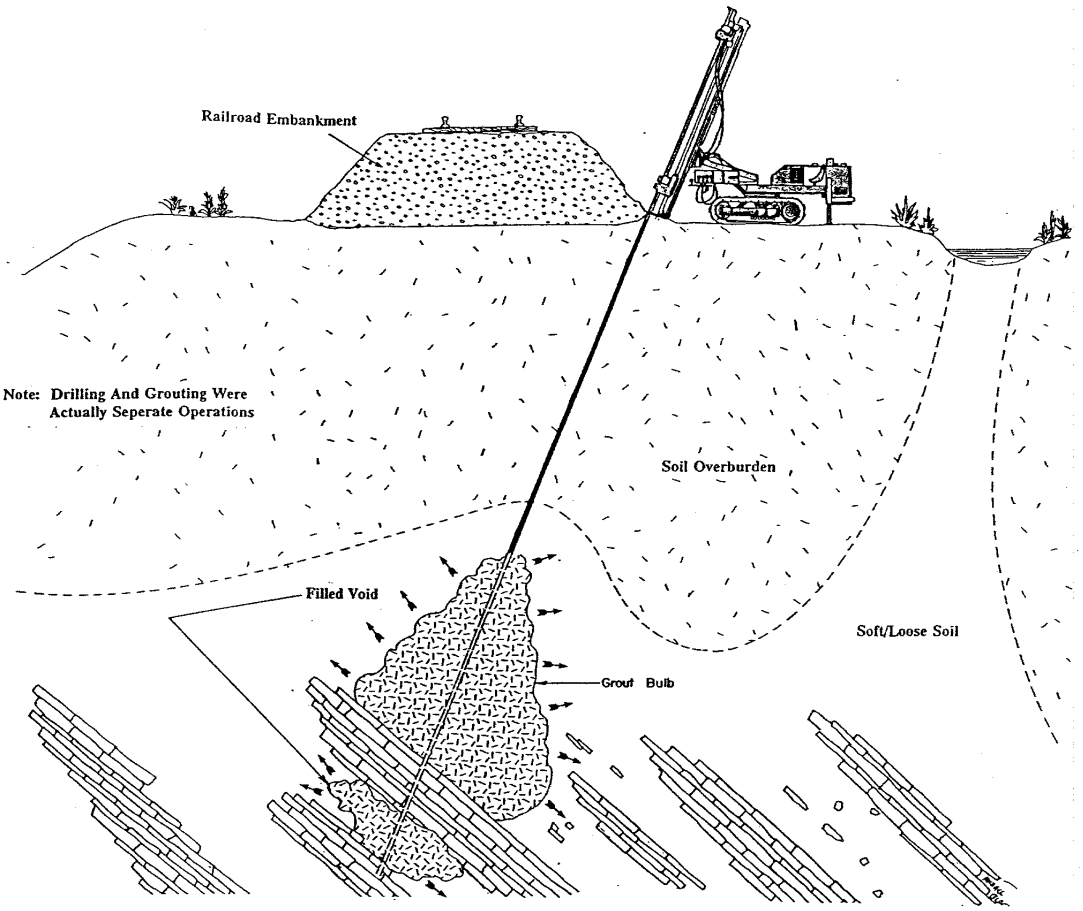
From Sowers (84)

Figure 3
Karst Feature Correction



From Sowers (84)

Figure 4
Karst Feature Correction



Schematic cross-section of compaction grouting remediation system.

Figure 5

Karst Feature Correction

From Brill & Hussin (93)

VERIFICATION

STATE OF COLORADO

COUNTY OF LARIMER

I, Ana G. Vargo, first being duly sworn, depose and say that I have read the foregoing statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

Ana G. Vargo

Subscribed and sworn to before me this 7th day of February, 2001

Notary Public

My Commission Expires 06/20/2004

My Commission Expires _____

STATE OF MINNESOTA

COUNTY OF RAMSEY

I, Ronald B. Farmer, first being duly sworn, depose and say that I have read the foregoing statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

Ronald B. Farmer

Subscribed and sworn to before me this 8 day of February, 2001

BRENDA SAUERWEIN
NOTARY PUBLIC – MINNESOTA
RAMSEY COUNTY
My Comm. Expires Jan. 31, 2005

Notary Public

My Commission Expires 1-31-05

Source: All Sources : Transportation : Administrative Materials & Regulations : **Federal Register and CFR - Transportation**
Terms: **sinkhole and railroad** (Edit Search)

*62 FR 15957, **

FEDERAL REGISTER

Vol. 62, No. 64

Notices

TENNESSEE VALLEY AUTHORITY (TVA)

Kingston Fossil Plant (KIF) Alternative Coal Receiving Systems, Roane County, Tennessee

62 FR 15957

DATE: Thursday, April 3, 1997

ACTION: Issuance of Record of Decision.

To view the next page, type .np* TRANSMIT.
To view a specific page, transmit p* and the page number, e.g. p*1

[*15957]

SUMMARY: This notice is provided in accordance with the Council on Environmental Quality's regulations (40 CFR parts 1500 to 1508) and TVA's procedures implementing the National Environmental Policy Act. TVA has decided to adopt the preferred alternative (Alternative C) identified in its Final Environmental Impact Statement (EIS) on Kingston Fossil Plant (KIF) Alternative Coal Receiving Systems. The Final EIS was made available to the public on January 15, 1997. A Notice of Availability of the Final EIS was published in the **Federal Register** on January 31, 1997. Under Alternative C, TVA would construct a new rail spur from the existing CSX Rail Yard or a direct tie in to the Norfolk Southern (NS) line at Walnut Hill in Harriman to the existing TVA coal delivery yard at KIF. The route would involve crossings of the Emory River and an embayment of Watts Bar Reservoir.

FOR FURTHER INFORMATION CONTACT:

Harold M. Draper, NEPA Specialist, Environmental Management, Tennessee Valley Authority, 400 West Summit Hill Drive, WT 8C, Knoxville, Tennessee **[*15958]** 37902-1499; telephone (423) 632-6889 or e-mail hmdraper@tva.gov.

SUPPLEMENTARY INFORMATION: The KIF receives by rail about 4 million tons of medium sulfur coal per year. This coal is transported by Norfolk Southern (NS) and CSX **Railroads** to Harriman, Tennessee. At Harriman (CSX origin), the coal is transported over a

short NS spur for transport to NS's Emory Gap rail yard and then to TVA's Caney Creek yard. TVA then moves the coal by rail from Caney Creek yard to KIF, a distance of about 4 miles. While NS has directed access to Caney Creek, CSX trains are charged a switching fee, now approximating $ 2 million annually for use of the NS spur. This switching fee contributes to higher fuel costs at KIF when compared to the fuel costs at other TVA fossil plants. In order to enhance the competitiveness of the KIF plant and to provide more economical access to lower sulfur coals, which will be required to meet new air quality regulations, TVA investigated alternative methods of coal delivery to the plant.

TVA provided public notice of its intent to prepare an Environmental Impact Statement on alternatives for coal delivery to KIF on May 22, 1995. A public meeting on the proposal was held on June 29, 1995. TVA released a draft EIS on May 15, 1996, and held a public meeting to receive comments on the document on June 11, 1996. After considering all comments, TVA revised the EIS appropriately. The Final EIS was distributed to commenting agencies and the public on January 15, 1997.

Alternatives Considered

In order to reduce the fuel costs for KIF, direct rail delivery was evaluated because it would eliminate rail line switching fees, reduce operation and maintenance costs, and increase competition between the rail carriers. Alternatives initially considered included construction of an overland conveyor, a new barge unloading facility, and a coal slurry pipeline. Also, increased truck deliveries were considered. However, all of these were rejected because they were not feasible from an economic or engineering standpoint. A longer 13-mile rail line from Oliver Springs was also rejected on economic and other grounds. Three alternatives were formulated that represented economically feasible options. These were no action and two alternatives that involved construction of a new rail spur.

Under *Alternative A*, No Action, conditions and impacts resulting from the existing coal delivery system would not change. However, this route, which passes through downtown Harriman, blocks several street crossings and impacts the ability of the city and county governments to provide emergency services during portions of the day. There are also ongoing noise impacts resulting from 30-car rail trips to the plant about six times per day.

