

APPLICATION FOR FEDERAL FINANCIAL  
PARTICIPATION IN TRAFFIC NOISE BARRIER  
CONSTRUCTION: THE MICHIGAN STATEWIDE  
TRAFFIC NOISE LEVEL INVENTORY - GROUP 1

Application is made to the Federal Highway Administration  
Under Section 114 of the Federal-Aid Highway Act of 1973,  
Section 109(i), Title 23, U.S.C.,  
Noise Standards and Procedures for Type II Projects

Research Laboratory Section  
Testing and Research Division  
Research Project 75 G-211  
Research Report No. R-1130

Michigan Transportation Commission  
Hannes Meyers, Jr., Chairman; Carl V. Pellonpaa,  
Vice-Chairman; Weston E. Vivian, Rodger D. Young,  
Lawrence C. Patrick, Jr., William C. Marshall  
John P. Woodford, Director  
Lansing, November 1979

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## PREFACE

The purpose of this document is to describe and justify a series of traffic noise abatement projects for which Federal financial participation is requested. Specifically, it is proposed to construct approximately 27,000 lin ft of traffic noise barrier along selected segments of US 23, I 75, and I 94.

The authority for the application herein being made to the Federal Highway Administration derives from Section 114 of the Federal-Aid Highway Act of 1973, Section 109(i), Title 23, U.S.C., Noise Standards and Procedures for Type II projects.

## NOISE ABATEMENT APPLICATION

### Application

The Michigan Department of Transportation is requesting Interstate Financial participation by the Federal Highway Administration in the noise abatement measures detailed here for the described segments of US 23, I 75, and I 94.

### Authority

The Federal Highway Noise Standards were first promulgated as Federal Highway Administration Policy and Procedure Memorandum 90-2 on January 24, 1973. On February 20, 1974, "Interim Guidelines for Noise Abatement Projects on Previously Constructed Highways," was issued. These existing issuances have been consolidated by the Federal-Aid Highway Program Manual, Volume 7, Chapter 7, Section 3 (FHPM 7-7-3), effective May 24, 1976. Under these guidelines, Regional Federal Highway Administrators or delegated Division Engineers were given authority to approve noise abatement projects for previously constructed highways on any Federal-Aid system, provided:

- 1) A noise analysis has been performed using the general guidelines outlined in FHPM 7-7-3,
- 2) A determination has been made that the noise abatement projects are clearly of high priority,
- 3) The noise abatement project will achieve a significant noise reduction,
- 4) The noise abatement benefits are judged to outweigh the overall economic and environmental cost of the projects,
- 5) The noise abatement measures are for noise-sensitive developed activities which were in existence on May 24, 1976.

## MICHIGAN TRAFFIC NOISE ABATEMENT

To support and supplement this application a brief review of the Department's noise abatement related activities has been included below.

### Noise Committee

In the spring of 1974 the Department established an ad hoc Noise Committee to formulate guidelines for the construction of noise barriers. In September of 1974 this committee was redesignated as standing, and given the assignment of dealing with and advising the Department on all noise problems.

### Noise Barrier Guidelines

The Department's Bureau of Highways Guidelines for Noise Barriers (Appendix A) were established to ensure that consistent, appropriate, and safe measures are taken with regard to noise barriers on existing highways; and that these measures are in the best public interest to achieve noise levels compatible with different land uses, with due consideration to social, economic, and environmental effects. Specifically, the guidelines provide the decision maker with answers as to whether a noise barrier should be built, or permitted; if it is to be built by the Bureau, what its priority should be; who should pay for it; and its design and construction specifications.\*

### Vehicle Noise Control Legislation

In 1978, Michigan took a major step towards solution of its traffic noise problem. On March 21, 1978, the Governor signed into law the State's first vehicle noise control statute. This act specifies the maximum noise level that cars, trucks, and motorcycles are allowed to generate on our roads and streets, and provides for enforcement of the act and penalties for its violation. This significant step, accomplished partly through the impetus of our Department, should, in time, help mitigate the noise problem for residential areas along our roadways.

### Noise Level Inventory

In a further attempt to ensure equitable distribution of Michigan noise abatement funds, a statewide freeway noise level inventory has been conducted. This inventory will enable the Department to better determine where noise abatement funds should be utilized to achieve maximum citizen benefit.

### Earlier Michigan Noise Barriers

To date, a number of barriers have been constructed in the State, notably a wooden wall along I 75 in Allen Park, a steel wall along I 75 in Southgate, an earthmound along I 94 near Kalamazoo, a five-mile long series of

concrete walls along I 275, and one concrete wall along I 75 in Lincoln Park. Also, it has become standard practice to mound the earth alongside new roadway sections, as feasible, for noise protection. As a result many less formally designed and installed barriers actually exist along Michigan roadways. Additionally, a number of noise barriers have been proposed in environmental impact statements (I 475, I 696, I 69) and are in various stages of implementation.

#### Noise Barrier Design Team

As a result of the many comments from nearby residents and highway users in general concerning the esthetic quality of early noise barriers, a noise barrier design team was formed in the fall of 1978. This six-person team consists of a landscape designer (team leader), three engineers (acoustical, structural, and highway), an environmental expert, and a community representative. The objective of the team is to review each project and to design the noise walls such that they will better fit into the environment and receive acceptance by the community in which they are being constructed.

### RECOMMENDED NOISE BARRIER PROJECTS

#### Barrier Site Selection

After completion of the two-volume Noise Level Inventory (MDOT Research Reports R-1013 and R-1013A), it was decided that a program should be undertaken to design and construct noise barriers for the highest priority residential areas established by the inventory. The program is to be carried out on a continuing basis with treatment applied to qualified residential areas in their order of descending priority. It will continue for as long as there are traffic noise impacted areas and the program remains economically realistic in the light of other Department programs.

The first group of proposed projects consists of sites experiencing noise levels of  $L_{10}$  80 dbA or higher per the R-1013A statewide ranking. These projects total approximately 27,000 lin ft of barrier wall with heights ranging from 14 to 19 ft. Only those residential areas adjacent to freeways and that existed prior to location and construction of the freeway (Priority 1) were considered for inclusion in the group.

For initial screening the top 57 inventory sites (83 to 87 dbA) were examined. Of these, 52 were eliminated for a variety of reasons, including: 1) not residential, 2) Priority 2 or 3, 3) low density, 4) low priority factor, 5) error in entry, 6) service drives, 7) duplicate, and others. From these 57 sites, five were selected to be proposed as barrier projects.

For secondary screening, the next 140 sites (80 to 82 dbA) were examined. Of these sites, six were selected for proposed barrier projects.

Selection was again based on high noise levels, existence of the site before freeway location and construction, a high priority factor, plus, in this grouping, existence of a previous noise complaint from the site. Further screening of this second group of sites will continue to identify other high priority sites for future barrier projects.

Eight proposed barriers to protect eleven inventory sites have been established as potential barrier projects provided other requirements of the Department's "Guidelines for Highway Noise Barriers for Type II Projects" can be met (Table 1, Fig. 1). Within the Priority 1 category of sites, priority factor values were calculated for each site according to the Barrier Guidelines formula. This priority factor is based upon the achievable reduction provided by the barrier, the number of living units protected and the State's cost of constructing the barrier. The State's (and local governmental unit, if appropriate) 10 percent cost of the project was calculated on the basis of \$100 per lin ft of barrier.

Complete details of each proposed project are included in Appendix B.

#### Public Involvement

The local government representing each site will be asked to furnish the Department with a formal resolution supporting the proposed barrier (Section IV.A of the Barrier Guidelines) and with documentation of its land use controls (Section IV.B). No further action will be undertaken on individual barrier projects until the appropriate local government responds in a positive manner. After local government concurrence with the proposed projects, receipt of preliminary FHWA approval and availability of detailed design plans, the barrier designs will be reevaluated and finalized by the Noise Barrier Design Team.

After completion of the design, a public hearing will be held to determine the community response to the wall location, height, length, material, and on any other noise related factors. Citizen comments will be analyzed and incorporated as appropriate and feasible.

TABLE 1  
 PROPOSED INVENTORY BARRIER SITES,  
 LENGTHS, AND PRIORITY FACTOR VALUES

Statewide Inventory Site No.	County	Route No.	Predicted L10 Noise Level, dbA <sup>1</sup>		Approximate Barrier Length, ft <sup>2</sup>	Priority Factor Value
			1974	1978		
3	Livingston	US 23	85	85	4,350	26.2
13	Kalamazoo	I 94	84	83	2,900	26.8
30	Kalamazoo	I 94	83	82	2,750	14.7
41, 47	Kalamazoo	I 94	83, 83	82, 82	3,400	16.7
67	Wayne	I 75	82	83	2,000	15.9
78, 94, 138	Wayne	I 75	82, 82, 81	83, 84, 82	5,700	67.8
143	Wayne	I 94	81	80	3,150	19.4
151	Wayne	I 75	80	79	<u>2,355</u>	25.5
					26,605	

<sup>1</sup> Predictions based upon traffic data in the biennial 'Sufficiency Rating, Report No. 153 for the years 1974 (year of inventory) and 1978 (latest available).

<sup>2</sup> Barrier lengths include an approximately four times the barrier receiver distance on each end to reduce end-flanking noise problems. It is also recommended that an additional 100 ft taper section be added to each end to lessen abrupt acoustic and esthetic effects.

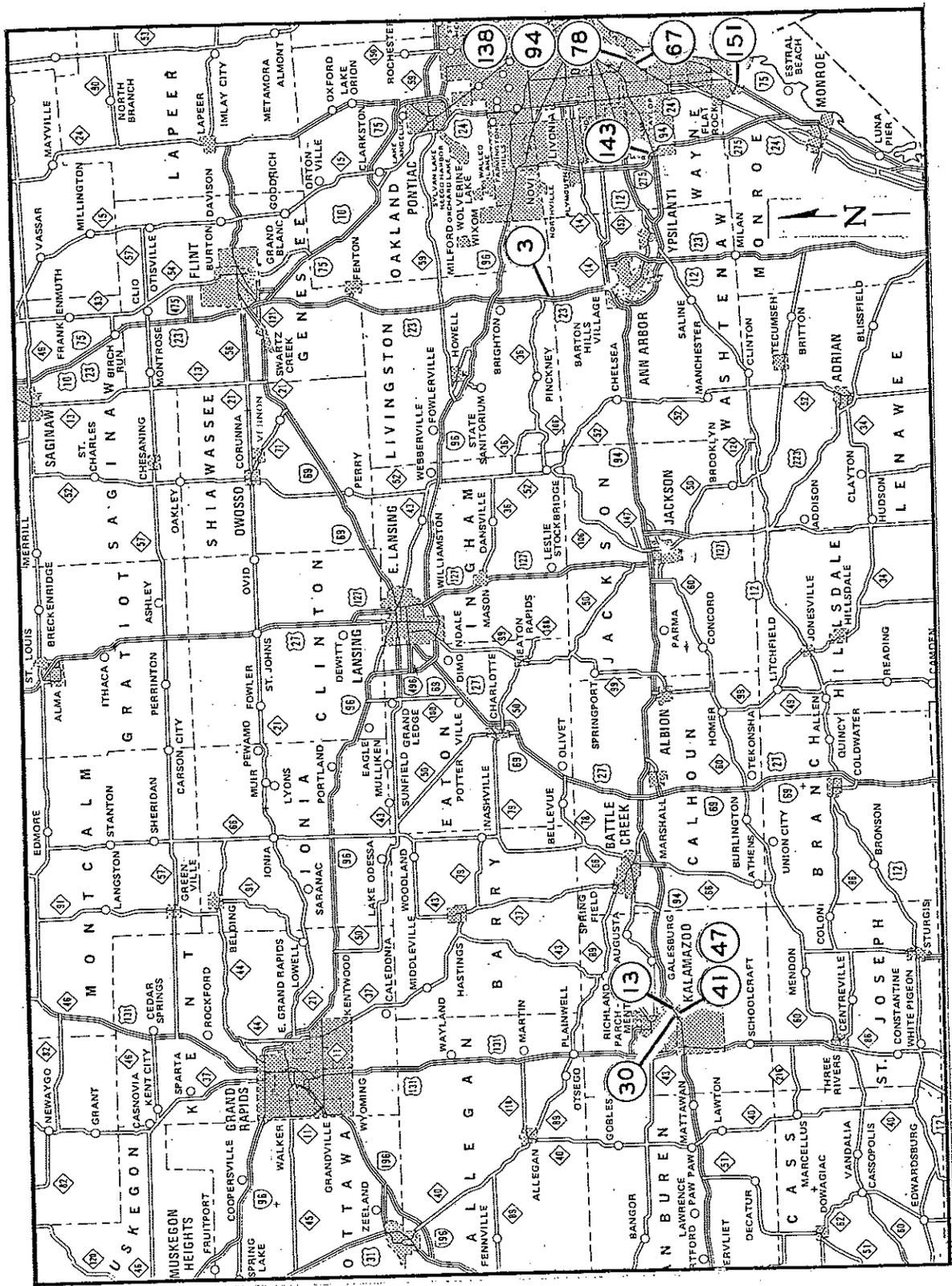


Figure 1. Group 1 barrier site locations.

