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## **MISSISSIPPI DEPARTMENT OF TRANSPORTATION HIGHWAY TRAFFIC NOISE POLICY EFFECTIVE JULY 13, 2011**

### **I. PURPOSE**

The purpose of this document is to provide policies and procedures for the consideration of highway traffic noise and highway traffic noise abatement in the planning, design and construction of highways.

### **II. INTRODUCTION**

The Mississippi Department of Transportation (MDOT) recognizes the adverse effects that highway traffic noise may have on the citizens of Mississippi and will do what is practical to lessen these effects. Noise considerations are a part of the planning, design and construction of highways. During the planning phase, alternate alignments are considered to minimize noise impacts; during design, site specific measures may be proposed to lessen noise impacts; and during construction MDOT is committed to minimizing disruption from construction noise. After all of the above efforts, some locations may still experience noise impact.

Federal requirements for handling noise impacts and abatement are contained in revised title 23 Code of Federal Regulations Part 772 (23 CFR 772), "Procedures for Abatement of Highway Traffic Noise and Construction Noise". MDOT considers the policies and procedures that follow to be consistent with both 23 CFR 772 and the Highway Traffic Noise Analysis and Abatement Guidance issued July 13, 2010, by the Federal Highway Administration (FHWA), Office of Natural Environment. Revised 23 CFR 772 and the guidance are effective July 13, 2011.

Three project types are specified in 23 CFR 772: Type I projects, Type II projects and Type III projects. The three types of projects are defined in 23 CFR 772 as follows:

#### *Type I Project.*

- (1) The construction of a highway on new location; or,
- (2) The physical alteration of an existing highway where there is either:
  - (i) Substantial Horizontal Alteration. A project that hases the distance between the traffic noise source and the closest receptor between the existing condition to the future build condition; or,
  - (ii) Substantial Vertical Alteration. A project that removes shielding therefore exposing the line-of-sight between the receptor and the traffic noise source. This is done by either altering the vertical alignment of the highway or by altering the topography between the highway noise source and the receptor; or,

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- (3) The addition of a through-traffic lane(s). This includes the addition of a through-traffic lane that functions as a HOV lane, High-Occupancy Toll (HOT) lane, bus lane, or truck climbing lane; or,
- (4) The addition of an auxiliary lane, except for when the auxiliary lane is a turn lane; or,
- (5) The addition or relocation of interchange lanes or ramps added to a quadrant to complete an existing partial interchange; or,
- (6) Restriping existing pavement for purpose of adding a through-traffic lane or an auxiliary lane; or,
- (7) The addition of a new or substantial alteration of a weigh station, rest stop, or ride-share lot or toll plaza.
- (8) If a project is determined to be a Type I project under this definition then the entire project area as defined in the environmental document is a Type I project.

*Type II Project.* A Federal or Federal-aid highway project for noise abatement on an existing highway. For a Type II project to be eligible for Federal-aid funding, the highway agency must develop and implement a Type II program in accordance with section 772.7(e).

*Type III Project.* A federal or Federal –aid highway project that does not meet the classifications of a Type I or a Type II project. Type III projects do not require a noise analysis.

A Highway Traffic Noise Impact Study must be conducted for all Type I projects. The MDOT does not develop or implement Type II projects.

In 23 CFR 772, the FHWA offers several examples of possible abatement measures which may be considered if noise impact is expected to occur. These include traffic management measures; alteration of horizontal and vertical alignments; acquisition of property rights for construction of noise barriers; construction of noise barriers; acquisition of property or interest therein to serve as a buffer zone to preempt development which would be adversely impacted by traffic noise; and noise insulation of noise sensitive receptors listed in Activity Category D of Table 1 of 23 CFR 772. States are only required to consider noise barriers by 23 CFR 772; however, the other measures listed may be considered and are also eligible for federal participation.

MDOT endeavors to integrate noise considerations into the selection of alternates and into the horizontal and vertical design of highways. Both vertical and horizontal alignments may be altered to minimize noise impacts where practical. MDOT believes that this is one of the most cost-effective means of reducing the overall noise impacts of a project.