Under *Alternative B*, Rail Spur Route No. 1, new rail spurs would originate at the CSX Harriman Yard or near the NS line at Walnut Hill. From north to south, the route would cross Bullard Branch and Quarry Branch (CSX spur only), pass south of the Fiske Road community, pass through the Harriman Industrial Park, cross the Emory River, and extend overland about three miles to the plant. Proceeding south from the Emory River, the route would cross Swan Pond Circle Road, cross an unnamed stream, pass under existing transmission lines, cross Swan Pond embayment on a causeway, cross Swan Pond Circle Road, cross Swan Pond Road, cross Swan Pond Creek, and link up with the existing rail line.

Implementation of Alternative B would result in a rail spur approximately 4.5 miles in length. From an infrastructure standpoint, trains would bypass downtown Harriman; however, in order to avoid two road crossings in a short distance, Swan Pond Road and Swan Pond Circle would need to be relocated near their junction, creating one crossing. Bridges would need to be constructed across the Emory River and two small creeks; and there would be a new causeway across Swan Pond embayment. Other traffic impacts would be that one existing and two new crossings would be blocked to allow trains to pass; however, because the roads are less-used then the ones crossed by the current route, fewer vehicles would be impacted. Under this alternative, there would be 24,730 fewer vehicle crossings of the rail route per day than under the No Action alternative.

Trains following the new rail line would increase noise levels in the Fiske Road community of Harriman. However, the largest potential noise increase in this community over existing levels is 0.4 decibels (dBA). The quieter Swan Pond Circle Road community south of the Emory River would also be impacted by operation of a new rail line. Noises in this community would result from crossing bridges, road crossing bells, train whistles, and wheel squeal due to track curvature. In this area, the largest potential noise increase would be 2.0 dBA over existing levels. In order to reduce this impact, welded rail would be used rather than jointed rail in the Swan Pond Circle area.

Construction of the rail spur in Alternative B would result in the loss of 7 acres of prime farmland and a 5-acre beaver-created wetland. However, to the extent practicable, TVA would locate the rail spur above the 750-foot contour in the Swan Pond embayment area to avoid wetland involvement. With strict adherence to Best Management Practices during construction of the proposed rail spur, no significant impacts to water quality, floodplains, wildlife, recreation, or endangered species are expected. However, because the rail construction would take place in a karst geology area, there is some risk of **sinkhole** subsidence. This would be minimized by proper geotechnical investigations. Approximately 43 views from residences would be affected. There would be a 31 percent reduction in locomotive emissions as compared to the No Action alternative. An archaeological survey of the proposed route identified four sites that were eligible or potentially eligible for listing in the National Register of Historic Places that could be impacted by the proposed route. TVA would continue consultation with the State Historic Preservation officer prior to construction to define measures to avoid or reduce adverse effects to these sites. Although most of the area is sparsely populated, it appears that compared to the No Action alternative, fewer minority population groups would be affected; however, slightly more low income individuals would be affected.

Under *Alternative C,* Rail Spur Route No. 2, the route would not cross Swan Pond embayment after crossing under transmission lines, but would proceed south along the east side of Swan Pond, cross Swan Pond Circle Road, cross the narrow embayment fronting the KIF ash stack on a causeway, and run parallel with Swan Pond Road and the existing rail line to the plant rail yard. Implementation of Alternative C would result in construction of a rail spur 4.75 miles in length. Under this alternative, there would be 28,600 fewer vehicle crossing of the rail route per day than under the No Action alternative. Construction along the Alternative C route would not result in loss of prime farmland and would only involve minor wetland crossings. Approximately 37 residential views would be affected. There would be slightly higher impacts on low-income individuals than Alternative B. Other impacts would be similar to those of Alternative B.

TVA Decision

The Final EIS identified Alternative C, Rail Spur Route No. 2, as the preferred alternative. The northern end **[*15959]** of this rail spur route includes options to link to both the CSX yard and the NS rail line. Of the two action alternatives, Alternative C avoids the most wetland and prime farmland impacts. It also involves fewer intersections, fewer vehicles affected at **railroad** crossings, fewer terrestrial ecology impacts, and fewer aesthetic impacts on neighboring residents. In comparison to the No Action alternative, a new rail delivery option would reduce the fuel costs of KIF through increased competition between rail carriers for coal deliveries, reduced operation and maintenance costs for TVA, and the elimination of switching fees currently associated with CSX deliveries. All of these benefits would help to provide TVA's customers with electricity at the lowest possible rate.

In choosing its preferred alternative, TVA carefully considered and addressed all comments submitted on the Draft EIS. In addition, TVA has considered comments received from the Environmental Protection Agency on the Final EIS comment responses. These additional

considerations are discussed below, along with the comment response number from the FEIS:

. *Comment No. 3.* EPA believes that environmental considerations associated with alternatives that were not considered in detail due to economic reasons, including the coal slurry pipeline alternative and the overland flexible pipe conveyor alternative, should be discussed in the EIS along with economic and feasibility considerations. Because the coal slurry pipeline alternative and overland flexible pipe conveyor alternative would follow the same routes as the other alternatives, TVA believes that many of the environmental impacts would be the same; however, had they been economical, there may have been some noise and air quality benefits of these alternatives. In addition, EPA believes TVA should have been more definitive in its statement of whether the Walnut Hill spur would have been constructed as part of Alternative C. The analysis of environmental impacts for each alternative considered both the route that would originate at the CSX yard as well as the Walnut Hill variation. As it turned out, the impacts for the route that would originate at the CSX yard are higher than impacts for the Walnut Hill variation for all areas except Environmental Justice. Accordingly, the Environmental Justice analysis identifies the impact of the Walnut Hill spur.

. *Comment No. 15.* EPA expresses concerns about the potential for derailment at a critical Swan Pond Circle Road intersection that might isolate residents east of Alternative C from emergency vehicles. The length of a unit coal train, including locomotives, is approximately 6700 feet. One of the earlier preliminary **railroad** alignment studies measured near that distance between the north and south intersections of Swan Pond Road. TVA will design the final centerline alignment such that the distance between crossings is greater than 7000 feet. With this commitment the scenario no longer exists where both crossings could be simultaneously blocked.

. *Comment No. 21.* EPA requests that an independent entity review spill plans to determine if the plans have been tested previously in the field and whether they are effective. Federal and state regulations require the development of Spill Prevention Control and Countermeasures (SPCC) Plans. These plans have to be kept at the site and made available to state and EPA inspectors upon request. The KIF SPCC Plan covers preventive measures required for TVA contractors and associated temporary tanks on TVA properties. The plan also provides for emergency response measures that have been successfully employed in the past. TVA SPCC Plans have been supplied to EPA Region IV along with spill incident reports, and no shortcomings have been identified. TVA has trained response personnel at the site as well as an emergency strike force located in strategic positions across the valley that can respond within an hour's notice. The SPCC Plan has been certified by a Professional Engineer and has been tested previously in the field.

. *Comment Nos. 24 and 25.* EPA expresses concern that the proposed earthen fill causeway across Swan Pond embayment would restrict water circulation and result in water quality problems in the embayment. EPA requests that a bridge over the embayment be considered. The earthen fill causeway proposed for crossing the Watts Bar Embayment area for Alternate C should allow good circulation and fish passage. Both navigational clearance considerations and drainage considerations influence the size of the culvert through the causeway. TVA shallow draft bridge clearance standards for the culvert in this causeway will be adequate in accommodating small recreational vessels. As stated in the FEIS, the standards require a minimum elevation of 6 feet vertically above normal maximum pool Elevation 741 and a horizontal clearance of a minimum 8 feet. Drainage considerations and sizing indicate the necessity for a large culvert. Preliminary culvert sizing indicates a concrete double barrel box culvert of size 13' x 36' as a minimum. This size box culvert is in effect a small bridge. The wind, rain, and inflows in the Watts Bar Embayment area should adequately flush the waters through the larger culvert and, thus, allow a good circulation in

the embayment. In addition, the costs associated with bridging are substantial, and a bridge would not be the most economical decision.