APPENDIX A  
NOISE BARRIER GUIDELINES

MICHIGAN DEPARTMENT OF STATE  
HIGHWAYS AND TRANSPORTATION

GUIDELINES FOR HIGHWAY NOISE BARRIERS FOR TYPE II PROJECTS

I. PURPOSE:

To establish guidelines for use in the planning, design and construction of earth mound or wall type barriers to abate noise radiating from Michigan highways into developed areas. They are to insure that consistent, appropriate and safe measures are taken with regard to noise barriers on existing highways not presently being considered for reconstruction, and that these measures are in the best public interest to achieve noise levels compatible with different land uses, with due consideration to social, economic and environmental effects. Specifically, they provide the decision maker with guidance as to whether any given noise barrier should be built; if it is to be built what its priority should be; who should pay for it; and its design and construction details.

II. APPLICABILITY:

These guidelines may be applied, as appropriate, to those Type II urban, suburban and rural FAI, FAP and FAS Michigan State trunkline projects covered by Federal Highway Administration FHPM 7-7-3.

A Type II project is a proposed Federal or Federal-Aid Highway project for noise abatement on an existing highway (located on a Federal-Aid System) which does not include construction or reconstruction of a highway section (or portion thereof).

III. EXCEPTIONS:

The conditions set forth in these guidelines will be complied with by Department personnel unless an exception is authorized, in writing, by the Deputy Director, Bureau of Highways and approved by the FHWA.

IV. CRITERIA FOR ACTION AND PRIORITY:

Construction of a Type II project noise barrier in the highway right-of-way adjacent to a developed site requires the following:

- A. Proposed noise barrier projects must be supported by a formal, local government resolution.
- B. The local government must also furnish the Department with documentation of its land use controls. These controls must be such as to reasonably preclude the necessity for publicly funded noise barriers in highway rights-of-way adjacent to such future developments. They should include, but are not limited to:
  - (1) Transportation noise as a component of the community's general development plan.
  - (2) Regulation of subdivision development providing for proper site design and building location where noise sensitive uses are to locate close to freeways.
  - (3) Zoning regulations which separate noise sensitive land uses from proximity to freeways and locate land uses compatible with traffic noise adjacent to freeways.
  - (4) Construction regulations insuring that all future buildings located close to freeways will be sound proofed against exterior noise.
- C. A noise analysis performed in accordance with the general guidelines outlined in FHPM 7-7-3 must confirm that the noise level for the appropriate land use category is being exceeded.
  - (1) The day-night use of residential property, in the absence of evidence to the contrary, will be assumed typical. That is, it will consist of a day-time activity period beginning between 5:00 - 7:00 AM and ending between 9:00 - 12:00 PM; and a sleep period beginning between 9:00 - 12:00 PM and ending between 5:00 - 7:00 AM.
  - (2) In residential areas the Design Noise Level of FHPM 7-7-3 must be exceeded during the period 9:00 PM to 6:00 AM.

- 3 -

- (3) In reducing the noise impact (level) in a residential area the barrier design must, to the extent technically and economically feasible, insure that there is no increase in the variability factor ( $L_{10}$  minus  $L_{90}$ ).

D. The assignment of priorities to noise barrier projects will be as follows:

Priority 1: Development that existed or was under development before the date that the Department officially notified the public of the adoption of the route location of the highway project. (FHPM 7-7-3 - Date of Public Knowledge of a Proposed Highway Project).

Priority 2: Development started after route adoption but before the date of construction contract award.

Priority 3: Development started after date of construction contract award.

Within each of the above priorities, highest consideration will be given to development experiencing the highest noise levels. To differentiate between those areas of similar noise level, that is, to further prioritize the above, the following will be used:

$$\text{Priority Factor} = \frac{\text{Achievable Reduction} \times \text{Number of Living Units Protected}}{\text{Adjusted Barrier Cost}}$$

where:

"Achievable Reduction" is the difference between the predicted average existing noise level and the predicted average noise level after barrier construction. Its determination will be based on achieving a noise level of  $L_{10}(h)$  70 dbA or  $L_{eq}(h)$  67 dbA at the development nearest the roadway.

"Number of Living Units Protected" is the total number of living units whose external traffic noise level will be reduced to or below  $L_{10}(h)$  70 dbA or  $L_{eq}(h)$  67 dbA by the barrier.

"Adjusted Barrier Cost:" On FAI projects the Adjusted Barrier Cost will equal the total cost of installation minus those portions paid by the Federal Government, Local Government, and others. On FAP and FAS projects the Adjusted Barrier Cost will equal the total cost of installation minus those portions paid by the Local Government, and others. (Financial participation by Local Governments, citizen groups, homeowner associations and others are to be encouraged, where appropriate, as a means to reduce the denominator in the Priority Formula above and thereby achieve a higher priority.)

- E. Where structures post-dating route adoption are intermixed with those pre-dating route adoption, as a general rule, no distinction will be made. All will be considered as warranting protection. Judgement, however, will be required in deciding whether or not to treat high ratio mixes of post-date to pre-date structures and the extent of barrier to install, if any.
- F. The noise abatement benefits must be judged to outweigh the overall social, economic, and environmental effects of the project.
- G. There must be no foreseeable, future public need for the highway right-of-way on which the noise barrier is to be erected.

## V. NOISE BARRIER CONSTRUCTION AND PERFORMANCE SPECIFICATIONS

For purposes of safety, economy, esthetics and effective noise abatement any noise barrier constructed by the Department will meet the following requirements:

- A. A minimum decrease in the  $L_{10}$  noise level of 6 dbA must be achieved at the protected human activity facility nearest the barrier.
- B. An earth mound, if constructed, shall blend with existing slopes and shall provide for continued proper drainage. A sound barrier wall, whether constructed on top of an earth mound, or in lieu of an earth mound, or the toe of any earth mound having slopes steeper than 1:4, should not be closer than 30 ft from the edge of pavement. At locations where a barrier wall is to be placed on a fill section or in a narrow right-of-way a lesser distance may be permitted.
- C. The front slope of an earth mound having its toe 50 ft or less from the edge of pavement, may be no steeper than 1 on 3. This slope may be increased to 1 on 2 if the beginning of the mound is 50 ft or more from the edge of pavement. The back slope of the mound may be 1 on 2 or any slope that will stand if it is outside the right-of-way.
- D. Slopes steeper than 1 on 2 must be sodded.
- E. Erosion control and turf establishment on all slopes shall be in accordance with the Standard Specifications and current Department practices.
- F. If the right-of-way fence must be removed and replaced, it shall be replaced in a condition equal to the existing fence; and shall be installed at the right-of-way line. If excess property owned by the Department is involved, the fence shall be installed at either the foot of the slope on the property owner side or, at the far end of the excess property line, whichever is closest to the roadway. (There could be cases where adjacent excess property, by itself, is sufficient to accommodate the earth fill.)
- G. Construction of any barrier shall not obstruct existing drainage, unless alternate drainage is provided. Adequate precaution shall be taken to prevent sediment from entering adjacent watercourses. Sediment must be removed from the road ditch at the conclusion of construction of the barrier.

- H. Any slopes damaged during the course of barrier construction shall be smoothed and restored and the entire highway facility shall be restored to pre-barrier construction condition.
- I. Where existing utilities must be adjusted or relocated due to noise barrier construction the work shall be coordinated with the affected utilities.

VI FUNDING NOISE BARRIER PROJECTS:

Funding for noise barriers will be arranged by the Department as follows:

- A. Federal Highway Administration participation as applicable: FHPM 7-7-3, 12.C.(1)

"The Federal share for noise abatement measures on Type II projects shall be the same as that for the Federal-aid system on which the project is located. For Type II projects on the Interstate System (including completed sections), the Federal share shall be from Federal-aid Interstate Funds."

- B. Local government participation as indicated by resolution and as required by state law.
- C. Department participation as applicable.



Location(s) and Height(s) 4,350 lin ft long, 18 ft high relative to reference plans.\*  
Structure will extend from Sta. 1432 southerly. In addition to the 4,350 lin ft length,  
a 100 lin ft step-down section should be added to each end.

Decibel decrease at facility nearest barrier (at least 6 dbA) At least 10 dbA  
Measured intrusiveness (L<sub>10</sub> - L<sub>90</sub>).

Before Barrier \_\_\_\_\_ After Barrier \_\_\_\_\_  
Unable to predict "After"—2 ft height additive will insure that "After" intrusiveness does  
not exceed "Before".

V. CRITERIA FOR ACTION AND PRIORITY:

Local government advised of requirements \_\_\_\_\_  
Resolution received \_\_\_\_\_  
Documentation on land use control received \_\_\_\_\_  
Evaluation of controls \_\_\_\_\_

VI. PRIORITY DETERMINATION:

Date development platted 1915, 8-30-21, 12-26-46, 11-16-56  
Date Department officially notified public of route adoption \_\_\_\_\_

Date of construction contract award 11-13-56

Priority determined (circle one):

Priority 1: Development that existed or was under development before the date that the  
Department officially notified the public of the adoption of the route location  
of the highway project.

Priority 2: Development platted after route adoption but before the date of construction  
contract award.

Priority 3: Development platted after date of construction contract award.

Within each of the above priorities, highest consideration will be given to development  
experiencing the highest noise levels. To differentiate between areas of similar noise level,  
the following is used:

$$\text{Priority Factor} = \frac{\text{Achievable Reduction} \times \text{Number of Living Units Protected}}{\text{Adjusted Barrier Cost (in \$1,000)}}$$

$$= \frac{(15) \times (76)}{(43.5)} = 26.2$$

\* For elevated or at-grade pavements the reference plane is at the elevation of the pavement  
edge. For depressed pavements the reference plane is at elevation of top of back slope  
(intersection of back slope and normal ground).

VII. OTHER FACTORS:

Ratio of post-date to pre-date structures and assessment of significance \_\_\_\_\_  
Ratio is very small—nearly all structures predate the roadway.

Noise abatement benefits versus social, economic and environmental effects of projects:  
No adverse social or environmental effects are anticipated. Environmental effects will  
be positive in that traffic noise impact to over 76 living units, will be reduced.

Foreseeable future public need for ROW \_\_\_\_\_ None

VIII. ESTIMATED BARRIER COST: \$ 435,000

Funding Sources:	
FHWA	90%: \$391,500
Local Government	---
Department	10%: \$ 43,500
Other	---

IX. EXCEPTIONS: \_\_\_\_\_ None

X. RECOMMENDED DESIGN FACTORS (by T&R):

This is a combined residential-tourist-recreational area. Therefore, the esthetics of the  
noise abatement structure should be given a somewhat more than average emphasis.

The barrier height proposed includes a 2 ft additive to compensate for uncertainty in the  
traffic noise predictor model and in the barrier insertion model, and to insure that the  
site noise intrusiveness (annoyance related L10 - L90) is not increased by the barrier.

A continuing objective in designing noise barriers is to use the earthmound type if at all  
possible. If that type is not feasible (usually because of insufficient R-O-W) the combined  
earthmound-wall type is the next choice. The third choice, and the type usually selected  
because of space constraints, is the wall.