The insulation and/or air conditioning of buildings to meet interior noise standards will only be considered for noise sensitive receptors listed in Activity Category D of Table 1 of 23 CFR 772. The insulation and/or air conditioning of other buildings is not provided for in 23 CFR 772.

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The option presently given the most frequent consideration by MDOT and FHWA for abating noise impacts is the construction of noise barriers on highway rights-of-way in the area between the shoulder and the right-of-way limits. According to 23 CFR 772.13(h) the FHWA will not approve project plans and specifications unless feasible and reasonable noise abatement measures are incorporated into plans and specifications to reduce the noise impact on existing activities, developed lands, or undeveloped lands for which development is permitted. The MDOT considers the detailed policies and procedures contained in SECTION VI of this document to be consistent with FHWA guidance and with 23 CFR 772.

While recognizing that proper planning, design and construction of highways can help reduce the impact of highway traffic noise, MDOT feels that much of the burden for reducing highway traffic noise impact should involve control of vehicular noise at the source and proper land use planning and development to minimize noise sensitive development near highways. Since MDOT does not have any authority over vehicular noise or land use planning and development, MDOT can only encourage local, state and Federal agencies having authority over vehicular noise, land use planning and development to help reduce highway noise impact.

## **III. DEFINITIONS**

(From 23 CFR 772)

*Benefited Receptor.* The recipient of an abatement measure that receives a noise reduction at or above the minimum threshold of 5 dBA, but not to exceed the highway agency's reasonableness design goal.

*Common Noise Environment.* A group of receptors within the same Activity Category in Table 1 that are exposed to similar noise sources and levels; traffic volumes, traffic mix, and speed; and topographic features. Generally, common noise environments occur between two secondary noise sources, such as interchanges, intersections, cross-roads.

*Date of Public Knowledge.* The date of approval of Categorical Exclusion (CE), the finding of No Significant Impact (FONSI), or the Record of Decision (ROD), as defined in 23 CFR 771.

*Design Year.* The future year used to estimate the probable traffic volume for which a highway is designed.

*Existing Noise Levels.* The worst noise hour resulting from the combination of natural and mechanical sources and human activity usually present in a particular area.

*Feasibility.* The combination of acoustical and engineering factors considered in evaluation of a noise abatement measure.

*Impacted Receptor.* The recipient that has a traffic noise impact.

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*L10.* The sound level that is exceeded 10 percent of the time (the 90<sup>th</sup> percentile) of the period under consideration, with L10(h) being the hourly value of L10.

*Leq.* The equivalent steady-state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same time period, with Leq(h) being the hourly value of Leq.

*Multifamily Dwelling.* A residential structure containing more than one residence. Each residence in a multifamily dwelling shall be counted as one receptor when determining impacted and benefited receptors.

*Noise Barrier.* A physical obstruction that is constructed between the highway noise source and the noise sensitive receptor(s) that lowers the noise level, including stand alone noise walls, noise berms (earth and other material), and combination berm/wall systems.

*Noise Reduction Design Goal.* The optimum dBA noise reduction determined from calculating the difference between future build noise levels with abatement, to future build noise levels without abatement. The noise reduction goal shall be at least 7 dBA, but not more than 10 dBA.

*Permitted.* A definite commitment to develop land with an approved specific design of land use activities as evidenced by issuance of a building permit.

*Property Owner.* An individual or group of individuals that holds a title, deed, or other legal documentation of ownership of a property or a residence.

*Reasonableness.* The combination of social, economic, and environmental factors considered in the evaluation of a noise abatement measure.

*Receptor.* A discrete or representative location of a noise sensitive area(s), for any of the land uses listed in Table 1.

*Residence.* A dwelling unit. Either a single family residence or each dwelling unit in a multifamily dwelling.

*Statement of Likelihood.* A statement provided in the environmental clearance document based on the feasibility and reasonableness analysis completed at the time the environmental document is being approved.

*Substantial Construction.* The granting of a building permit, prior to right-of-way acquisition or construction approval for the highway.