. *Comment No. 31.* EPA states that the frequency and magnitude of train whistles near residential areas should be discussed. TVA has estimated the impacts at the closest residence in a "worst-case" scenario in the FEIS. Typically, there would be two train trips per day during daylight hours past a given point, with the train whistles lasting several seconds.

. *Comments No. 42-44.* EPA requests that Environmental Justice mitigation be provided for low-income populations affected by the Walnut Hill spur. All mitigation commitments to reduce noise and to ensure safety of the rail would apply throughout the route of the proposed rail line. TVA does not feel that special mitigation at this site is necessary for the following reasons. Under Alternative C (with Walnut Hill spur), virtually all of the minority population is located in Census Tract 308, Block Group 3. This block group also has a poverty rate of 30.1 percent, much higher than the 21 percent in the rest of the impact area. However, most of the residents of this block group are far enough removed from the rail site that the impacts range from minimal to essentially nonexistent. Within this block group, the rail will run through a largely unpopulated area between Fiske Road and the Emory River. The population of the block group is on the other side of Fiske Road extending toward the north for some distance. This consideration essentially eliminates impacts to minority populations and reduces the low-income population to a share not much higher than the county and state rates. If the proposed Walnut Hill spur is not built, all the coal would go the CSX Harriman Yard. The additional area impacted in transporting coal to the CSX Harriman Yard is about 10.6 percent minority, with a poverty rate of 26.9 percent. The overall impact area for the new rail line combined with the area between Walnut Hill and the CSX Harriman Yard has a 6.5 percent minority population, well below the state average of 17 percent but well above the county average of 3.8 percent. The poverty rate is well above both the state and county rates. However, the **[*15960]** route through the additional area to the CSX Harriman Yard would be on existing rail, not new rail, and would add routine transient traffic to an existing facility. EPA also requests data on how many of the affected people are low-income minorities. With the proposed Walnut Hill spur, the project impact area has approximately 53 persons (2.3 percent of the total population) who are both minority and low-income. Without the Walnut Hill spur (the coal goes to the CSX Harriman Yard), the impact area would have approximately 109 persons (2.8 percent of the total population) who are low-income minorities. TVA does not believe that these impacts are disproportionately high.

After carefully considering EPA comments, TVA has decided to implement Alternative C as identified in its Final EIS.

Environmentally Preferable Alternative

Because Alternative A, No Action, would result in no change in existing conditions, it could be characterized as the environmentally preferable alternative. However, Alternative A does not accomplish the goal of reducing fuel costs. Further, none of the action alternatives would be environmentally destructive and none would likely result in significant environmental impacts. Of the action alternatives, Alternative C is environmentally preferable due to fewer impacts to wetlands and prime farmlands.

Environmental Consequences and Commitments

In choosing Alternative C, all practical means to avoid or minimize environmental harm have been adopted. These measures are listed below:

. To minimize noise impacts in the rural Swan Pond Circle community, the radius of track curvature would be kept as high as possible to minimize wheel-squeal. Noise will also be reduced by the use of welded rail in the Swan Pond community area. Also, all construction equipment will be equipped with noise attenuating devices, such as mufflers and insulated engine housings.

. On-site open burning will not be conducted when an air stagnation advisory or a special dispersion statement issued by the National Weather Service is in effect for the area. Where necessary, a water wagon will be used to control dust associated with construction activities.

. Should a potentially adverse water pollution incident occur in association with construction, state regulators and upstream and downstream water supply operators will be notified. During construction, Best Management Practices for silt control will be utilized, including straw dikes, filter fabric, and where necessary, retention basins.

. **Sinkhole** subsidence or collapse will be avoided by appropriate planning and design based on sound geotechnical investigations. Proper spill prevention procedures will be put in place to prevent contamination of groundwater from fuels, oils, and solvents during construction.

. Appropriate hydraulic analyses will be performed to ensure that the project is consistent with local floodplain regulations.

. Direct impacts to riparian zone forests at the Emory River bridge crossing will be minimized by crossing the river at a 90-degree angle.

. Wetlands will be avoided in the Swan Pond embayment by keeping all construction for the rail spur above the 750-foot elevation except at stream crossings.

. Phase II and III archaeological surveys will be conducted during the Spring of 1997 to determine the significance of the four archaeological sites in the corridor, and to allow any needed data recovery from the sites.

. TVA will design the final centerline alignment such that the distance between road crossings is greater than 7000 feet.

Dated: March 10, 1997.

Gregory M. Vincent,

Vice President, Fuel Supply and Engineering Fossil and Hydro Power.

[FR Doc. 97-8513 Filed 4-2-97; 8:45 am]

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*62 FR 65478, **

FEDERAL REGISTER

Vol. 62, No. 239

Proposed Rules

DEPARTMENT OF TRANSPORTATION (DOT)

Federal **Railroad** Administration (FRA)

49 CFR Part 243

[FRA Docket No. HST-1]

RIN 2130-AB14

FOX High Speed Rail Safety Standards

Part II

62 FR 65478

DATE: Friday, December 12, 1997

ACTION: Notice of proposed rulemaking for rule of particular applicability (NPRM).

To view the next page, type .np* TRANSMIT.
To view a specific page, transmit p* and the page number, e.g. p*1

[*65478]

SUMMARY: FRA is proposing a rule of particular applicability that establishes safety standards for the Florida Overland eXpress (FOX) high speed rail system. The proposed standards are not intended for general application in the **railroad** industry, but would apply only to the FOX system that is planned for development in the State of Florida. The FOX system will operate from Miami to Tampa, via Orlando on dedicated track, with no grade crossings, at a maximum speed of 200 mph. The FOX equipment and track are patterned after the French TGV high speed rail system, and will be used exclusively for passenger service.

The proposed rule of particular applicability takes a systems approach, and so includes standards that address all aspects of the FOX high speed system, including system description, system safety, signal, track, rolling stock, operating practices, system qualification tests, personnel qualifications, and power distribution. In addition, the proposed rule adopts and incorporates by reference many existing standards that apply to all **railroads,** which are appropriate for application to FOX, such as alcohol and drug

standards, hours of service requirements, and locomotive engineer qualifications.

DATES: (1) *Written comments:* Written comments must be received on or before February 10, 1998. Comments received after that date will be considered only to the extent possible without incurring substantial expense or delay.

(2) *Public hearing:* A public hearing will be held if one is requested by January 2, 1998. Anyone requesting a hearing must notify FRA's Docket Clerk, Renee Bridgers, in writing and provide her with the requesting party's name, telephone number, and address. If a hearing is requested, FRA will notify the public of the date, time, and location of the hearing, and provide instructions for those who wish to make an oral statement at the hearing.

ADDRESSES: Written comments must identify the docket number and be submitted in triplicate to the Docket Clerk, Office of Chief Counsel, Federal **Railroad** Administration, Stop 10, 400 Seventh Street, S.W., Washington, D.C. 20590. Persons desiring to be notified that their comments have been received by FRA should submit a stamped, self-addressed postcard with their comments. The Docket Clerk will indicate on the postcard the date on which the comments were received and will return the card to the addressee. Written comments will be available for examination, both before and after the closing date for written comments, during regular business hours on the seventh floor of 1120 Vermont Avenue, NW, in Washington, D.C.

FOR FURTHER INFORMATION, CONTACT: Bill Goodman or Mark Jones, Signal Division, Office of Safety Assurance and Compliance, FRA, 400 Seventh St., S.W., Stop 25, Washington, D.C. 20590, (telephone: 202-632-3353); Bill O'Sullivan or Dave Jamieson, Track Division, at the same address, (telephone: 202-632-3341); Ed Pritchard, Motive Power and Equipment Division, at the same address, (telephone: 202-632-3348); Doug Taylor or Laura Mizner, Operating Practices Division, at the same address, (telephone: 202-632-3346); Bob Dorer, Volpe National Transportation Systems Center, Kendall Square, Cambridge, MA 02142, (telephone: 617-494-3481); or Christine Beyer, Trial Attorney, Office of Chief Counsel, FRA, 400 Seventh St., S.W., Stop 10, Washington, D.C. 20590 (telephone: 202-632-3177).