XI. PUBLIC MEETING:

Date and Time \_\_\_\_\_

Location \_\_\_\_\_

Department Representatives \_\_\_\_\_

Community Attendees (number, makeup, identified community spokespersons) \_\_\_\_\_

Program Description (agenda, displays, visual aids, etc.) \_\_\_\_\_

Attendee Response (tone of meeting, comments, criticisms, etc.) \_\_\_\_\_

XII. COMPLIANCE:

As of \_\_\_\_\_ the proposed barrier project described and detailed in the foregoing is deemed to be in compliance with the MDOT Noise Barrier Guidelines, subject to the exceptions of Section IX.

Signed \_\_\_\_\_

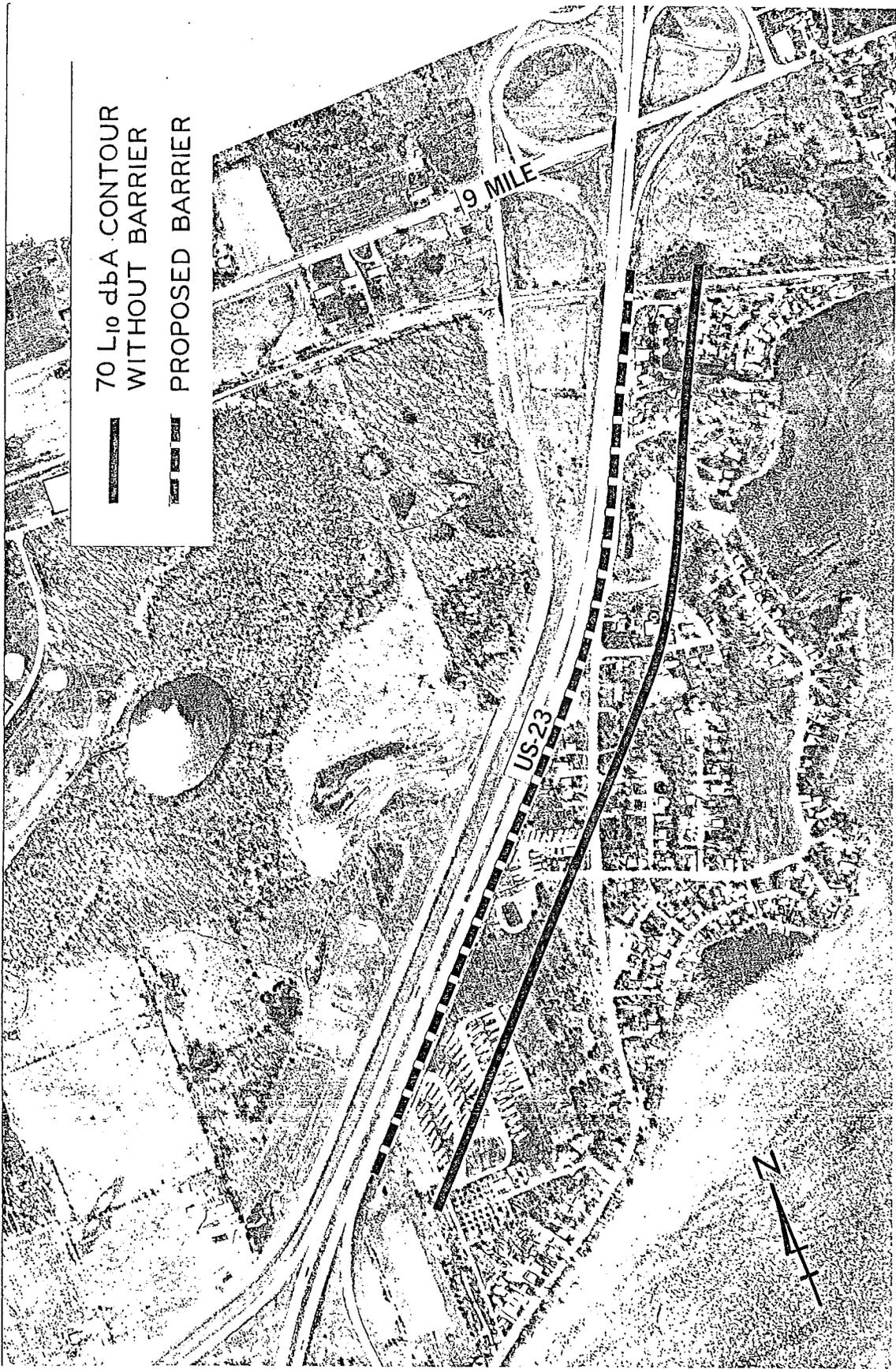


Figure B1. Site 3, northbound US 23, between 8 Mile and 9 Mile, Livingston County.

File Proj. No.: 77 TI-440

Date: August 1979

GUIDELINE COMPLIANCE ASSURANCE FOR  
TYPE II NOISE BARRIER PROJECTS

I. PROJECT INFORMATION:

Job No./Control Section No. /39022, Inventory Site No. 13  
Title Noise Barrier Study for Westbound I 94 Between Sprinkle and Kilgore

Route I 94 Municipality Kalamazoo  
Township -- County Kalamazoo  
Subdivision Milwood/Bloomfield  
Stationing or Other Descriptors See attached aerial photo (Fig. B2).

Initiation By MDOT from Group 1 of Statewide Freeway Noise Level Inventory. Request from City of Kalamazoo (November 14, 1977).

II. COMMENTS: (Inventory rank, traffic, route changes, or other present or future special problems) This project is No. 2 on the District 7 Inventory ranking and No. 13 on the Statewide ranking. The proposed barrier will protect a group of single-family houses adjacent to I 94.

III. NOISE ANALYSIS:

Noise analysis completed confirming that FHPM 7-7-3 design noise level is being exceeded, and range of noise levels occurring Inventory prediction = L<sub>10</sub> 84 dbA at the R-O-W. Noise measurements on April 25, 1978 at R-O-W fence: L<sub>10</sub> 81 dbA and L<sub>eq</sub> 78 dbA. 1978 traffic data resulted in a predicted L<sub>10</sub> 83 dbA at the R-O-W.

Design noise level anticipated to be exceeded during period 9:00 PM - 6:00 AM based upon predicted nighttime traffic. Yes  No

Day-night use typical No evidence to the contrary.

IV. BARRIER INFORMATION:

Design Objective(s) To reduce the L<sub>10</sub> traffic noise level by a minimum of 13 dbA at the nearest human activity area with an esthetically acceptable barrier wall.

Proposed Type(s) Wall or wall atop low mound. Material of wall construction preferably low maintenance concrete.

Location(s) and Height(s) 2,900 lin ft long, 17 ft high relative to reference plane.\*  
Structure will extend from ramp Sta. 91 northeasterly. In addition to the 2,900 lin ft length, a 100 lin ft step-down section should be added to each end.

Decibel decrease at facility nearest barrier (at least 6 dbA) At least 10 dbA  
Measured intrusiveness (L<sub>10</sub> - L<sub>90</sub>).

Before Barrier meas. (81-65) = 16 dbA After Barrier \_\_\_\_\_  
Unable to predict "After" - 2 ft height additive will insure that "After" intrusiveness does not exceed "Before."

V. CRITERIA FOR ACTION AND PRIORITY:

Local government advised of requirements \_\_\_\_\_

Resolution received \_\_\_\_\_

Documentation on land use control received \_\_\_\_\_

Evaluation of controls \_\_\_\_\_

VI. PRIORITY DETERMINATION:

Date development platted 7-15-50, 2-27-53, 6-13-25

Date Department officially notified public of route adoption \_\_\_\_\_

Date of construction contract award 2-28-56

Priority determined (circle one):

Priority 1: Development that existed or was under development before the date that the Department officially notified the public of the adoption of the route location of the highway project.

Priority 2: Development platted after route adoption but before the date of construction contract award.

Priority 3: Development platted after date of construction contract award.

Within each of the above priorities, highest consideration will be given to development experiencing the highest noise levels. To differentiate between areas of similar noise level, the following is used:

$$\text{Priority Factor} = \frac{\text{Achievable Reduction} \times \text{Number of Living Units Protected}}{\text{Adjusted Barrier Cost (in \$1,000)}}$$

$$= \frac{(14) \times (50)}{(26.1)} = 26.8$$

\* For elevated or at-grade pavements the reference plane is at the elevation of the pavement edge. For depressed pavements the reference plane is at elevation of top of back slope (intersection of back slope and normal ground).

VII. OTHER FACTORS:

Ratio of post-date to pre-date structures and assessment of significance \_\_\_\_\_  
Ratio is very small—most structures predate roadway.

Noise abatement benefits versus social, economic and environmental effects of projects:  
No adverse social or environmental effects are anticipated. Environmental effects will  
be positive in that traffic noise impact to over 50 living units will be reduced.

Foreseeable future public need for ROW \_\_\_\_\_ None

VIII. ESTIMATED BARRIER COST: \$ 290,000

Funding Sources:	
FHWA	90%: \$261,000
Local Government	1%: \$ 2,900
Department	9%: \$ 26,100
Other	---

IX. EXCEPTIONS: \_\_\_\_\_ None

X. RECOMMENDED DESIGN FACTORS (by T&R):

This is a residential area. Therefore, the esthetics of the noise abatement structure  
should be given a somewhat more than average emphasis.

The barrier height proposed here includes a 2 ft additive to compensate for uncertainty in  
the traffic noise predictor model and in the barrier insertion model, and to insure that the  
site noise intrusiveness (annoyance related L10 - L90) is not increased by the barrier.

A continuing objective in designing noise barriers is to use the earthmound type if at all  
possible. If that type is not feasible (usually because of insufficient R-O-W) the combined  
earthmound-wall type is the next choice. The third choice, and the type usually selected  
because of space constraints, is the wall.



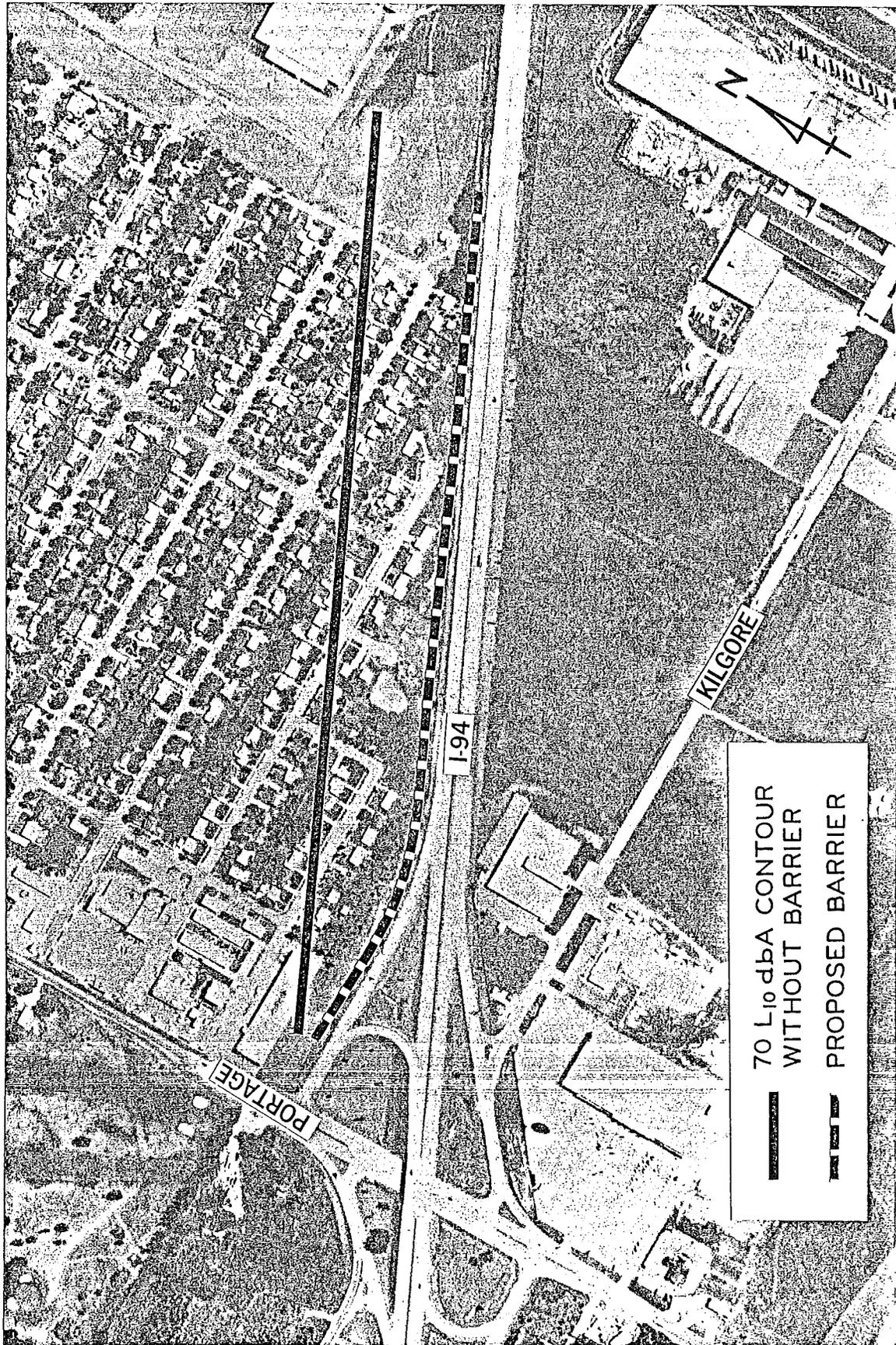


Figure B2. Site 13, westbound I 94, between Sprinkle and Kilgore, Kalamazoo County.