*Substantial noise increase.* One of two types of highway traffic noise impacts. For a type I project, an increase in noise levels of 5 to 15 dBA in the design year over the existing noise level.

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*Traffic Noise Impacts.* Design year build condition noise levels that approach or exceed the NAC listed in Table 1 for the future build condition; or design year build condition that create a substantial increase over existing noise levels.

## **IV. HIGHWAY TRAFFIC NOISE IMPACT STUDY**

The MDOT will conduct a Highway Traffic Noise Impact Study for each alternative of Type I projects under detailed study. This study will be re-evaluated and updated during each subsequent phase of project development. The study will include the following:

1. **Identification of existing and planned noise sensitive land uses.** An inventory will be made of all existing activities, developed lands, and undeveloped lands for which development is planned, designed and programmed, which may be affected by noise from the proposed highway. Proposed development will be considered planned, designed and programmed on the date of issuance of building permits. All noise sensitive receptors listed in Activity Categories A, B, C, D, and E of Table 1 of 23 CFR 772 will be included in the inventory. Land uses in Activity Category F of Table 1 of 23 CFR 772 may be included in the inventory if it will contribute to the completeness of the study; however, land uses in Category F are not required to be included in the inventory. Since Mississippi is a rural state with an average of less than 50 noise sensitive receptors along a typical 10 mile long project, the inventory will normally list each, house, place of worship, school, apartment building, or other noise sensitive receptor. However, several trailer houses in a trailer park or other closely spaced noise sensitive receptors having the same noise environment may be grouped.
2. **Determination of existing noise levels.** The determination of existing noise levels at the existing and planned noise sensitive receptors will be made by measuring and/or predicting Leq noise levels for the traffic characteristics which yield the worst hourly traffic noise impact on a regular basis at each noise sensitive receptor. The noise level should normally be determined at the closest point of the noise sensitive receptor to the proposed highway; however, if there is no noise sensitive activity at this location the noise level should be determined at the nearest noise sensitive activity to the highway. Normally at least one measurement will be made for every 20 noise sensitive receptors identified. Each house, place of worship, school, apartment building, etc. will normally be considered to be a separate noise sensitive receptor; however; several trailer houses in a trailer park or other closely spaced noise sensitive receptors having the same noise environment may be grouped. Each noise measurement will be made for a period of at least fifteen minutes with an ANSI Type I or Type II integrating sound level meter or analyzer.

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Predictions will be made using a prediction model approved by the FHWA. The model is validated if measured existing highway traffic noise levels and predicted highway traffic noise levels for the existing condition are within +/-3 dBA.

3. **Prediction of design year noise levels.** The Leq noise levels will be predicted at existing and planned noise sensitive receptors for each alternative under detailed consideration including the no build alternative. The predictions will be made using a prediction method approved by the FHWA. The predictions will be made for the traffic characteristics which yield the worst hourly traffic noise impact on a regular basis. Average pavement type will be used in predicting noise levels unless a different pavement type is approved by the FHWA. Noise contour lines may be used for project alternative screening or for land use planning, but shall not be used for determination of highway traffic noise impacts.
4. **Determination of traffic noise impacts.** Primary consideration will be given to exterior areas where frequent human use occurs. Exterior traffic noise impact will be determined at each existing and planned noise sensitive receptor by comparing the predicted design year noise level with the Noise Abatement Criteria (NAC) of 23 CFR 772 and with the existing noise level. If the predicted design year noise level approaches (comes within 1 dBA) or exceeds the NAC noise impact will occur. Noise impact will also occur if the predicted design year noise level substantially exceeds the existing noise level (15 dBA or greater).
5. **Determination of interior noise impacts.** An indoor analysis shall only be done after exhausting all outdoor analysis options. In situations where no exterior activities will be affected by traffic noise, the interior noise levels shall be used to determine noise impact for noise sensitive receptors in Activity Category D of Table 1 of 23 CFR 772.
6. **Examination and evaluation of alternative noise abatement measures for reducing or eliminating noise impacts.** Noise abatement measures such as traffic management measures, changes in horizontal and vertical alignments, acquisition of property for buffer zones, insulation and/or air conditioning of buildings to meet interior noise standards for sensitive receptors listed in Activity Category D of Table 1 of 23 CFR 772, and construction of noise barriers will be considered. The feasibility and reasonableness of noise barriers is covered in detail in Section VI.
7. **Preparation of noise study report.** A detailed noise study report will be prepared if noise impact is expected to occur at any location along the route of the proposed project. If noise impact is not expected to occur in the vicinity of the proposed project, a detailed noise study report or a short summary type noise study report will be prepared. TNM files and other