SUPPLEMENTARY INFORMATION:

Background and Regulatory Structure

The State of Florida plans to develop a high speed rail system that will run from Miami to Tampa, via Orlando. The system's trains will travel on dedicated rail, with no public grade crossings, in exclusive passenger service, at speeds not to exceed 200 mph. These operational characteristics and the equipment that the State plans to use mark a dramatic step forward for the development of regional high speed passenger rail service in the United States. FRA announces in this notice proposed safety standards for the system that will be developed in Florida.

Through a public bid process, Florida has selected the Florida Overland eXpress (FOX) to build and operate the high speed rail system. FOX is a consortium of engineering and rail design and construction entities. The system FOX proposes to build in Florida utilizes the high speed technology and equipment currently in use in France, Holland, Spain, and

Belgium, which was developed in France and is known as the French TGV (train a grande vitesse, or very high speed train). The French TGV has been in service in Europe since 1981 and has safely carried 450 million passengers. This is a traditional rail system, in the sense that steel wheels operate over steel rails, powered by electrical power that is carried and transferred to the equipment through an overhead catenary system. However, the TGV equipment is generally lighter than conventional rail vehicles, and utilizes advanced computer and aerodynamic technology that facilitates travel at very high speeds with minimal track and equipment degradation. (The trainsets travel at maximum speeds of 186 mph in France.) In addition, the TGV high speed trainsets are articulated into one long unit that resists buckling or rolling in the event of an accident, which greatly reduces the likelihood of serious injury for passengers. The lightweight design of the equipment permits high speed travel, but also lends itself to grave damage if involved in a train-to-train collision, particularly where heavy freight vehicles are present. To counter this aspect of the design, the TGV is operated with a focus on collision-avoidance, in addition to collision-mitigation, a systems approach to safety that has proven to be quite successful. (It is also important to note here that the Florida system will not include any freight traffic.) Newer generations of the TGV system include in-cab signal systems and passenger stations that are customized to service high speed trainsets only. The French TGV system has an exceedingly safe record, which is discussed in greater detail below.

The federal **railroad** statutes apply to all **railroads,** as defined in 49 U.S.C. 20102, including the FOX system proposed to be built in Florida. The only **railroads** excluded from FRA's jurisdiction are urban rapid transit **railroads** that are not connected to the general **railroad** system. The contemplated FOX system will clearly be intercity passenger rail, not urban rapid transit. Accordingly, the Florida system will be subject to FRA jurisdiction whether or not it is connected to the general **railroad** system. Moreover, FRA would consider a stand-alone intercity **railroad** line to be part of the general system, even though not physically connected to other **railroads** (as FRA has previously stated with respect to the Alaska **Railroad;** see 49 CFR part 209, Appendix A). **[*65479]**

FRA has a regulatory program in place, pursuant to its statutory authority, to address equipment, track, operating practices, and human factors in the existing, conventional **railroad** environment. However, significant operational and equipment differences exist between the system proposed for Florida and existing passenger operations in the United States. In many of the **railroad** safety disciplines, FRA's existing standards of general applicability do not address the safety concerns and operational peculiarities of the proposed FOX system. Therefore, in order to assure the public that this new system will operate safely, minimum federal standards must be in place when FOX commences operations.

FOX and FDOT discussed their plans for the system in a series of meetings with FRA held throughout 1996. The purpose of the discussions was to explain to FRA the system that they plan to build in Florida, and for FOX and FDOT to understand more fully the applicable regulatory framework that would govern their operations. On February 18, 1997, FOX filed a petition for rulemaking (Petition) with FRA, which proposes standards that would apply to their system safety program, track, rolling stock, signal, operating practices, personnel qualifications, and power distribution. Since February, FOX has supplemented the Petition with additional information that is pertinent to the existing French operation or the one planned for Florida. (A copy of the Petition and supplemental submissions are available for public review in the docket of this matter, which is docket number HST-1, previously identified as docket number RM Pet. 97-1.) The FOX Petition attempts to incorporate the French practice in each safety discipline listed in the Petition, but also contains proposed standards that differ from practices in France. FRA understands these differences to reflect operational and environmental deviations between the system proposed for Florida and the TGV lines in operation in France.

FRA analyzed the Petition and supporting documentation, gathered background data that describe the French system, and now publishes this Notice of Proposed Rulemaking (NPRM), based on consideration of the available information and the expertise of the Agency's safety specialists. This NPRM constitutes FRA's initial response to the Petition and includes standards that are similar, but not identical, to those in the FOX Petition.

It is important to note at this juncture that any new standards which FRA adopts to address safety on the FOX high speed rail system would apply only to that system, and therefore will be issued in the form of a rule of particular applicability, rather than one of general applicability. Such a rule of particular applicability would not displace existing safety standards that apply to all other entities in the **railroad** industry, and would be enforced only against the FOX system. Also, it should be noted that FRA plans at this time to publish any final standards that pertain to the FOX system in the Code of Federal Regulations (CFR). For that reason, these proposed standards have been assigned Part number 243, and are organized into Subparts for each safety discipline.

Safety Characteristics of the French TGV System

As part of the process for determining appropriate rules for those aspects of the FOX system that will duplicate the French TGV system, it is logical to consider the safety record of the French high speed rail system.

In preparation for filing the Petition, FOX and the Florida Department of Transportation (FDOT) commissioned DLSF Systems, Inc. to complete a risk assessment to evaluate the relative safety of the FOX system vis-a-vis the French TGV system, and that predicted for the Amtrak 150-mph trainsets in the northeast corridor (NEC). (A copy of the Florida Overland eXpress Risk Assessment is available for public review in the docket of this matter, docket number HST-1.) The analysis set forth in the risk assessment provides a fairly extensive discussion of the safety of TGV high speed rail in France, and the numbers indicate an admirable safety record.

The risk assessment divides the analysis of the TGV system into two categories: those that are exclusive high speed lines, which include in-cab signaling, and passenger stations designed to service only high speed trains; and those that consist of a mixed high speed/conventional system in which high speed trains service conventional passenger stations, and use conventional trackside signaling. For the most part, the risk assessment deals with incidents that occurred between January 1, 1990 and June 30, 1996. The numbers are limited to post-1989 data because the Societe Nationale des Chemins de Fer Francais (SNCF), the quasi-governmental agency in France that oversees and operates TGV, does not have computerized records concerning events prior to 1990.

It is important to note that the accident figures discussed below occurred in a system that maintains high traffic density and passenger service: train-miles for this period totaled 204 million for all TGV service and 111 million for the exclusive high speed lines; passenger-miles on the high speed lines totaled 43,316,000; and the number of passengers served on TGV trains totaled 249,696. The TGV system operates at a maximum speed of 186 mph and runs approximately 184 trains per day.

On the exclusive high speed lines, only thirteen incidents have been recorded from January 1, 1990 through June 30, 1996. There have been no fatalities and no collisions between trains during this period. Of the thirteen recorded incidents, only three resulted in passenger injury. The first incident that caused injury did not involve casualties on board a TGV trainset. This incident, which caused 27 of the 30 total injuries, occurred when passengers waiting on a loading platform were sprayed with ballast that was kicked up by a derailed truck. The truck in this incident derailed due to a wheel slide failure that resulted in

a flat wheel. The second incident that resulted in casualty involved two passengers who were slightly injured when a trainset derailed. The derailment occurred while traveling at 150 mph, due to track subsidence that was caused by heavy rains and a previously unknown World War I trench. The third event, in which one passenger was injured, was caused by human error. Fasteners were incorrectly tightened after a maintenance procedure, which caused a fairing to fall and break a window in a passenger coach.

The remaining ten incidents on the exclusive high speed lines did not involve passenger injuries. Five of the incidents recorded involved trainsets that struck an animal in the right-of-way. Two of the incidents consisted of fire on moving equipment: In one event the fire was located in the baggage compartment, cause unknown; and in the other it was located in the rear locomotive, due to rolling stock failure. Two of the thirteen incidents involved the operation of the passenger compartment doors. In one of these events, a trainset door opened and was pulled away by the force of the wind while the conductor was checking an air leak, and in the second event a passenger compartment door opened while the train was moving, due to rolling stock failure. Finally, in the last incident a trainset hit concrete covers of electrical cable conduits, which was attributed to vandalism.

