# 4. FHWA AND ODOT NOISE ANALYSIS PROCEDURES AND MITIGATION REQUIREMENTS

## 4.1. FEDERAL PROCEDURES AND REQUIREMENTS

Title 23 CFR, Part 772 sets Federal Procedures that must be followed for transportation improvement projects that utilize Federal Funding. The purpose of Title 23 CFR, Part 772 is "To provide procedures for noise studies and noise abatement measures to help protect the public health and welfare, to supply noise abatement criteria, and to establish requirements for information to be given to local officials for use in the planning and design of highways approved pursuant to Title 23 U.S.C." These regulations require consideration of all available noise abatement methods (identified in the introduction of this report) to mitigate noise associated with "Type I" highway projects. As per 23 CFR, 772, a Type I project is a proposed Federal or Federal-aid project for the construction of a highway on new location or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes. These projects generally involve significant roadway improvements that increase the capacity of a given roadway (or place a new roadway on new location), and have the potential to increase noise levels at noise-sensitive land uses in proximity to the roadway corridor.

This regulation also applies to "Type II" projects, which are defined as proposed Federal or Federal-aid highway projects for noise abatement on an existing highway. Type II programs are not mandatory requirements of 23 U.S.C., and not required by this regulation. However, this regulation can be applied to Type II projects, should a given state choose to participate in a Type II program.

**As per 23 CFR, part 772, §772.9 Analysis of traffic noise impacts and abatement measures.**

*(a) The highway agency shall determine and analyze expected traffic noise impacts and alternative noise abatement measures to mitigate these impacts, giving weight to the benefits and cost of abatement, and to the overall social, economic and environmental effects.*

*(b) The traffic noise analysis shall include the following for each alternative under detailed study:*

*(1) Identification of existing activities, developed lands, and undeveloped lands for which development is planned, designed and programmed, which may be affected by noise from the highway;*

*(2) Prediction of traffic noise levels;*

*(3) Determination of existing noise levels;*

*(4) Determination of traffic noise impacts;*

*(5) Examination and evaluation of alternative noise abatement measures for reducing or eliminating the noise impacts.*

*(c) Highway agencies proposing to use Federal-aid highway funds for Type II projects shall perform a noise analysis of sufficient scope to provide information needed to make the determination required by §772.13(a) of this chapter.*

**As per 23 CFR, part 772, §772.11 Noise Abatement**

*(a) In determining and abating traffic noise impacts, primary consideration is to be given to exterior areas. Abatement will usually be necessary only where frequent human use occurs and a lower noise level would be a benefit.*

*(b) In those situations where there are no exterior activities to be affected by traffic noise, or where the exterior activities are far from or physically shielded from the roadway in a manner that prevents an impact on exterior activities, the interior criterion shall be used as the basis of determining noise impacts .*

*(c) If a noise impact is identified, the abatement measures listed in §772.13(c) of this chapter must be considered.*

*(d) When noise abatement measures are being considered, every reasonable effort shall be made to obtain substantial noise reductions.*

*(e) Before adoption of a final environmental impact statement or finding of no significant impact, the highway agency shall identify;*

*(1) Noise abatement measures which are reasonable and feasible and which are likely to be incorporated in the project; and*

*(2) Noise impacts for which no apparent solution is available.*

*(f) The views of the impacted residents will be a major consideration in reaching a decision on the reasonableness of abatement measures to be provided.*

*(g) The plans and specifications will not be approved by FHWA unless those noise abatement measures which are reasonable and feasible are incorporated into the plans and specifications to reduce or eliminate the noise impact on the existing activities, developed lands, or undeveloped lands for which development is planned, designed, and programmed.*

**As per 23 CFR, Part 772, §772.13 Federal Participation.**

*(a) Federal funds may be used for noise abatement measures where:*

*(1) A traffic noise impact has been identified,*

*(2) The noise abatement measures will reduce the traffic noise impact, and*

*(3) The overall noise abatement benefits are determined to outweigh the overall adverse social, economic, and environmental effects and the costs of the noise abatement measures.*

*(b) For Type II projects, noise abatement measures will only be approved for projects that were approved before November 28, 1995, or are proposed along lands where land development or substantial construction predated the existence of any highway. The granting of a building permit, filing of a plat plan, or similar action must have occurred prior to the right-of-way acquisition or construction approval for the original highway. Noise abatement measures will not be approved at locations where such measures were previously determined not to be reasonable and feasible for a Type I project.*

*(c) The noise abatement measures listed below may be incorporated in Type I and Type II projects to reduce traffic noise impacts. The costs of such measures may be included in Federal-aid participating project costs with the Federal share being the same as that for the system on which the project is located.*

*(1) Traffic management measures (e.g., traffic control devices and signing for the prohibition of certain vehicle types, time use restrictions for certain vehicle types, modified speed limits, and exclusive lane designations).*

*(2) Alteration of horizontal and vertical alignments.*

*(3) Acquisition of property rights (either in fee or lesser interest) for construction of noise barriers.*

*(4) Construction of noise barriers (including landscaping for aesthetic purposes) whether within or outside the highway right-of-way.*

*(5) Acquisition of real property or interests therein (predominately unimproved property) to serve as a buffer zone to preempt development which would be adversely impacted by traffic noise. This measure may be included in Type I projects only.*

*(6) Noise insulation of public use nonprofit institutional structures.*

*(d) There may be situations where severe traffic noise impacts exist or are expected, and abatement the abatement measures listed above are physically infeasible or economically unreasonable. In these instances, noise abatement measures other than those listed in paragraph (c) of this section may be proposed for Types I and II projects by the highway agency and approved by the FHWA on a case-by-case basis when the conditions of paragraph (a) of this section have been met.*

Title 23 CFR, Part 772 also provides a table which identifies the noise abatement criteria for a variety of land uses. **Table 3** provides a summary of the FHWA Noise Abatement Criteria.