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support files should be submitted on electronic media. The following will normally be included in a detailed noise study report:

- INTRODUCTION
- SUMMARY OF RESULTS
- FUNDAMENTALS OF SOUND AND NOISE
- NOISE IMPACT CRITERIA
- NOISE LEVEL MEASUREMENTS
- NOISE LEVEL ESTIMATES
- TRAFFIC
- EXISTING NOISE ENVIRONMENT
- DESIGN YEAR NO-BUILD NOISE ENVIRONME
- DESIGN YEAR BUILD ALTERNATIVE NOISE ENVIRONMENT
- TRAFFIC NOISE ABATEMENT
- CONSTRUCTION NOISE ABATEMENT
- FHWA POLICY REGARDING LAND USE DEVELOPMENT AND FUTURE NOISE ABATEMENT
- TABLE NO. 1                    EXTERIOR NOISE LEVELS
- TABLE NO. 2                    TRAFFIC DATA AND Leq CONTOURS
- MAP                                PROPOSED PROJECT

### **V. COORDINATION WITH LOCAL OFFICIALS**

The lack of consideration of highway traffic noise in land use planning and development at the local level has added to the highway traffic noise problem. Many developments now experiencing high noise levels were constructed adjacent to major highways long after these highways were proposed and constructed. This lack of concern for predictable high noise levels by local planning and zoning agencies and by developers has affected citizens and caused MDOT many problems. Since MDOT does not have any authority over land use planning and development, MDOT can only encourage local officials and developers to consider highway traffic noise in the planning, zoning and development of property near existing and proposed highways. MDOT will send a letter to local officials at least ever two years encouraging them to consider highway traffic noise in land use planning and development. The letter will also encourage local officials to visit the FHWA Highway Traffic Noise website ([www.fhwa.dot.gov/environment/noise/](http://www.fhwa.dot.gov/environment/noise/)) to learn more about Noise Compatible Planning.

In order to help local officials and developers consider highway traffic noise in the vicinity of proposed Type I projects, MDOT will include a copy of the noise study report in the Categorical Exclusion (CE), Environmental Assessment (EA), Finding of No Significant Impact (FONSI) or Environmental Impact Statement (EIS) for the proposed project. The noise study report will contain the distances to the 66 dBA and the 71 dBA contours along each segment of the proposed project. The noise study report will also encourage local officials and developers to visit the FHWA Highway Traffic Noise

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website ([www.fhwa.dot.gov/environment/noise/](http://www.fhwa.dot.gov/environment/noise/)) to learn more about Noise Compatible Planning.

## **VI. FEASIBILITY AND REASONABLENESS OF NOISE BARRIERS** FOR TYPE I HIGHWAY CONSTRUCTION PROJECTS

### **FEASIBILITY**

Feasibility deals with engineering considerations - that is, can a substantial noise reduction be achieved given the conditions of a specific location. Is the ability to achieve noise reduction limited by: (1) topography; (2) animal migratory paths; (3) cultural resources such as historic places; (4) access requirements for driveways, ramps, etc.; (5) maintenance issues and utility encumbrances; (6) the presence of local cross streets; or (7) other noise sources in the area, such as aircraft, trains, or industry? All these considerations affect the ability of noise barriers to achieve an actual noise reduction.

It is state policy that construction of a noise barrier is **NOT FEASIBLE** if a noise reduction of at least 5 dBA cannot be achieved.

### **REASONABLENESS**

Reasonableness is a more subjective criterion than feasibility. It implies that common sense and good judgment have been applied in arriving at a decision. Reasonableness should be based on a number of factors, with regard for all of the individual, specific circumstances of a particular project.