In the second category, which includes all mixed high speed/ **[*65480]** conventional lines, eight incidents have been recorded from January 1, 1990 to June 30, 1996. In this group of accidents, two fatalities occurred. The first involved a passenger who boarded the trainset, and then subsequently disembarked after departure was underway, and fell under the train. The second fatality occurred when a conductor attempted to board after train departure and fell between the train and platform. In another incident reported in this group, ten injuries occurred when a high speed trainset passed an absolute stop signal during a switching movement and hit a local train. The injuries occurred on the local, conventional train. In the final incident which involved injuries, a passenger standing on a platform was injured when a shock absorber between two passenger cars broke and kicked up ballast.

The remaining four incidents on the mixed lines occurred due to human error. In two instances, the locomotive engineer forgot to apply an immobilization brake after a switching movement, and in each case the trainset slowly hit another rail car. In one case, an engineer was distracted by another individual in the cab and released the brakes. The trainset slowly hit a bumper. In the last incident, a trainset rolled from a rolling stock repair facility unattended and hit a loading ramp.

Prior to 1990, one significant accident involving TGV equipment is noted, in which two fatalities and forty-four injuries occurred. A highway vehicle at a public grade crossing entered the **railroad** right-of-way and was struck by a TGV trainset. The TGV engineer and a passenger were killed and forty-four people were injured. (It is important to note here that the FOX high speed rail system will not contain any public grade crossings.) A second event is noted in the risk assessment concerning a terrorist attack in 1983 in which fatalities occurred, but no description of the incident is provided.

In summary, four fatalities have occurred on the TGV system from 1981 through June 1996, and none of these occurred on the exclusive high speed lines. FRA and, undoubtedly, the SNCF believe that any loss of life is one too many. However, given the traffic density, speed of travel, and passenger load that the TGV system supports, these figures are exceptional. The risk assessment calculates a TGV passenger risk of less than 0.99 per billion passenger-miles traveled.

It is difficult to make many meaningful comparisons between the French TGV system and existing passenger service in the United States because the operating environment, technology, data collection, and equipment differ in a variety of ways. However, the risk

assessment computes fatality rates based on available information for the TGV system in France and the NEC, and those rates provide some context to the accident data. According to the risk assessment, the normalized passenger risk calculated in per billion passenger-miles for the TGV system in France is 5.9% of that for the 1994 NEC.

FRA understands that differences of opinion may exist concerning methodology or conclusions reached in the FOX/FDOT risk assessment. Moreover, as explained below, FRA's safety determinations about the FOX system are based on its own careful analysis of the proposed system and the existing French system. However, the Agency believes the document presents useful data concerning the general safety of the French TGV system.

FRA, in conjunction with the Volpe National Transportation Systems Center (Volpe), has studied the French TGV system extensively. FRA and Volpe technical staff visited France and Belgium in order to examine the TGV system in operation, to review the signal system testing as it is conducted, and to pose questions to representatives of the SNCF concerning details of the system.

FRA and Volpe staff visited a manufacturing plant in eastern France where the equipment is constructed, and met with the plant's staff to discuss equipment design, crashworthiness, operating characteristics, and construction. FRA and Volpe staff visited a central train dispatching center, and studied the practices and required procedures that train dispatchers follow to prevent train collisions. FRA and Volpe staff spent several days at the signal system test track in Belgium to review the test procedures and test results with SNCF personnel. In addition, FRA has maintained communications with personnel at the test site to follow the progress of the signal testing as it proceeds.

FRA and Volpe staff visited a TGV repair facility in order to analyze the existing facility design, and employee practices at repair facilities generally. At the repair site, Agency staff received training from SNCF personnel on the operation of the major components of the TGV rolling stock, and the inspection and maintenance frequencies that have been established over time by the SNCF.

Agency and Volpe staff met with representatives of the French government and the SNCF in a series of meetings, and discussed a variety of questions concerning governmental oversight of the TGV operation, annual safety reviews, the process by which the SNCF revises the TGV system safety plan, personnel qualifications, operating rules, track maintenance and repair, and the development of new equipment.

Personnel from Volpe have studied and prepared reports on the French TGV, which not only provide a broad overview of the system, but also examine individual components and operating practices of the system. This, in combination with Volpe's broad expertise in the area of high speed rail systems generally, aided the FRA team to make effective and rapid comparisons and assessments of the relative safety of all aspects of the French TGV as the comprehensive review proceeded. Based on its own review of all of the information received, FRA possesses a high level of confidence in the safety of many of the major elements of the French system that will be duplicated in Florida.

Safety Characteristics of the FOX System

The FOX system planned for development in Florida contains safety features that do not exist on the TGV system in France, and so presumably, FOX has the potential to surpass the level of safety that exists on the TGV high speed lines. The primary improvements include lower traffic density, no opportunity for mixed traffic, an expanded intrusion protection system, fewer underpasses and overpasses, an advanced technology signal system, and the addition of protective station platform doors. In addition, the FOX system includes several

attributes that do not exist on passenger lines in the U.S., which are discussed below, that should also enhance the overall safety of the program.

The traffic density will be lower in Florida than that of the TGV system in France. FOX anticipates operating a maximum of eighteen trains per day in the first two years of operation, at a rate of approximately one train every thirty minutes. FOX plans to increase the number to twenty-six per day afterward. In France, approximately 184 TGV trains run per day. Traffic density has generally been associated with train accidents and incidents, and can impact the likelihood and severity of train accidents. The expanded train departure intervals on FOX are expected to reduce the risk of one train overtaking another or train-to-train collisions.

FOX will operate over a dedicated right-of-way that will not include freight **[*65481]** traffic or other types of passenger equipment. The high speed track in France is connected directly to conventional lines and so the risk of freight penetrating the high speed tracks exists. In Florida, the track will not be connected to rail lines that carry freight traffic. The only freight equipment that will be permitted on the FOX system is that involved in FOX maintenance or rescue operations. This is a significant factor that will eliminate or reduce a variety of risks. First, the likelihood of a freight-to-passenger trainset collision, and the high casualty rates that would accompany such a collision, will be nearly eliminated. Second, the absence of freight traffic will minimize track degradation that occurs with the transport of heavy loads, which in turn will reduce the risk of track defects that cause train derailments. Finally, train dispatchers will not manage districts that carry mixed passenger and freight loads, and so the stress and confusion that may result from freight and passenger route scheduling will be eliminated.

There will no public at-grade crossings on the FOX system, and so the risk of a highway-rail grade crossing accident will be eliminated. There are no public at-grade crossings on the TGV high speed lines in France, but highway-rail grade crossings are prevalent on the U.S. rail system, and account for many human injuries and fatalities. This aspect of the FOX system greatly reduces the risk of casualties to **railroad** employees, passengers, and road travelers along the FOX right-of-way.

FOX will install fencing that runs the length of the right-of-way to restrict unauthorized entry, which should minimize the risk of accidents involving trespassers and animals. In addition, the FOX system will include detection systems for intrusion, high wind, flood conditions, and rolling stock that contains dragging equipment. These detection systems will be connected to the signal system, and will notify the main dispatching center when hazardous events occur. Some of these features do not exist on the French TGV, and most do not currently exist on American **railroads.** It is expected that they will enhance safety for the FOX system.

The French TGV operates over a system that includes 490 overpasses and 676 underpasses. Current plans for FOX indicate that there will be approximately 100 overpasses and 60 underpasses. In addition, there will be no moveable bridges on the Florida system, structures that, like overpasses and underpasses, tend to increase the need for maintenance and the risk of incident.