Location(s) and Height(s) 2,750 lin ft long, 17 ft high relative to reference plane.\*  
Structure will extend from ramp Sta. 85 southwesterly. In addition to the 2,750 lin ft length, a 100 lin ft step-down section should be added to each end.

Decibel decrease at facility nearest barrier (at least 6 dbA) At least 10 dbA  
Measured intrusiveness (L<sub>10</sub> - L<sub>90</sub>).

Before Barrier \_\_\_\_\_ After Barrier \_\_\_\_\_  
Unable to predict "After" = 2 ft height additive will insure that "After" intrusiveness does not exceed "Before".

V. CRITERIA FOR ACTION AND PRIORITY:

Local government advised of requirements \_\_\_\_\_  
Resolution received \_\_\_\_\_  
Documentation on land use control received \_\_\_\_\_  
Evaluation of controls \_\_\_\_\_

VI. PRIORITY DETERMINATION:

Date development platted 8-22-45, 8-22-49  
Date Department officially notified public of route adoption \_\_\_\_\_

Date of construction contract award 7-28-56

Priority determined (circle one):

Priority 1: Development that existed or was under development before the date that the Department officially notified the public of the adoption of the route location of the highway project.

Priority 2: Development platted after route adoption but before the date of construction contract award.

Priority 3: Development platted after date of construction contract award.

Within each of the above priorities, highest consideration will be given to development experiencing the highest noise levels. To differentiate between areas of similar noise level, the following is used:

$$\text{Priority Factor} = \frac{\text{Achievable Reduction} \times \text{Number of Living Units Protected}}{\text{Adjusted Barrier Cost (in \$1,000)}} \\ = \frac{(13) \times (28)}{(24.75)} = 14.7$$

\* For elevated or at-grade pavements the reference plane is at the elevation of the pavement edge. For depressed pavements the reference plane is at elevation of top of back slope (intersection of back slope and normal ground).

VII. OTHER FACTORS:

Ratio of post-date to pre-date structures and assessment of significance \_\_\_\_\_  
Ratio is very small, nearly all homes predate the highway.

Noise abatement benefits versus social, economic and environmental effects of projects:  
No adverse social or environmental effects are anticipated. Environmental effects will  
be positive in that traffic noise impact to over 28 living units will be reduced.

Foreseeable future public need for ROW None

VIII. ESTIMATED BARRIER COST: \$ 275,000

Funding Sources:

FHWA	90%: \$247,500
Local Government	1%: \$ 2,750
Department	9%: \$ 24,750
Other	---

IX. EXCEPTIONS: None

X. RECOMMENDED DESIGN FACTORS (by T&R):

This is a residential area. Therefore, the esthetics of the noise abatement structure  
should be given a somewhat more than average emphasis.

The barrier height proposed here includes a 2 ft additive to compensate for uncertainty in  
the traffic noise predictor model and in the barrier insertion model, and to insure that the  
site noise intrusiveness (annoyance related L10 - L90) is not increased by the barrier.

A continuing objective in designing noise barriers is to use the earthmound type if at all  
possible. If that type is not feasible (usually because of insufficient R-O-W) the combined  
earthmound-wall type is the next choice. The third choice, and the type usually selected  
because of space constraints, is the wall.

XI. PUBLIC MEETING:

Date and Time \_\_\_\_\_

Location \_\_\_\_\_

Department Representatives \_\_\_\_\_

Community Attendees (number, makeup, identified community spokespersons) \_\_\_\_\_

Program Description (agenda, displays, visual aids, etc.) \_\_\_\_\_

Attendee Response (tone of meeting, comments, criticisms, etc.) \_\_\_\_\_

XII. COMPLIANCE:

As of \_\_\_\_\_ the proposed barrier project described and detailed in the foregoing is deemed to be in compliance with the MDOT Noise Barrier Guidelines, subject to the exceptions of Section IX.

Signed \_\_\_\_\_

File Proj. No.: 77 TI-437

Date: August 1979

GUIDELINE COMPLIANCE ASSURANCE FOR  
TYPE II NOISE BARRIER PROJECTS

I. PROJECT INFORMATION:

Job No./Control Section No. /39022, Inventory Site Nos. 41 and 47  
Title Noise Barrier Study for Eastbound I 94 Between Lovers Lane and Portage

Route I 94 Municipality Portage

Township - County Kalamazoo

Subdivision \_\_\_\_\_

Stationing or Other Descriptors See attached aerial photo (Fig. B3).

Initiation By MDOT from Group 1 of Statewide Freeway Noise Level Inventory. Request from Mrs. J. Hartley to District Engineer, F. R. Russell.

II. COMMENTS: (Inventory rank, traffic, route changes, or other present or future special problems) This project consists of two sites (Nos. 8 and 10 in the District 7 Inventory ranking and Nos. 41 and 47 in the Statewide ranking). The proposed barrier will protect a group of single-family houses adjacent to I 94.

III. NOISE ANALYSIS:

Noise analysis completed confirming that FHPM 7-7-3 design noise level is being exceeded, and range of noise levels occurring Inventory prediction = L<sub>10</sub> 83 dbA at the R-O-W. Noise measurements on April 25, 1978 at R-O-W fence: L<sub>10</sub> 78 dbA and L<sub>eq</sub> 76 dbA. 1978 traffic data resulted in a predicted L<sub>10</sub> 82 dbA at the R-O-W.

Design noise level anticipated to be exceeded during period 9:00 PM - 6:00 AM based upon predicted nighttime traffic. Yes X No \_\_\_\_\_

Day-night use typical No evidence to the contrary.

IV. BARRIER INFORMATION:

Design Objective(s) To reduce the L<sub>10</sub> traffic noise level by a minimum of 12 dbA at the nearest human activity area with an esthetically acceptable barrier wall.

Proposed Type(s) Wall or wall atop low mound. Material of wall construction preferably low maintenance concrete.

Location(s) and Height(s) 3,400 lin ft long, 17 ft high relative to reference plane.\*  
Structure will extend from ramp A Sta. 29 southwesterly. In addition to the 3,400 lin ft  
length, a 100 lin ft step-down section should be added to each end.

Decibel decrease at facility nearest barrier (at least 6 dbA) At least 10 dbA  
Measured intrusiveness (L<sub>10</sub> - L<sub>90</sub>).

Before Barrier meas. (78-65) = 13 dbA After Barrier \_\_\_\_\_  
Unable to predict "After" - 2 ft height additive will insure that "After" intrusiveness  
does not exceed "Before".

V. CRITERIA FOR ACTION AND PRIORITY:

Local government advised of requirements \_\_\_\_\_  
Resolution received \_\_\_\_\_  
Documentation on land use control received \_\_\_\_\_  
Evaluation of controls \_\_\_\_\_

VI. PRIORITY DETERMINATION:

Date development platted 10-4-29, 3-6-26, 8-22-45

Date Department officially notified public of route adoption \_\_\_\_\_

Date of construction contract award 7-28-56

Priority determined (circle one):

**Priority 1:** Development that existed or was under development before the date that the Department officially notified the public of the adoption of the route location of the highway project.

Priority 2: Development platted after route adoption but before the date of construction contract award.

Priority 3: Development platted after date of construction contract award.

Within each of the above priorities, highest consideration will be given to development experiencing the highest noise levels. To differentiate between areas of similar noise level, the following is used:

$$\text{Priority Factor} = \frac{\text{Achievable Reduction} \times \text{Number of Living Units Protected}}{\text{Adjusted Barrier Cost (in \$1,000)}}$$

$$= \frac{(13) \times (39)}{(30.4)} = 16.7$$

\* For elevated or at-grade pavement the reference plane is at the elevation of the pavement edge. For depressed pavements the reference plane is at elevation of top of back slope (intersection of back slope and normal ground).

VII. OTHER FACTORS:

Ratio of post-date to pre-date structures and assessment of significance \_\_\_\_\_  
Ratio is very small, nearly all homes predate highway.

Noise abatement benefits versus social, economic and environmental effects of projects:  
No adverse social or environmental effects are anticipated. Environmental effects will  
be positive in that traffic noise impact to over 39 living units will be reduced.

Foreseeable future public need for ROW \_\_\_\_\_ None

VIII. ESTIMATED BARRIER COST: \$ 340,000

Funding Sources:

FHWA	90%: \$306,000
Local Government	1%: \$ 3,400
Department	9%: \$ 30,400
Other	---

IX. EXCEPTIONS: \_\_\_\_\_ None

X. RECOMMENDED DESIGN FACTORS (by T&R):

This is a residential area. Therefore, the esthetics of the noise abatement structure  
should be given a somewhat more than average emphasis.

The barrier height proposed here included a 2 ft additive to compensate for uncertainty in  
the traffic noise predictor model and in the barrier insertion model, and to insure that the  
site noise intrusiveness (annoyance related L<sub>10</sub> - L<sub>90</sub>) is not increased by the barrier.

A continuing objective in designing noise barriers is to use the earthmound type if at all  
possible. If that type is not feasible (usually because of insufficient R-O-W) the combined  
earthmound-wall type is the next choice. The third choice, and the type usually selected  
because of space constraints, is the wall.

XI. PUBLIC MEETING:

Date and Time \_\_\_\_\_

Location \_\_\_\_\_

Department Representatives \_\_\_\_\_

Community Attendees (number, makeup, identified community spokespersons) \_\_\_\_\_

Program Description (agenda, displays, visual aids, etc.) \_\_\_\_\_

Attendee Response (tone of meeting, comments, criticisms, etc.) \_\_\_\_\_

XII. COMPLIANCE:

As of \_\_\_\_\_ the proposed barrier project described and detailed in the foregoing is deemed to be in compliance with the MDOT Noise Barrier Guidelines, subject to the exceptions of Section IX.