It is state policy that the final determination of reasonableness will be made only after a careful and thorough consideration of a wide range of criteria. However, noise barriers will definitely not be built if a majority of benefited receptors do not want them. During the environmental phase of a project it will be assumed that the benefited receptors will want a noise barrier. During the design phase of the project after the exact location and design of the project have been determined a public meeting will be held to provide detailed information on the design of the project and possible noise barriers. After the public meeting a survey will be conducted of the benefited receptors to determine if they want a noise barrier.

23 CFR 772.13(d)(2)(iv) requires that reasonableness factors 1, 2, and 3 listed below must collectively be achieved in order for a noise abatement measure to be deemed reasonable. Failure to achieve any of the three required reasonableness factors will result in the noise abatement measures being deemed not reasonable. In addition to the required reasonableness factors optional reasonableness factors 4 through 8 listed below may be

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considered. However, no single optional reasonableness factor can be used to determine reasonableness.

1. The construction of a noise barrier is not reasonable unless a majority of residents and property owners of the benefited receptors (receptors that receive a noise reduction of 5 dBA or more from the noise barrier) want a noise barrier even if all other criteria indicate that a noise barrier is reasonable. During the environmental phase of a project it will be assumed that the benefited receptors want a noise barrier. During the design phase of the project a public meeting will be held for residents and owners of benefited receptors. Local officials will also be invited and encouraged to attend this public meeting. After the public meeting a survey will be conducted to determine if the residents and owners of the benefited receptors want a noise barrier. Local officials will be encouraged to consider highway traffic noise in the land use planning process.
2. The construction of a noise barrier is not reasonable if the cost is more than \$30,000 per benefited receptor. The barrier cost will include the cost of construction (material and labor), the cost of additional right-of-way, the additional cost of relocating utilities and any other costs associated with the barrier. The estimated cost of construction (material and labor) will be \$25 per square foot. The allowable cost per benefited receptor and the cost for construction shall be re-analyzed every 5 years. All receptors with noise reductions of 5 dBA or more will be counted. Each house or apartment unit will be counted as one receptor. Every 100 linear feet of frontage will be counted as one receptor when considering parks, active sports areas, campgrounds, cemeteries, and other similar outdoor noise sensitive land uses. For non-residential uses such as schools, places of worship, community centers and auditoriums the following equation will be used to determine the equivalent number of receptors:

$$\begin{aligned} \text{Equivalent No. of Receptors} &= (\text{no. of occupants}/3) \times (\text{usage}) \\ \text{usage} &= (\text{no. of hours used per day}/24) \times (\text{no. of days used per year}/365) \end{aligned}$$

3. Each barrier must reduce the noise level by at least 7 dBA at ten percent or more of the benefited receptors.
4. The construction of a noise barrier is not reasonable if the impacted receptors were not constructed or the building permits were not issued before the date of public knowledge of the project. The date of public knowledge is the date the public is officially notified of the adoption of the location of a proposed highway project. This date is considered to be the date of approval of CEs, FONSI, or RODs when considering highway traffic noise and highway traffic noise abatement.

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5. The date of development of impacted receptors should be an important part of the determination of reasonableness. More consideration will be given to impacted receptors that predated initial highway construction.
6. More consideration will be given to impacted receptors with future build noise levels at or above the 23 CFR 772 Noise Abatement Criteria. Even if the noise levels are expected to increase by more than 15 dBA noise barriers should normally not be constructed unless the future build noise levels are at or above the 23 CFR 772 Noise Abatement Criteria.
7. More consideration will be given to impacted receptors with larger increases over existing noise levels. If the future build noise levels are at least 5 dBA greater than the existing noise levels more consideration will be given.
8. More consideration will be given to areas where larger changes in traffic noise levels are expected to occur if the project is constructed than if it is not. If the future build noise levels are at least 3 dBA greater than the future no-build noise levels additional consideration will be given..