FOX will utilize a new signal and train control system that is not currently in revenue service anywhere in the world. Trainsets in Belgium are testing the system, which is a form of Positive Train Control (PTC), and it is anticipated that before FOX commences revenue operations, the system will be certified and in use in Europe. Although FRA and others familiar with the system generally believe that this new variety of signaling will increase **railroad** safety, there may be some risk associated with the introduction of this new component to an operative **railroad** system. The risk assessment prepared for FOX and

FDOT does not address this factor. However, FRA believes that this item deserves significant attention, given the ramifications of a signal system failure on high speed passenger lines. This issue deserves particular concern in Florida because of the significant risk that exists there of extreme weather conditions, *i.e.*, lightning strikes, hurricanes, and flooding which could require relatively frequent exercise of the safety-critical features of this signal system. As the risk assessment notes, these are conditions that do not exist in France. FRA must be very cautious in establishing standards for a system that has not been used in revenue service, and that will be expected to function without fail in a location where catastrophic weather conditions are not rare. Therefore, FRA proposes as a requirement in this NPRM, a process in which an independent entity with proven technical expertise will conduct a review of the safety of the safety-critical hardware and software microprocessor-based elements of the signal system, which will be submitted to FRA. The proposed standards include a brief acceptance procedure that would follow this submission and precede implementation of the signal system as finally configured. FRA anticipates that this sort of process will accompany certification of the system in Europe, which will likely predate FOX operations. Given the risks presented by a signaling failure on a passenger line traveling at speeds of 200 mph, the Agency believes it is necessary to implement standards that formalize such a peer review process for FOX in this country. This is very similar to procedures that FRA has required other entities to follow concerning signal systems. However, FRA invites comment on this and all other proposals set forth in the NPRM from interested and expert parties, particularly as to the criteria that should be addressed in the peer review, or other avenues of achieving the same end.

Although FRA does not currently enforce safety standards concerning passenger stations, it is important to note that the FOX system will include protective doors on the station platforms to prevent the risk of injury from loose equipment or flying debris. As the TGV safety record discussed above points out, passengers waiting to board face the risk of injury unless shielded by the sort of protection that will be included in the FOX system.

There are certain advantages to building this new **railroad** system, particularly relating to roadbed and infrastructure, that accrue simply because construction will be designed to suit all components of the system. For instance, the right-of-way may be selected to suit the needs of the track and signaling system. Track curves will be minimized during track layout and designed to accommodate speeds in excess of the maximum revenue service speed of 200 mph. However, it is important to acknowledge, as the risk assessment does, that unique system aspects such as sink holes are an ever-present, potential problem in Florida, and decrease the safety of the FOX system unless mitigated. FOX plans to use geotechnical analysis to look for indicators of **sinkhole** activity prior to installing the track infrastructure. FRA's proposal includes a proviso that any abnormalities which arise in the construction phase of development must be recorded, and that all actions taken in response to the abnormality must be documented. Also, this hazard must be accounted for in the FOX system safety plan, which will be developed prior to commencing construction. FRA seeks comment from interested parties and experts on this subject to determine other methods for managing this risk effectively.

There are two other potential areas of risk that warrant particular attention. Neither is fully addressed in the FOX/FDOT risk assessment. The first involves the increase in TGV speed from a maximum of 186 mph, which is currently used in French operations, to 200 mph, which is proposed for Florida operations. The risk assessment states that French TGV plans to increase the operating speed to 200 mph, and a safety record will have developed in France prior to FOX operations in Florida. Unfortunately, FRA finds itself in the position of writing safety standards for the system at this juncture, when the appropriate safety record concerning these enhanced speeds is unformed. As is also noted in the risk assessment, higher train speed tends to **[*65482]** increase the severity of accidents. The FOX system safety plan must address this issue, but we also seek comment from interested parties and

experts as to the enhanced risk involved, if any, and other viable methods of addressing it.

Second, FRA believes that there is a risk, however intangible, that arises from moving this European system to a new culture where the pertinent institutional knowledge is not abundant and the role of the government in supporting operations is quite different. For instance, rolling stock maintenance personnel on FOX will be expected to inspect and maintain equipment using unfamiliar tools, in dramatically different repair facilities, on equipment that utilizes computers to achieve what is traditionally done in the U.S. by visual and manual means. No amount of training can achieve the level of professional insight that fifteen years of experience on the equipment would produce. The risk assessment alludes to this factor in passing, and seems to indicate that so long as the TGV equipment, inspection frequencies, and procedures are implemented on FOX, nothing is lost and no risk ensues.

FRA agrees that it is very difficult to quantify the value of institutional knowledge in a system as large as the French TGV or FOX. However, this is not a factor that the Agency can or desires to overlook. In discussions with FRA, FOX and FDOT have indicated that they plan to bring TGV professionals into the training, maintenance, and operation of the system. However, it is impossible to know at this point whether or to what extent that participation will occur, as revenue operations are not planned to commence until 2004. A variety of events may occur between now and then to make those plans difficult or impossible to achieve.

Also factored into this issue of risk, is the knowledge that the TGV has a different cost accounting structure, in which the daily safety of the operation is not compromised by short-term operating costs and long-term capitol costs. The SNCF may be able to make purchases and decisions that a private entity would be unable to accomplish. FRA is certain that all reputable transportation companies have as their first priority the safety of passengers and employees. However, the need to be profitable in a privately financial context undeniably plays a role in decision making that on occasion impacts safety. FRA believes that there may be a connection between the TGV's superb safety record and the degree to which the system is financially supported that will not exist on the FOX system. There is no way of knowing with certainty whether TGV safety is due in some measure to its financial structure. Similarly, there is no way of ascertaining at this point whether the loss of comprehensive institutional knowledge that is bound to occur in Florida will impact the safety of the operation. However, FRA believes that the potential for these safety risks is sufficient to make preventative measures sensible.

In this proposal, FRA seeks to address these concerns with standards that provide a very high level of safety in areas where FRA believes French TGV safety cannot or will not be met in Florida. FRA anticipates that the petitioner may object to the imposition of certain of the proposed standards that require more than is currently the practice in France. However, given the risk factors outlined above, the grave potential for human loss in the event of an accident, and the flexibility that is incorporated into the proposal, FRA believes at this time that any perceived burdens are justified.

System Safety

System safety is the cornerstone of the French TGV, and as proposed in these standards, the heart of the FOX high speed rail system. The systems approach to safety is used pervasively in a variety of industries to reduce the likelihood and occurrence of accidents and injuries. FRA has discussed the need for this approach to safety in two recent rulemakings, Passenger Train Emergency Standards, 62 FR 8330 (February 24, 1996), and Passenger Equipment Safety Standards, 62 FR 49728 (September 23, 1997). This concept requires an organization to identify, evaluate, and reduce or eliminate safety hazards that exist in any portion of the organization's "system," or may be caused by interrelationships

US OFFICE PRODUCTS

VERIFIED STATEMENT OF RICHARD W. FREESE, P.E.

ROCHESTER PUBLIC WORKS DEPARTMENT

COST ESTIMATES FOR PUBLIC UTILITY RELOCATIONS IF GRADE SEPERATED CROSSINGS ARE INSTALLED AT SPECIFIC LOCATIONS IN ROCHESTER, MINNESOTA

My name is Richard W. Freese. I am the Director of Public Works / City Engineer for the City of Rochester Minnesota. I have held this position for over 7 years. I am a licensed Professional Engineer in the State of Minnesota. Between 1979 and 1994, I served as the Director of Public Works in two cities in Wisconsin. I was licensed as a Professional Engineer in the State of Wisconsin during that time. Prior to that I worked for five years with American Electric Power Service Corporation as a Civil Project Engineer. I have a Degree in Civil Engineering from the University of Wisconsin – Platteville. My mailing address is 201 Fourth Street SE, Room 108, Rochester, MN 55904.

In October 1998, I prepared an estimate of costs to relocate sanitary sewer, storm sewer and watermain facilities owned and operated by the City of Rochester within existing public right-of-way at seven specific at-grade crossings that currently exist under the main line of the DM&E Railroad in Rochester. The estimate of costs is reflective of the costs to relocate existing sanitary sewer, storm sewer and watermain located within the public right-of-way to accommodate grade separated crossings of the DM&E Railroad main line at seven specific locations in Rochester. I completed the estimate of costs in October 1998 based on current and recent costs for similar public utility work that had been done for the City. On October 8, 1998 I completed the attached estimates and summarized the costs by specific location.

I have reviewed the estimate of costs provided by Ben H. Ortgies of Wilbur Smith Associates used in the City of Rochester's comments on the DM&E Draft Environmental Impact Statement relative to the utility relocations associated with grade separations at selected intersections. I find that the estimate of costs used by Ben H. Ortiges is comparable with my estimates prepared on October 8, 1998 given that he is using an additional 29% contingency and administration figure and construction costs have increased since my 1998 preparation.