Signed \_\_\_\_\_

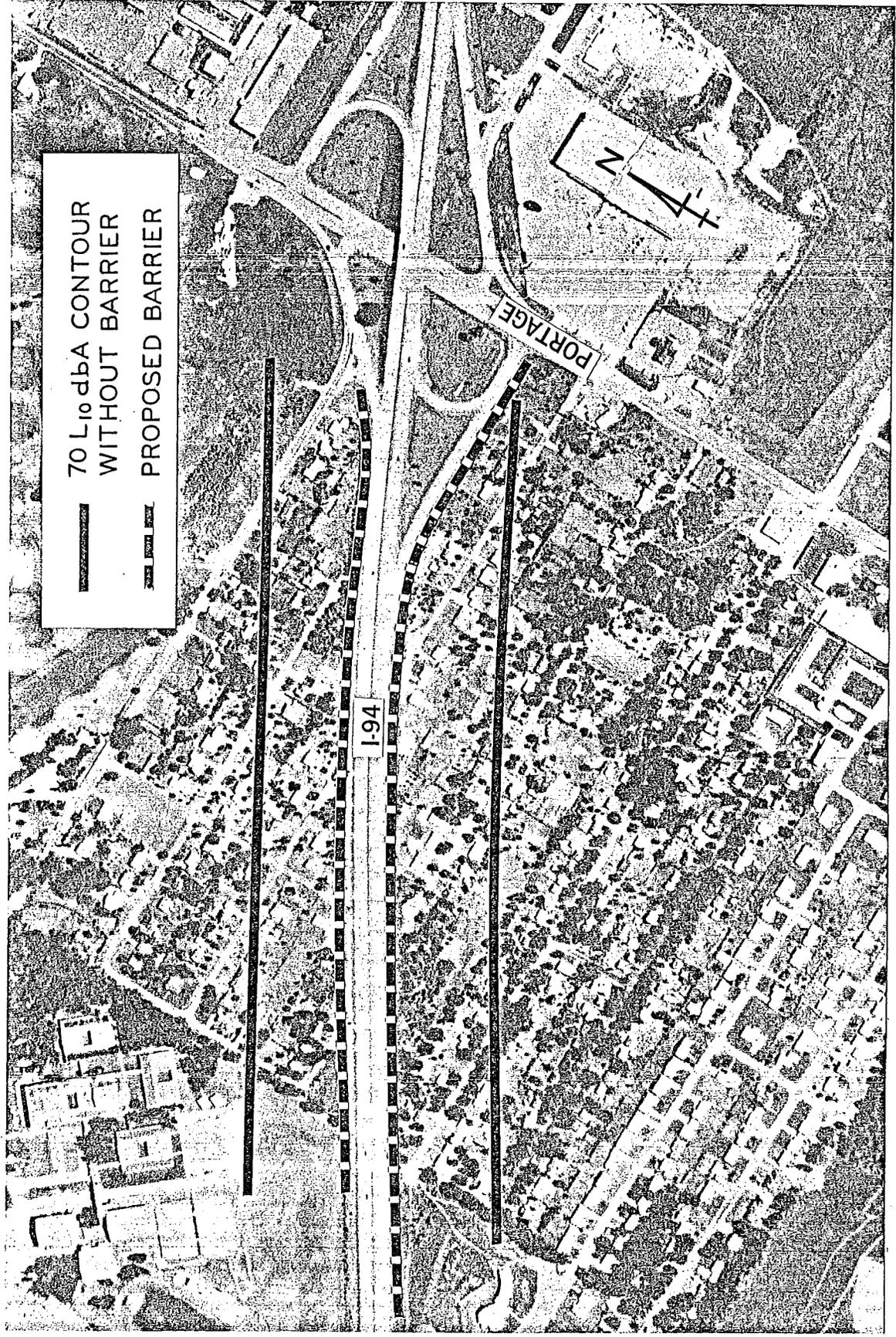


Figure B3. Site 30, westbound I 94 and Sites 41, 47, eastbound I 94, between Portage and Lovers Lane, Kalamazoo County.

File Proj. No.: 78 TI-487

Date: August 1979

GUIDELINE COMPLIANCE ASSURANCE FOR TYPE II NOISE BARRIER PROJECTS

I. PROJECT INFORMATION:

Job No./Control Section No. /82194, Inventory Site No. 67

Title Noise Barrier Study for Northbound I 75 Between Cicotte and Outer Drive

Route I 75 Municipality Lincoln Park

Township -- County Wayne

Subdivision

Stationing or Other Descriptors See attached aerial photo (Fig. B4).

Initiation By MDOT from Group 1 of Statewide Freeway Noise Level Inventory.

II. COMMENTS: (Inventory rank, traffic, route changes, or other present or future special problems)

This project consists of a single site (No. 12 in the Metro District Inventory ranking and No. 67 in the Statewide ranking). The proposed barrier will protect a group of single-family houses adjacent to I 75.

III. NOISE ANALYSIS:

Noise analysis completed confirming that FHPM 7-7-3 design noise level is being exceeded, and range of noise levels occurring Inventory prediction = L10 82 dbA at the R-O-W. 1978 traffic data resulted in a predicted L10 83 dbA at the R-O-W.

Design noise level anticipated to be exceeded during period 9:00 PM - 6:00 AM based upon predicted nighttime traffic. Yes X No

Day-night use typical No evidence to the contrary.

IV. BARRIER INFORMATION:

Design Objective(s) To reduce the L10 traffic noise level by a minimum of 13 dbA at the nearest human activity area with an esthetically acceptable barrier wall.

Proposed Type(s) Wall or wall atop low mound. Material of wall construction preferably low maintenance concrete.

Location(s) and Height(s) 2,000 lin ft long, 19 ft high relative to reference plane.\*  
Structure will extend from University northerly along the Outer Drive exit ramp to  
LaFayette. In addition, a 100 lin ft step-down section should be added to each end.

Decibel decrease at facility nearest barrier (at least 6 dbA) At least 10 dbA  
Measured intrusiveness (L<sub>10</sub> - L<sub>90</sub>).

Before Barrier \_\_\_\_\_ After Barrier \_\_\_\_\_  
Unable to predict "After" - 2 ft height additive will insure that "After" intrusiveness  
does not exceed "Before".

V. CRITERIA FOR ACTION AND PRIORITY:

Local government advised of requirements \_\_\_\_\_

Resolution received \_\_\_\_\_

Documentation on land use control received \_\_\_\_\_

Evaluation of controls \_\_\_\_\_

VI. PRIORITY DETERMINATION: C. W. Harrahs Pennsylvania RR Sub, 2-24;

Date development platted Des Harnais Garden Sub, 2-39; Lincoln Park Assessor's Plat #3, 5-3

Date Department officially notified public of route adoption \_\_\_\_\_

Date of construction contract award 9-24-64

Priority determined (circle one):

Priority 1: Development that existed or was under development before the date that the Department officially notified the public of the adoption of the route location of the highway project.

Priority 2: Development platted after route adoption but before the date of construction contract award.

Priority 3: Development platted after date of construction contract award.

Within each of the above priorities, highest consideration will be given to development experiencing the highest noise levels. To differentiate between areas of similar noise level, the following is used:

$$\text{Priority Factor} = \frac{\text{Achievable Reduction} \times \text{Number of Living Units Protected}}{\text{Adjusted Barrier Cost (in \$1,000)}}$$

$$= \frac{(13) \times (22)}{(18.0)} = 15.9$$

\* For elevated or at-grade pavements the reference plane is at the elevation of the pavement edge. For depressed pavements the reference plane is at elevation of top of back slope (intersection of back slope and normal ground).

VII. OTHER FACTORS:

Ratio of post-date to pre-date structures and assessment of significance \_\_\_\_\_  
All homes predate roadway construction.

Noise abatement benefits versus social, economic and environmental effects of projects:  
No adverse social or environmental effects are anticipated. Environmental effects  
will be positive in that traffic noise impact to over 22 living units will be reduced.

Foreseeable future public need for ROW \_\_\_\_\_ None

VIII. ESTIMATED BARRIER COST: \$ 200,000

Funding Sources:

FHWA	90%: \$180,000
Local Government	1%: \$ 2,000
Department	9%: \$ 18,000
Other	---

IX. EXCEPTIONS: \_\_\_\_\_ None

X. RECOMMENDED DESIGN FACTORS (by T&R):

This is a residential area. Therefore, the esthetics of the noise abatement structure  
should be given a somewhat more than average emphasis.

The barrier height proposed here included a 2 ft additive to compensate for uncertainty in  
the traffic noise predictor model and in the barrier insertion model, and to insure that the  
site noise intrusiveness (annoyance related L<sub>10</sub> - L<sub>90</sub>) is not increased by the barrier.

A continuing objective in designing noise barriers is to use the earthmound type if at all  
possible. If that type is not feasible (usually because of insufficient R-O-W) the combined  
earthmound-wall type is the next choice. The third choice, and the type usually selected  
because of space constraints, is the wall.

XI. PUBLIC MEETING:

Date and Time \_\_\_\_\_

Location \_\_\_\_\_

Department Representatives \_\_\_\_\_

Community Attendees (number, makeup, identified community spokespersons) \_\_\_\_\_

Program Description (agenda, displays, visual aids, etc.) \_\_\_\_\_

Attendee Response (tone of meeting, comments, criticisms, etc.) \_\_\_\_\_

XII. COMPLIANCE:

As of \_\_\_\_\_ the proposed barrier project described and detailed in the foregoing is deemed to be in compliance with the MDOT Noise Barrier Guidelines, subject to the exceptions of Section IX.

Signed \_\_\_\_\_



Figure B4. Site 67, northbound I 75, between Cicotte and Outer Dr, Wayne County.

File Proj. No.: 78 TI-496

Date: August 1979

GUIDELINE COMPLIANCE ASSURANCE FOR TYPE II NOISE BARRIER PROJECTS

I. PROJECT INFORMATION:

Job No./Control Section No. /82194, Inventory Site Nos. 78, 94, 138
Title Noise Barrier Study for Northbound I 75 Between Outer Drive and Schaefer

Route I 75 Municipality Detroit

Township -- County Wayne

Subdivision Fort Pepper, Ries Estates, Hannan's American Park

Stationing or Other Descriptors See attached aerial photo (Fig. B5).

Initiation By MDOT from Group 1 of Statewide Freeway Noise Level Inventory. Request from Mrs. J. Joubert to District Engineer, P. Riley, May 1978.

II. COMMENTS: (Inventory rank, traffic, route changes, or other present or future special problems) This project consists of three sites (Nos. 15, 22, and 52 in the Metro District Inventory ranking and Nos. 78, 94, and 138 in the Statewide ranking). The proposed barrier will protect a group of single-family houses adjacent to I 75.

III. NOISE ANALYSIS:

Noise analysis completed confirming that FHPM 7-7-3 design noise level is being exceeded, and range of noise levels occurring Inventory prediction = L10 81, 82 dbA at the R-O-W. Noise measurements on July 31, 1978 at R-O-W at 12:40 p.m.: L10 75 dbA and Leq 72 dbA. 1978 traffic data resulted in a predicted L10 83, 84, 82 dbA at the R-O-W for Sites 78, 94, and 138, respectively.

Design noise level anticipated to be exceeded during period 9:00 PM - 6:00 AM based upon predicted nighttime traffic. Yes X No

Day-night use typical No evidence to the contrary.

IV. BARRIER INFORMATION:

Design Objective(s) To reduce the L10 traffic noise level by a minimum of 12 to 14 dbA at the nearest human activity area with an esthetically acceptable barrier wall.

Proposed Type(s) Wall or wall atop low mound. Material of wall construction preferably low maintenance concrete.

Location(s) and Height(s) A variable height (19 ft down to 16 ft). Barrier wall located at R-O-W from Sta. 910 to Sta. 967+75 (5,700 lin ft). In addition, a 100 lin ft step-down section will be added to each end. The barrier height is relative to the reference plane.\*

Decibel decrease at facility nearest barrier (at least 6 dbA) At least 10 dbA  
Measured intrusiveness (L<sub>10</sub> - L<sub>90</sub>).

Before Barrier meas. (75-65) = 10 dbA After Barrier \_\_\_\_\_  
Unable to predict "After" - 2 ft height additive will insure that "After" intrusiveness does not exceed "Before".

V. CRITERIA FOR ACTION AND PRIORITY:

Local government advised of requirements \_\_\_\_\_

Resolution received \_\_\_\_\_

Documentation on land use control received \_\_\_\_\_

Evaluation of controls \_\_\_\_\_

VI. PRIORITY DETERMINATION: Fort Pepper Sub., 10-11-24;

Date development platted Ries Estates Sub., 7-31-26; Hannan's American Park Sub., 9-15-1

Date Department officially notified public of route adoption \_\_\_\_\_

Date of construction contract award 9-24-64

Priority determined (circle one):

Priority 1: Development that existed or was under development before the date that the Department officially notified the public of the adoption of the route location of the highway project.