### **VII. EXTENUATING CIRCUMSTANCES**

There may be extenuating circumstances where unique or unusual conditions warrant special consideration of highway traffic noise impacts and/or implementation of noise abatement measures. These circumstances could involve areas such as (1) those that are extremely noise-sensitive, (2) those where severe traffic noise impacts are anticipated, or (3) those containing Section 4(f) resources. Extenuating circumstances will be considered on an individual project basis.

### **VIII. STATEMENT OF LIKELIHOOD**

A statement of the likelihood of noise abatement measures shall be included in the CE, EA FONSI or the EIS for the proposed project. 23 CFR 772.13(g)(3) says, "The environmental document shall identify locations where noise impacts are predicted to occur, where noise abatement is feasible and reasonable, and locations with impacts that have no feasible or reasonable noise abatement alternative. For environmental clearance, this analysis shall be completed to the extent that design information on the alternative(s) under study in the environmental document is available at the time the environmental clearance document is completed. A statement of likelihood shall be included in the environmental document since feasibility and reasonableness determinations may change due to changes in project design after approval of the environmental document. The statement of likelihood shall also indicate that final recommendations on the construction of an abatement measure(s) is determined during the completion of the project's final design and the public involvement process."

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## **IX. INVENTORY OF CONSTRUCTED NOISE BARRIERS**

The Mississippi Department of Transportation shall maintain an inventory of all constructed noise abatement measures. The inventory shall include the following parameters: type of abatement; cost (overall cost, unit cost per/sq. ft.); average height; length; area; location; year of construction; average insertion loss/noise reduction as reported by the model in the noise analysis; NAC category(s) protected; material(s) used; features (absorptive, reflective, surface texture); foundation (ground mounted, on structure); project type(Type I, .Type II, and optional project types such as State funded, county funded, tollway/turnpike funded other, unknown).

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## **NOISE BARRIER EVALUATION FORM**

Proposed Project:  
Location:

### **FEASIBILITY**

Can a 5 dBA noise reduction be achieved at any impacted receptors?

If yes complete the reasonableness section.

If no, a noise barrier should not be constructed. No additional analysis is required.

### **REASONABLENESS**

	<u>Not Reasonable</u>	<u>Marginally Reasonable</u>	<u>Fully Reasonable</u>	<u>Highly Reasonable</u>
<b>REQUIRED FACTORS: *</b>				
1. % of benefited receptors wanting barrier	<u>&lt;50%</u>	<u>50-60%</u>	<u>61-75%</u>	<u>&gt;75%</u>
2. cost/receptor	<u>&gt;\$30K</u>	<u>\$26K-\$30K</u>	<u>\$20K-\$25K</u>	<u>&lt;\$20K</u>
3. % of benefited receptors with 7 dBA noise reduction	<u>&lt;10%</u>	<u>10%-20%</u>	<u>21%-40%</u>	<u>&gt;40%</u>
<b>OPTIONAL FACTORS: **</b>				
4. % developed before public knowledge of proposed project	<u>&lt;20%</u>	<u>20%-30%</u>	<u>31%-40%</u>	<u>&gt;40%</u>
5. % developed before highway constructed	<u>&lt;20%</u>	<u>20%-30%</u>	<u>31%-40%</u>	<u>&gt;40%</u>
6. Build level _____ Noise abatement criteria	<u>less than</u>	<u>equal to</u>	<u>1-3 dBA above</u>	<u>&gt; 4 dBA above</u>
7. Build level ___ dBA Greater than existing	<u>&lt;3dBA</u>	<u>3-4</u>	<u>5-10</u>	<u>&gt;10</u>
8. Build level ___ dBA Greater than no-build	<u>&lt;2dBA</u>	<u>2</u>	<u>3-5</u>	<u>&gt;5</u>

9. ADDITIONAL CONSIDERATIONS: \_\_\_\_\_

DECISION AND REASONS: \_\_\_\_\_

\* 23 CFR 772.13(d)(2)(iv) requires that reasonableness factors 1-3 must each be achieved for a noise abatement measure to be considered reasonable.

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\*\* 23 CFR 772.13(d)(2)(iv) allows consideration of these optional abatement factors, which cannot singly eliminate an abatement measure that meets the requirements of 1-3 above.