Cost to Relocate Sanitary Sewer, Storm Sewer and Watermain Facilities Based on Grade Separations at Three Existing At-grade Crossings of the DM&E Railroad in Rochester

Broadway (TH 63)

Relocate and reconstruct 350 feet of 16" watermain	350'	$100.00	$35,000
Relocate and reconstruct 700 feet of 12" watermain	700'	$75.00	$52,500
Relocate and reconstruct 300 feet of 8" watermain	300'	$50.00	$15,000
Relocate and reconstruct 2,700 feet of 27" sanitary sewer	2,700'	$125.00	$337,500
Relocate and reconstruct 300 feet of 33" sanitary sewer	300'	$100.00	$30,000
Relocate and reconstruct 1,850 feet of 72" storm sewer	1,850'	$150.00	$277,500
	Total Cost		$747,500*

*Engineering & Contingencies @ 29% included in WSA estimate

West Silver Lake Drive (2nd Avenue NE)

Relocate and reconstruct 700 feet of 8" watermain	700'	$50.00	$35,000
Relocate and reconstruct 450 feet of 8" sanitary sewer	450'	$75.00	$33,750
Relocate and reconstruct 900 feet of 24" storm sewer	900'	$100.00	$90,000
	Total Cost		$158,750*

*Engineering & Contingencies @ 29% included in WSA estimate

East Circle Drive

Relocate and reconstruct 900 feet of 12" sanitary sewer	900'	$75.00	$67,500
Relocate and reconstruct 2 @ 200 feet of sewer sleeves	400'	$200.00	$80,000
	Total Cost		$147,500*

*Engineering & Contingencies @ 29% included in WSA estimate

TOTAL ESTIMATE FOR THE THREE CROSSINGS **$1,053,750**

VERIFICATION

STATE OF MINNESOTA

COUNTY OF OLMSTED

I, Richard W. Freese, first being duly sworn, depose and say that I have read the forgoing statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

Subscribed and sworn to before me this 2nd day of March, 2001.

Richard W. Freese

Richard W. Freese

Kim M. Hanson

Notary Public

My Commission Expires 1-31-2005

KIM M. HANSON
Notary Public
Minnesota
My Commission Expires Jan. 31, 2005

VERIFIED STATEMENT OF GREG A. WOODWORTH

ROCHESTER PUBLIC UTILITIES COST ESTIMATES FOR FACILITIES RELOCATIONS IF GRADE SEPARATION CROSSINGS ARE INSTALLED AT SPECIFIC LOCATIONS IN ROCHESTER

My name is Greg A. Woodworth. I am the Engineering Manager for Rochester Public Utilities, a Department of the City of Rochester, Minnesota. I have been in this position for 12 years. For 4 years prior to that, I was a Senior and Project Electrical Engineer for Rochester Public Utilities. For 10 years prior to that I was employed as an engineer by Black and Veatch of Kansas City, Missouri or Black and Veatch Arabia or Al Khobar, Saudi Arabia. My mailing address is 4000 East River Road NE, Rochester, Minnesota 55906.

In early April 2000, I was requested by Richard Freese, Public Works Director of the City of Rochester to estimate the cost for relocating RPU electric facilities at six specific at-grade crossings that currently exist on the main line of the DME railroad through Rochester. After having the specifics of the six potential crossings explained to me, I completed the estimate based on current and recent costs for similar work that RPU has completed. On April 11, 2000 I completed the attached estimate. The results of the estimate and the assumptions that can affect the relocation costs are listed on the attached three sheets.

Cost to Relocate RPU Electric Facilities Page GAW2

Based on DM&E Upgrading Through Town 2/27/01

11th Avenue NW Overpass		**Cost per**	**Cost of**
	Unit	**Unit**	**Item**
Removal of 1/2 mile of overhead 336	0.5	22,000	11,000
16 customers removed	16	500	8,000
Maintenance of Circuit Ties during construction			87,500
Maintenance of Service to Customers (Northgate) during construction		35,000	35,000
Transmission - 4 poles-No steel	4	25,000	100,000
Transmission Line Construction			50,000
Conduit in Bridge -	10560	10	105,600
Circuit Reinstallation	4200	30	126,000
Switches and Equipment			35,000
Subtotal			558,100
Engineering, Switching and Labor @10% of total			55,810
Total Cost			**$613,910**

4th Avenue NW Overpass		**Cost per**	**Cost of**
	Unit	**Unit**	**Item**
Removal of 1/2 mile of overhead 336 and 1/0	0.5	22,000	11,000
35 customers removed	35	500	17,500
Maintenance of Service to Affected Customers during construction		12,000	12,000
Two Steel Deadend Transmission Poles	2	25,000	50,000
Two Steel Angle Transmission Poles	2	25,000	50,000
Transmssion Pole Foundations - 4	4	25,000	100,000
Transmission Line Construction			50,000
Revised Substation Deadend and Terminations	1	40,000	40,000
Conduit in Bridge -	8800	10	88,000
Circuit Reinstallation	3520	30	105,600
Switches and Equipment			15,000
Switching and Mayo Operational Considerations			20,000
Subtotal			559,100
Engineering, Switching and Labor @10% of total			55,910
Total Cost			**$615,010**
Potential Costs if Mayo Duct on 4th Ave NW is Disturbed			
Manholes	8	28000	224,000
Duct	1320	200	264,000
Circuit Removal	6600	10	66,000
Circuit Reinstallation	6600	30	198,000
Switching and temporary ties for Load Retention			75,000
Subtotal			827,000
Engineering and Operational Costs			82,700
Potential Mayo Duct Costs			**$909,700**
Potential Total Costs			**$1,524,710**

North Broadway Tunnel		**Unit**	**Cost per Unit**	**Cost of Item**
Removal of 1/4 mile of overhead #4		0.25	22,000	5,500
25 customers removed		25	500	12,500
Maintenance of Service to Affected Customers during construction			12,000	12,000
Four Steel Transmission Poles		4	25,000	100,000
Transmssion Pole Foundations - 4		4	25,000	100,000
Transmssion Line Construction				50,000
Conduit in Bridge -		8800	10	88,000
Manholes for Fdr 305 by Marigold		3	20,000	60,000
Affected Duct Replacement		800	100	80,000
Circuit Reinstallation		1600	30	48,000
Switches and Equipment				15,000
	Subtotal			571,000
Engineering, Switching and Labor @10% of total				57,100
	Total Cost			**$628,100**

Silver Lake Drive NE Underpass		**Unit**	**Cost per Unit**	**Cost of Item**
Removal of 1/4 mile of overhead 336		0.25	22,000	5,500
Maintenance of Service to Affected Customers during construction			12,000	12,000
Three Steel Deadend/Angle Double-circuit Transmission Poles		3	25,000	75,000
Manhole and Duct Modifications - Manholes		3	25,000	75,000
Duct Replacement/Matchup				35,000
Transmssion Pole Foundations -		3	30,000	90,000
Transmssion Line Construction				50,000
Revised Substation Deadend and Terminations		1	40,000	40,000
Conduit in Underpass -		7040	10	70,400
Circuit Reinstallation		1760	30	52,800
	Subtotal			505,700
Engineering, Switching and Labor @10% of total				50,570
	Total Cost			**$556,270**

Assumes Construction Provisions are taken to not undermine the Substation Control House and the 110 foot steel transposition structure (The Magic Pole) in the Silver Lake Substation. Also assumes that the Circ Water and other lines in front of the Silver Lake Plant are maintained to allow the plant to run during construction of the underpass.