Priority 2: Development platted after route adoption but before the date of construction contract award.

Priority 3: Development platted after date of construction contract award.

Within each of the above priorities, highest consideration will be given to development experiencing the highest noise levels. To differentiate between areas of similar noise level, the following is used:

Priority Factor =  $\frac{\text{Achievable Reduction} \times \text{Number of Living Units Protected}}{\text{Adjusted Barrier Cost (in\$1,000)}}$

$$= \frac{(12) \times (290)}{(51.3)} = 67.8$$

\* For elevated or at-grade pavements the reference plane is at the elevation of the pavement edge. For depressed pavements the reference plane is at elevation of top of back slope (intersection of back slope and normal ground).

VII. OTHER FACTORS:

Ratio of post-date to pre-date structures and assessment of significance \_\_\_\_\_  
All structures predate highway.

Noise abatement benefits versus social, economic and environmental effects of projects:  
No adverse social or environmental effects are anticipated. Environmental effects  
will be positive in that traffic noise impact to over 290 living units will be reduced.

Foreseeable future public need for ROW \_\_\_\_\_ None

VIII. ESTIMATED BARRIER COST: \$ 570,000

Funding Sources:

FHWA	90%: \$513,000
Local Government	1%: \$ 5,700
Department	9%: \$ 51,300
Other	---

IX. EXCEPTIONS: None

X. RECOMMENDED DESIGN FACTORS (by T&R):

This is a residential area. Therefore, the esthetics of the noise abatement structure  
should be given a somewhat more than average emphasis.

The barrier height proposed here included a 2 ft additive to compensate for uncertainty  
in the traffic noise predictor model and in the barrier insertion model, and to insure that  
the site noise intrusiveness (annoyance related L10 - L90) is not increased by the barrier.

A continuing objective in designing noise barriers is to use the earthmound type if at all  
possible. If that type is not feasible (usually because of insufficient R-O-W) the combined  
earthmound-wall type is the next choice. The third choice, and the type usually selected  
because of space constraints, is the wall.

XI. PUBLIC MEETING:

Date and Time \_\_\_\_\_

Location \_\_\_\_\_

Department Representatives \_\_\_\_\_

Community Attendees (number, makeup, identified community spokespersons) \_\_\_\_\_

Program Description (agenda, displays, visual aids, etc.) \_\_\_\_\_

Attendee Response (tone of meeting, comments, criticisms, etc.) \_\_\_\_\_

XII. COMPLIANCE:

As of \_\_\_\_\_ the proposed barrier project described and detailed in the foregoing is deemed to be in compliance with the MDOT Noise Barrier Guidelines, subject to the exceptions of Section IX.

Signed \_\_\_\_\_

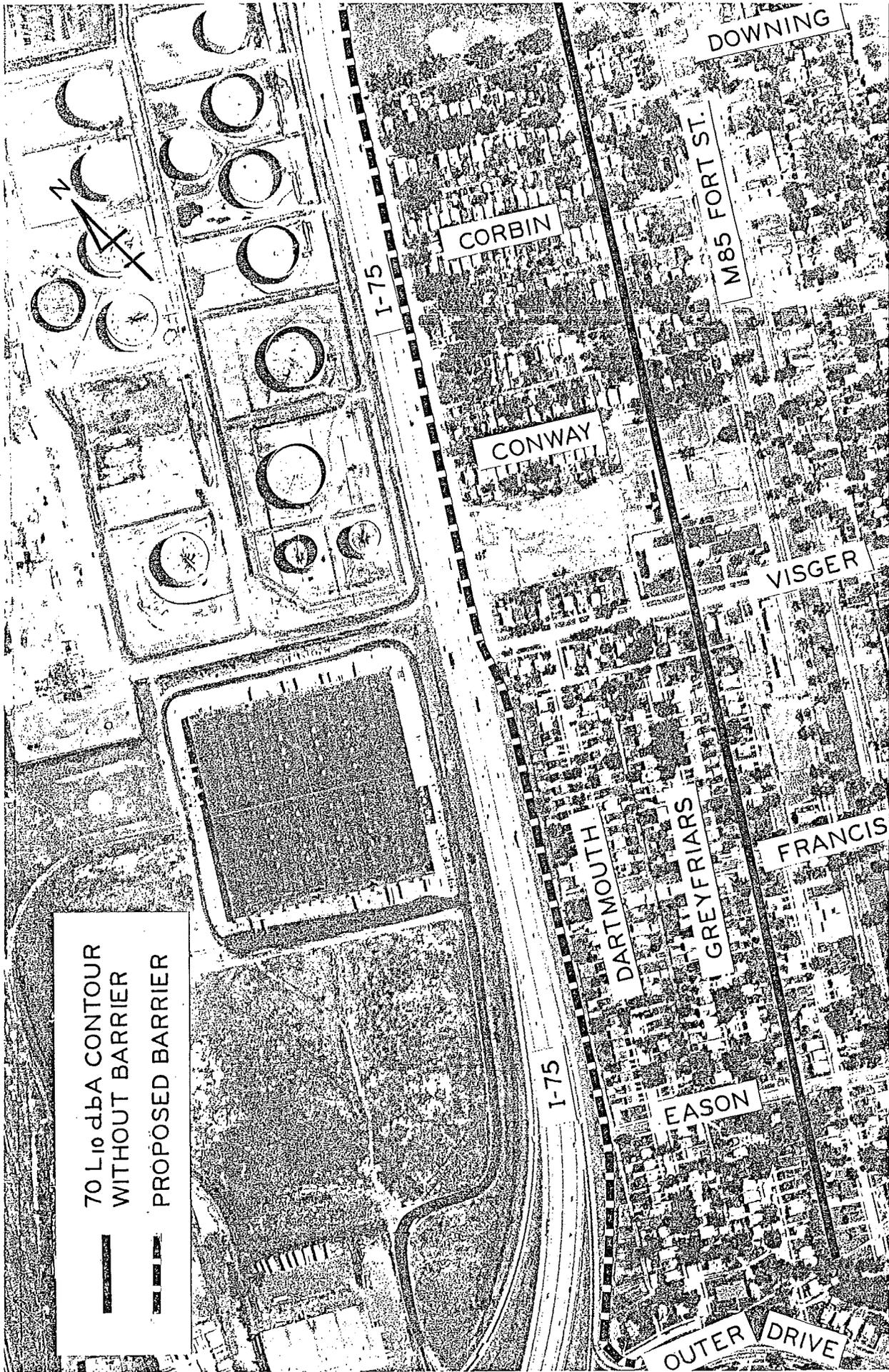


Figure B5. Sites 78, 94, and 138, northbound between Outer Dr and Schaefer.

File Proj. No.: 79 TI-571

Date: August 1979

GUIDELINE COMPLIANCE ASSURANCE FOR TYPE II NOISE BARRIER PROJECTS

I. PROJECT INFORMATION:

Job No./Control Section No. /82022, Inventory Site No. 143
Title Noise Barrier Study for Westbound I-94 Between Wick and Wayne Roads

Route I 94 Municipality Romulus
Township -- County Wayne
Subdivision Wyndclift
Stationing or Other Descriptors See attached aerial photo (Fig. B6).

Initiation By MDOT from Group 1 of Statewide Freeway Noise Level Inventory. Petition for noise barrier from City of Romulus, March 1979.

II. COMMENTS: (Inventory rank, traffic, route changes, or other present or future special problems) This project consists of Site No. 54 in the Metro District Inventory ranking and No. 143 in the Statewide ranking. The proposed barrier will protect a group of single-family houses adjacent to I 94.

III. NOISE ANALYSIS:

Noise analysis completed confirming that FHPM 7-7-3 design noise level is being exceeded, and range of noise levels occurring Inventory prediction = L10 81 dbA at the R-O-W. Measured L10 81 dbA and Leq 78 dbA at nearest subdivision area. 1978 traffic data resulted in a predicted L10 80 dbA at the R-O-W.

Design noise level anticipated to be exceeded during period 9:00 PM - 6:00 AM based upon predicted nighttime traffic. Yes X No

Day-night use typical No evidence to the contrary.

IV. BARRIER INFORMATION:

Design Objective(s) To reduce the L10 traffic noise level by a minimum of 10 dbA at the nearest human activity area with an esthetically acceptable barrier wall.

Proposed Type(s) Wall or wall atop low mound. Material of wall construction preferably low maintenance concrete.

Location(s) and Height(s) 15 ft high barrier wall along R-O-W from Sta. 32+50 (westbound exit ramp) to 152+00, 1 94. Approximately 3,150 lin ft. In addition a 100 lin ft step-down section will be added to each end. The barrier height is relative to the reference plane.\*

Decibel decrease at facility nearest barrier (at least 6 dbA) At least 10 dbA.  
Measured intrusiveness (L<sub>10</sub> - L<sub>90</sub>).

Before Barrier meas. (81-70) = 11 dbA After Barrier \_\_\_\_\_  
Unable to predict "After" - 2 ft height additive will insure that "After" intrusiveness does not exceed "Before".

V. CRITERIA FOR ACTION AND PRIORITY:

Local government advised of requirements \_\_\_\_\_  
Resolution received \_\_\_\_\_  
Documentation on land use control received \_\_\_\_\_  
Evaluation of controls \_\_\_\_\_

VI. PRIORITY DETERMINATION:

Date development platted Plat recorded August 2, 1965  
Date Department officially notified public of route adoption \_\_\_\_\_

Date of construction contract award Initial 5-7-42, last major reconstruction 3-4-66.  
Priority determined (circle one): Resurfaced and upgraded 9-12-55.

Priority 1: Development that existed or was under development before the date that the Department officially notified the public of the adoption of the route location of the highway project.

Priority 2: Development platted after route adoption but before the date of construction contract award.

Priority 3: Development platted after date of construction contract award.

Within each of the above priorities, highest consideration will be given to development experiencing the highest noise levels. To differentiate between areas of similar noise level, the following is used:

Priority Factor =  $\frac{\text{Achievable Reduction} \times \text{Number of Living Units Protected}}{\text{Adjusted Barrier Cost (in \$1,000)}}$

=  $\frac{(11) \times (50)}{(28.35)} = 19.4$

\* For elevated or at-grade pavements the reference plane is at the elevation of the pavement edge. For depressed pavements the reference plane is at elevation of top of back slope (intersection of back slope and normal ground).

VII. OTHER FACTORS:

Ratio of post-date to pre-date structures and assessment of significance Nearly all homes predate reconstruction.

Noise abatement benefits versus social, economic and environmental effects of projects: No adverse social or environmental effects are anticipated. Environmental effects will be positive in that traffic noise impact to over 50 living units will be reduced.

Foreseeable future public need for ROW None

VIII. ESTIMATED BARRIER COST: \$ 315,000

Funding Sources:

FHWA	<u>90%: \$283,500</u>
Local Government	<u>1%: \$ 3,150</u>
Department	<u>9%: \$ 28,350</u>
Other	<u>---</u>

IX. EXCEPTIONS: None

X. RECOMMENDED DESIGN FACTORS (by T&R):

This is a residential area. Therefore, the esthetics of the noise abatement structure should be given a somewhat more than average emphasis.

The barrier height proposed here included a 2 ft additive to compensate for uncertainty in the traffic noise predictor model and in the barrier insertion model, and to insure that the site noise intrusiveness (annoyance related L10 - L90) is not increased by the barrier.

A continuing objective in designing noise barriers is to use the earthmound type if at all possible. If that type is not feasible (usually because of insufficient R-O-W) the combined earthmound-wall type is the next choice. The third choice, and the type usually selected because of space constraints, is the wall.

XI. PUBLIC MEETING:

Date and Time \_\_\_\_\_

Location \_\_\_\_\_

Department Representatives \_\_\_\_\_

Community Attendees (number, makeup, identified community spokespersons) \_\_\_\_\_

Program Description (agenda, displays, visual aids, etc.) \_\_\_\_\_

Attendee Response (tone of meeting, comments, criticisms, etc.) \_\_\_\_\_

XII. COMPLIANCE:

As of \_\_\_\_\_ the proposed barrier project described and detailed in the foregoing is deemed to be in compliance with the MDOT Noise Barrier Guidelines; subject to the exceptions of Section IX.

Signed \_\_\_\_\_

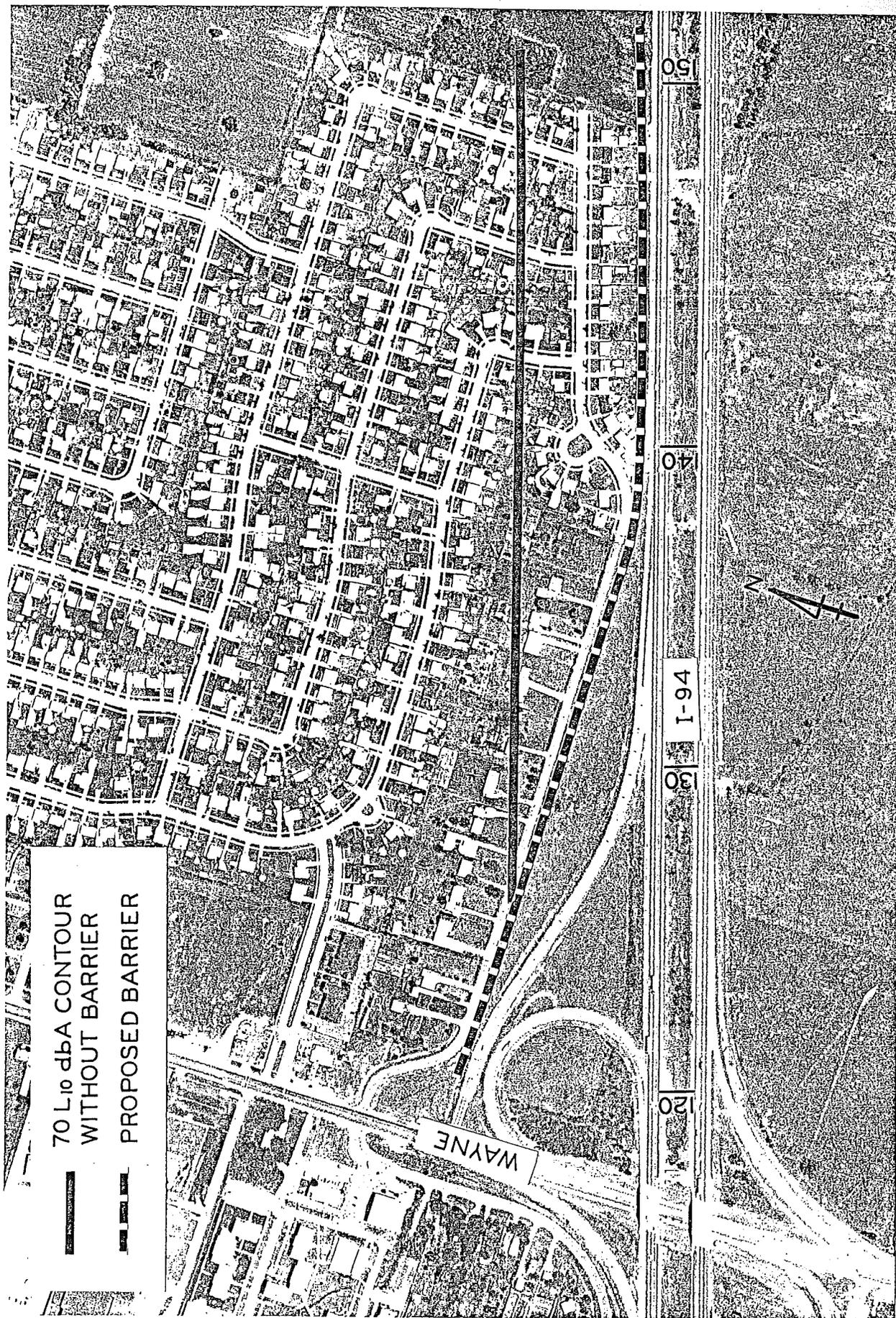


Figure B6. Site 143, westbound between Wick and Wayne Rd.

File Proj. No.: 78 TI-527

Date: August 1979

GUIDELINE COMPLIANCE ASSURANCE FOR  
TYPE II NOISE BARRIER PROJECTS

I. PROJECT INFORMATION:

Job No./Control Section No. /82191, Inventory Site No. 151  
Title Noise Barrier Study for Southbound I 75 Between Woodruff and Huron River Drive

Route I 75 Municipality Rockwood  
Township -- County Wayne  
Subdivision \_\_\_\_\_  
Stationing or Other Descriptors See attached aerial photo (Fig. B7).

Initiation By MDOT from Group 1 of Statewide Freeway Noise Level Inventory. Original noise complaint by resolution of City of Rockford, June 19, 1974. Reinitiated October 3, 1978 by call from Ms. B. Highley to J. P. Woodford.

II. COMMENTS: (Inventory rank, traffic, route changes, or other present or future special problems) This project consists of a single site (No. 57 in the District 8 Inventory ranking and No. 151 in the Statewide ranking). The proposed barrier will protect a group of single-family houses adjacent to I 75.

III. NOISE ANALYSIS:

Noise analysis completed confirming that FHPM 7-7-3 design noise level is being exceeded, and range of noise levels occurring Inventory prediction = L<sub>10</sub> 80 dbA at the R-O-W.  
Noise measurements December 18, 1978 (3:00 p.m.) produced levels of L<sub>10</sub> 78 dbA and L<sub>eq</sub> 75 dbA. 1978 traffic data resulted in a predicted L<sub>10</sub> 79 dbA at the R-O-W.

Design noise level anticipated to be exceeded during period 9:00 PM - 6:00 AM based upon predicted nighttime traffic. Yes X No \_\_\_\_\_  
Predicted SSH L<sub>10</sub> 75 dbA  
Day-night use typical No evidence to the contrary.

IV. BARRIER INFORMATION:

Design Objective(s) To reduce the L<sub>10</sub> traffic noise level by a minimum of 10 dbA at the nearest human activity area with an esthetically acceptable barrier wall.

Proposed Type(s) Wall or wall atop low mound. Material of wall construction preferably low maintenance concrete.

Location(s) and Height(s) 14 ft high barrier wall along R-O-W fence from Sta. 1351+00 southerly to Sta. 7+00 on ramp A. Approximately 2,355 lin ft. In addition a 100 ft step-down section will be added to each end. The barrier height is relative to the reference plane.\*

Decibel decrease at facility nearest barrier (at least 6 dbA) At least 10 dbA  
Measured intrusiveness (L<sub>10</sub> - L<sub>90</sub>).

Before Barrier \_\_\_\_\_ After Barrier \_\_\_\_\_  
Unable to predict "After" - 2 ft height additive will insure that "After" intrusiveness does not exceed "Before".

V. CRITERIA FOR ACTION AND PRIORITY:

Local government advised of requirements \_\_\_\_\_

Resolution received \_\_\_\_\_

Documentation on land use control received \_\_\_\_\_

Evaluation of controls \_\_\_\_\_

VI. PRIORITY DETERMINATION:

No. 1 - 7-6-59 ; No. 2 - 10-6-59

Date development platted Huron River Gardens Sub. : No. 3 - 7-14-60; No. 4 - 3-28-69

Date Department officially notified public of route adoption \_\_\_\_\_

Date of construction contract award Initial construction 10-13-54 and 5-7-56

Priority determined (circle one): Reconstruction widening 10-10-72

Priority 1: Development that existed or was under development before the date that the Department officially notified the public of the adoption of the route location of the highway project.

Priority 2: Development platted after route adoption but before the date of construction contract award.

Priority 3: Development platted after date of construction contract award.

Within each of the above priorities, highest consideration will be given to development experiencing the highest noise levels. To differentiate between areas of similar noise level, the following is used:

$$\text{Priority Factor} = \frac{\text{Achievable Reduction} \times \text{Number of Living Units Protected}}{\text{Adjusted Barrier Cost (in \$1,000)}}$$

$$= \frac{(10) \times (60)}{(23.55)} = 25.5$$

\* For elevated or at-grade pavements the reference plane is at the elevation of the pavement edge. For depressed pavements the reference plane is at elevation of back slope (intersection of back slope and normal ground).

VII. OTHER FACTORS:

Ratio of post-date to pre-date structures and assessment of significance \_\_\_\_\_  
All homes predate 1972 reconstruction and widening to three lanes per direction. Extra lane brought I 75 traffic closer to resident's homes.

Noise abatement benefits versus social, economic and environmental effects of projects:  
No adverse social or environmental effects are anticipated. Environmental effects will be positive in that traffic noise impact to over 61 living units will be reduced.

Foreseeable future public need for ROW \_\_\_\_\_ None

VIII. ESTIMATED BARRIER COST: \$ 235,500

Funding Sources:	
FHWA	90%: \$211,950
Local Government	---
Department	10%: \$ 23,550
Other	---

IX. EXCEPTIONS: \_\_\_\_\_ None

X. RECOMMENDED DESIGN FACTORS (by T&R):

This is a residential area. Therefore, the esthetics of the noise abatement structure should be given a somewhat more than average emphasis.

The barrier height proposed here included a 2 ft additive to compensate for uncertainty in the traffic noise predictor model and in the barrier insertion model, and to insure that the site noise intrusiveness (annoyance related L10 - L90) is not increased by the barrier.

A continuing objective in designing noise barriers is to use the earthmound type if at all possible. If that type is not feasible (usually because of insufficient R-O-W) the combined earthmound-wall type is the next choice. The third choice, and the type usually selected because of space constraints, is the wall.

XI. PUBLIC MEETING:

Date and Time \_\_\_\_\_

Location \_\_\_\_\_

Department Representatives \_\_\_\_\_

Community Attendees (number, makeup, identified community spokespersons) \_\_\_\_\_

Program Description (agenda, displays, visual aids, etc.) \_\_\_\_\_

Attendee Response (tone of meeting, comments, criticisms, etc.) \_\_\_\_\_

XII. COMPLIANCE:

As of \_\_\_\_\_ the proposed barrier project described and detailed in the foregoing is deemed to be in compliance with the MDOT Noise Barrier Guidelines, subject to the exceptions of Section IX.