11th Avenue NE Overpass		**Unit**	**Cost per Unit**	**Cost of Item**
Removal of 1/2 mile of overhead 336 and #4		0.5	22,000	11,000
30 customers removed		30	500	15,000
Maintenance of Circuit Ties during construction				37,000
Maintenance of Service to Customers during construction			35,000	35,000
Transmission - 4 poles-No steel		4	25,000	100,000
Transmssion Line Construction				50,000
Conduit in Bridge -		9152	10	91,520
Circuit Reinstallation		4200	30	126,000
Switches and Equipment				15,000
	Subtotal			480,520
Engineering, Switching and Labor @10% of total				48,052
	Total Cost			**$528,572**

East Circle Drive Overpass		**Unit**	**Cost per Unit**	**Cost of Item**
Transmission - 4 poles-No steel		4	25,000	100,000
Transmssion Line Construction				40,000
Conduit in Bridge -		9152	10	91,520
	Subtotal			231,520
Engineering, Switching and Labor @10% of total				23,152
	Total Cost			**$254,672**

Cost Summary

11th Avenue NW Overpass	$613,910	
4th Avenue NW Overpass	$615,010	$909,700
North Broadway Tunnel	$628,100	
Silver Lake Drive NE Underpass	$556,270	
11th Avenue NE Overpass	$528,572	
East Circle Drive Overpass	$254,672	
	$3,196,534	$4,106,234

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VERIFICATION

STATE OF MINNESOTA

COUNTY OF OLMSTED

I, Greg A. Woodworth, being duly sworn, depose and say that I have read the foregoing Statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

Subscribed and sworn to before me this 27 day of February, 2001.

Greg A. Woodworth

Greg A. Woodworth

Diane K. Bengtson

Notary Public

My Commission Expires 1-31-2005

DIANE K. BENGTSON
NOTARY PUBLIC-MINNESOTA
MY COMMISSION EXPIRES 1-31-2005

VERIFIED STATEMENT
OF
MICHAEL J. NIGBUR

My name is Michael J. Nigbur; I am the Land Development Manager for the City of Rochester Public Works Department. I have a Bachelors Degree from the University of Wisconsin Milwaukee and additional education gained from Continuing Education Courses. I am a Certified Residential Real Property Appraiser in the State of Minnesota, a Registered Landscape Architect in the States of Wisconsin and Minnesota, a Licensed Real Estate Agent in the State of Minnesota, and I am a member of the American Institute of Certified Planners. I have been involved in real estate issues in both the Public and Private Sectors since 1988. I have been employed with the City of Rochester since 1995 as the Right of Way Agent/Land Development Manager. My current responsibilities include:

- Land Rights Acquisition (Fee Simple acquisition, various types of easement acquisition, and temporary construction access acquisition for roadway projects, airport expansion, storm water/wetlands, parkland and downtown redevelopment)
- Coordination of development activities that impact public facilities.
- Project Management of new construction projects relating to new development.
- Feasibility/preliminary engineering reports development for public facilities.

- Appraisal review/development & Highest/Best use analysis.
- Expert Witness relating to condemnation actions.

My experiences in both the private and public sectors have covered various real estate issues, encompassing acquisition and development in the rural and urban settings.

I have reviewed the proposed route of the DM&E Rail bypass and have determined an estimate of the costs for land acquisition. My estimate includes the right of way area needed for the railroad construction (547 acres) as well as additional lands I believe may need to be purchased.

The additional lands to be purchased include property that may have severance damages (due to irregular shape or limited size for rural uses) or that will no longer have access to roadways due to rail location. However, I also believe that a good share of these lands acquired may also be resold upon completion of the project to either abutting landowners or be sold off as new parcels.

My assumptions for the calculation of land values include the following:

- The typical agricultural land values in this area are estimated at $1500.00 per acre.
- The actual settled purchase price for the land acquired would be in excess of the typical agricultural land values and therefore is estimated at $2,350.00 per acre.
- The re-selling of excess lands would have a lower value due to the limited size and irregular shape and therefore is estimated at $1,000.00 per acre.

- Acquisition values for parcels with structures assumed that a 5 acre tract and the structure had a value of $150,000 plus any additional land in excess of the 5 acres at an assumed value of $2350.00 per acre.
- Each individual parcel was not valued separately. Individually each parcel may have variations in value due to crop production, wetlands, zoning, access or other factors.

Based on the assumptions above I determined that in addition to the needed rail right of way area consisting of 547 acres there would be a need to acquire an additional 776 acres of vacant land and 480 acres of land that contained structures (7 homes and 1 small business).

547 acres X $2350.00	= $1,285,450.00
776 acres X $2350.00	= $1,823,600.00
8 structures (5 acres each)	= $1,270,750.00
440 acres X $2350.00	= $1,034,000.00
SUB TOTAL	= $5,413,800.00

I have also determined there may be revenue generated from the sale of excess lands acquired in the above scenario. The estimated acreage that might be re-sold after the bypass construction is 1,117 acres. Approximately 139 acres of the additional lands acquired may not be resold due to size, location, or shape. However, some of these unsold lands may be retained for storm water purposes, wetlands replacement or additional right of way.

1117 X $1,000.00	= $1,117,000.00

There is also an unknown cost for relocation of the occupants of the homes and business. Assuming a cost of $35,000 per relocation the estimated total relocation cost is $280,000.00.

The net cost for land acquisition, without considering the use of excess land for wetland replacement, flood mitigation, or storm water management, is estimated as follows:

$5,413,800.00 - $1,117,000.00 + $280,000.00 = $4,576,800.00

In an attempt to be conservative in our estimate I have recommended that Mr. Ortgies utilize the full $5,413,800.00 for the real estate acquisition estimate. Applying thirty-five (35) percent for contingency/administration will further increase the acquisition cost estimate to ensure that adequate funds will be available for acquisitions and that the costs are not underestimated should the market conditions continue to change.

I believe that the information relating to values contained herein represents a reasonable value determination and cost exposure for acquisition affected by the entire DM & E By-Pass Project.

STATE OF MINNESOTA

COUNTY OF OLMSTED

I, Michael J. Nigbur, first being duly sworn, depose and say that I have read the forgoing statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

Michael J. Nigbur AICP, LA

Subscribed and sworn to before me. This 1st day of March, 2001

Notary Public

JOAN CLARK
Notary Public
Minnesota
My Commission Expires Jan. 31, 2005

VERIFIED STATEMENT

Of

Steven W. Leqve

My name is Steven W. Leqve. I currently hold the position of Airport Manager at Rochester International Airport, Rochester, Minnesota. I have held this position for 10 years and, prior to being promoted to Airport Manager, held various positions at the airport since 1978. Additionally, I have asked our General Consultant, ACSG, Inc. to assist with preparation of this response. ACSG, Inc. specializes in airport consulting and prepared the 1997 Master Plan for Rochester International Airport.

I am making this statement in response to the Verified Statement of Mr. William R. Otter, Jr. in which he responded to the Rochester South Bypass proposal, which was submitted to the Surface Transportation Board on January 6, 1999. On page 6 of subject statement, Mr. Otter specifically indicated "The proposed corridor appears to pass in close proximity to the guidance and approach lighting systems of the Rochester Airport. . . . Based on my experiences elsewhere, train traffic that close to the airport could be problematic. . . ."

FAA Advisory Circular 150/5300-13, para. 211a(8) specifically states:

"Other objects which require clearing are those which generally can have an adverse effect on the airport. These include objects in the inner part of the approach area (coinciding with the Runway Protection Zone) such as fuel handling and storage facilities, smoke and dust generating activities, MISLEADING LIGHTS, AND THOSE WHICH MAY CREATE GLARE OR ATTRACT WILDLIFE."

The proposed corridor enters the general airport area from the northwest, proceeds south and east until it runs parallel with I90, and proceeds generally east from there. It comes closest to the approach end of runway 02. However, even at its closest point, and considering the long term plan to extend this runway to 8,500', the corridor is outside (2,600') the 2,500' runway protection zone. At the point it comes closest to the approach end of runway 31, the corridor is 4,500' from the end of this runway.

The proposed corridor meets FAA specifications and would not pose a problem with the runways at Rochester International Airport.

VERIFICATION

STATE OF MINNESOTA

COUNTY OF OLMSTED

I, Steven W. Leqve, first being duly sworn, depose and say that I have read the forgoing statement, know the contents thereof, and the same is true and correct to the best of my knowledge.

Subscribed and sworn to before me this 2nd day of January, 2000.

Steven W. Leqve

Steve Leqve

Kim M. Hanson

Notary Public

My Commission Expires 1-31-2005

KIM M. HANSON
Notary Public
Minnesota
My Commission Expires Jan. 31, 2005