Signed \_\_\_\_\_

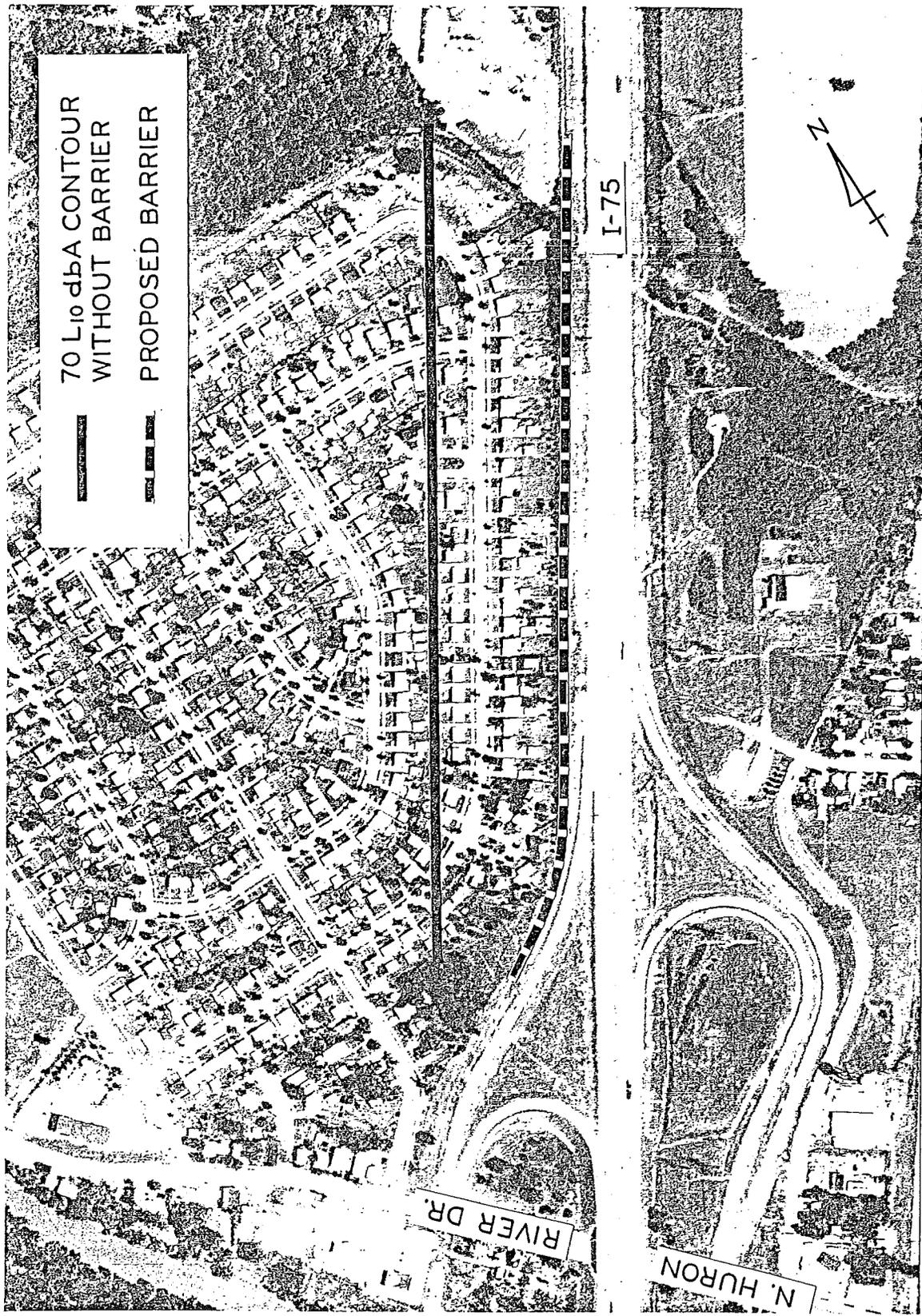


Figure B7. Site 151, southbound I 75, between Woodruff and Huron River Dr.



## OFFICE MEMORANDUM

DATE: December 12, 1979

TO: K. A. Allemeier  
Engineer of Testing and Research

FROM: G. M. Smith

SUBJECT: Stimsonite Delineators  
Research Project 78 NM-588, Research Report No. R-1131

This is in response to J. J. Kanillopoulos' June 12, 1979 request to test the subject delineators (marked Stimsonite Model No. 962-001). Photometric tests, sealing tests, and heat or warping tests were conducted. The seal between the front face and the supporting back face was considered satisfactory. The delineator showed no evidence of water intake after being submerged in water in a pressurized container at 2.5 psi for 15 minutes.

Results from a heat test which subjected the delineator to a 125 F temperature for four hours showed no loss in photometric performance of the delineator. Initial specific luminance values for the delineator are shown in Table 1. Entrance angle and orientation angle geometries are shown in Figure 1 for information purposes.

The Model 962 delineator, as shown in Figure 2, houses its delineator face at a 10° angle. Center mount delineators rotated to the same 10° angle provide about the same reflective intensity performance as the Model 962 delineator.

Mounted on a barrier wall, the Stimsonite delineator would protrude about 2-1/2 in. from the barrier, and therefore, is highly susceptible to impact damage. A relatively short service life can be expected.

Experimental barrier wall installations can be recommended with the reservation that a short service life is expected. The Model 962 delineator cannot be expected to provide the optical performance for limited viewing distance delineators—less than the 400 ft recommended and shown in Table 2.

This evaluation of the Stimsonite delineator may be compared with the results for Astro Optics delineators, Research Report No. R-1110, and for NFS Industries delineators, Research Report No. R-1111, both dated March 28, 1979.

TESTING AND RESEARCH DIVISION

*George M. Smith*  
Supervisor - Photometry Group

GMS:bf

TABLE 1  
INITIAL SPECIFIC LUMINANCE OF STIMSONITE DELINEATOR

Divergence Angle	Specific Luminance, cd/ftc/unit at 0.2 Degree Divergence																						
	+							-															
	Entrance Angle																						
	70	60	50	40	35	30	25	20	15	10	5	0	5	10	15	20	25	30	35	40	50	60	70
0.2°	--	0.2	2.1	39.4	55.5	70.2	81.7	88.4	91.7	91.7	91.7	88.6	76.9	61.4	47.3	14.4	4.1	1.5	0.5	0.1	--	--	--

TABLE 2  
OPTICAL PERFORMANCE OF LIMITED  
VIEWING DISTANCE DELINEATORS

Color	Specific Luminance, Candela Per Footcandle Per Unit At 0.2 Degree Divergence Angle		
	Entrance Angle, degrees		
	0	+20	+60
Crystal	25	25	25
Yellow	15	15	15

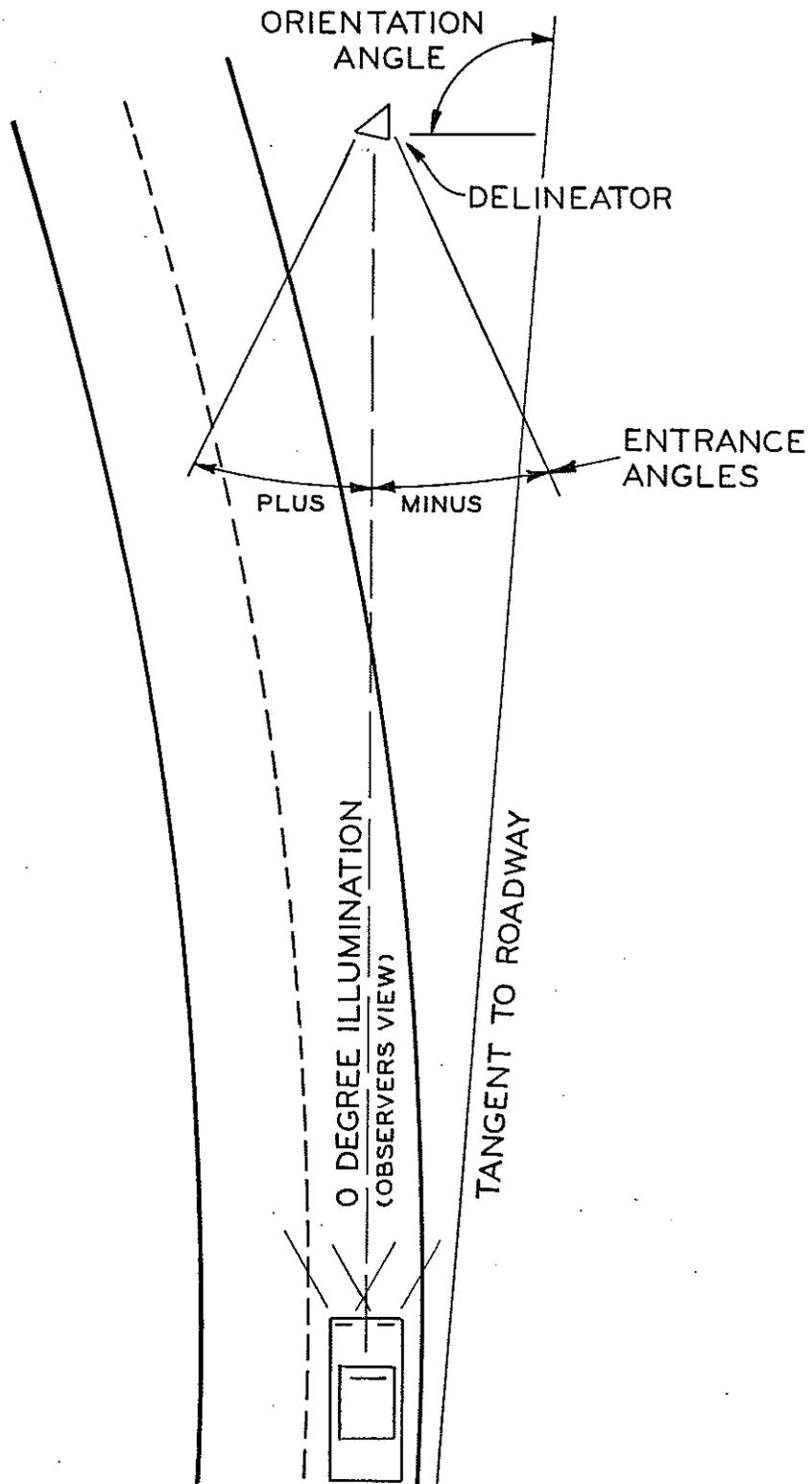


Figure 1. Delineator entrance angle and orientation angle geometries.

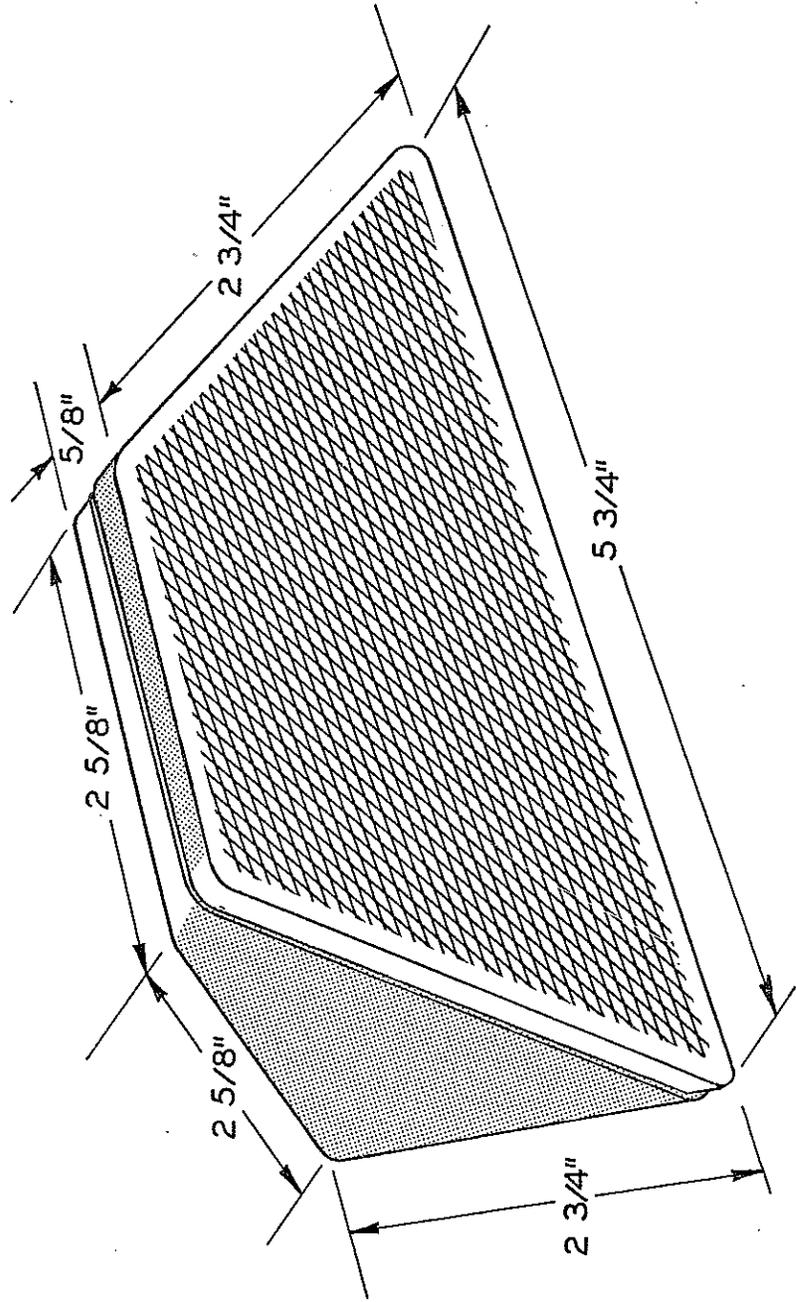


Figure 2. Stimsonite delineator, Model 962.