Traffic noise impacts are considered to occur when predicted traffic noise levels approach or exceed the noise abatement criteria identified in **Table 3**, or when predicted (design year) traffic noise levels substantially exceed the existing noise levels.

**Table 3: NOISE ABATEMENT CRITERIA (NAC)
HOURLY A-WEIGHTED SOUND LEVEL DECIBALS (dBA)**

| Activity Category | Leq(h) | $L_{10}$ | Description of Activity Category |
|---|---|---|---|
| A | 57 (Exterior) | 60 | Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the are is to continue to serve its intended purpose. |
| B | 67 (Exterior) | 70 | Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals. |
| C | 72 (Exterior) | 75 | Developed lands, properties, or activities not included in Categories A or B above. |
| D | | | Undeveloped lands. |
| E | 52 (Interior) | 52 (Interior) | Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums. |

Source: 23 CFR, part 772

It is left up to each individual state to define the level which is considered to "approach" criteria (often a level within 1 dBA of the criteria), as well as to define the level which is considered a "substantial increase above existing levels" (often defined as an increase of 10 dBA or greater between existing and future conditions). **Appendix D** provides a complete copy of Title 23, CFR Part 772.

All state Departments of Transportation must adopt written statewide noise policies that have been approved by FHWA. Statewide policies must demonstrate substantial compliance with the noise regulations, 23 CFR, Part 772, as well as with reissued noise policies and guidance. Draft State Policies are submitted to FHWA for review and comment, and final copies of each State's approved policy are kept on file [4]. Once a State's Noise Policy is approved by FHWA, noise analyses and mitigation commitments for Type I and Type II projects must comply with the State/Federal noise policy to be eligible for the use of federal funds.

## 4.2. STATE PROCEDURES AND REQUIREMENTS

ODOT's noise procedures are documented in Standard Procedures No. 417-001(SP). *Standard Procedures for Analysis and Abatement of Highway Traffic Noise* provides procedural guidelines for the assessment of noise impacts of highway improvement projects during the Preliminary Design and Final Design phases of the Highway Project Development Process. These procedures became effective on July 1, 2005; superseding the previous ODOT Noise Procedures (Policy 417-00(SP)), dated January 17, 2003; however, the procedures are currently being updated. ODOT highway noise impact assessment procedures, noise abatement procedures, coordination requirements, and noise abatement criteria are based on FHWA, Title 23 CFR, Part 772 and the FHWA Guidance entitled *Highway Traffic Noise Analysis and Abatement – Policy and Guidance*, dated June 1995. The ODOT Standard Procedures are applicable to both Federally-funded and 100% State Funded projects. The ODOT noise policy follows the direction of 23 CFR, 772 and further defines the specific interpretation and decision-making criteria applied by ODOT. Below is a summary of ODOT's interpretation of the Federal requirements.

ODOT participates in noise mitigation for State and Federally-funded Type I and Type II projects. ODOT further defines Type I projects as a Federal, Federal-aid, or State-funded highway project for the construction of a highway on a new location or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes and includes auxiliary lanes longer than 1.5 miles. The addition of non through lanes such as ramps, spurs, etc. can create a significant change in the vertical and horizontal alignment, therefore these projects can also be considered Type I projects.

ODOT defines a Type II project as a Federal, Federal-aid, or State-funded project proposed to provide noise abatement at locations that do not meet the Type I project criterion. ODOT's Type II program is currently active, with an operating budget of $5,000,000 per year, funded for the next 10 fiscal years to build Type II noise abatement. The program is funded through the overall ODOT Budget, and includes Federal funding and participation. To ensure that relief from traffic noise is provided first for those people who have experienced the most noise for the longest period of time ODOT utilizes a "Noise Abatement Priority Index (NAPI). The prioritization process considers the magnitude of traffic, the proximity to the highway facility, the length of time the impacts have existed and the density of the development, to ensure a fair and equitable prioritization process. At the time of this report, there are currently 27 projects on the list that are programmed for construction of Type II noise abatement between 2006 and 2015. These 27 projects represent those areas that had the highest NAPI scores of any of the projects included on the state-wide list. More than 150 additional communities/projects remain on the Type II list for future consideration of noise abatement.

As per FHWA and ODOT policy and procedures, when noise impacts are anticipated, noise mitigation techniques are "warranted"; that is, they are required to be considered in an attempt to reduce future noise levels below criteria. Again, **Table 3** provides a summary of the FHWA Noise Abatement Criteria (NAC). As per ODOT, noise impacts occur when the predicted traffic noise levels approach or exceed the NAC (i.e., within one dBA) of the levels

shown in **Table 3**; or when predicted noise levels substantially exceed the existing noise levels, defined as 10 dBA or more. Additionally, ODOT defines an "extraordinary increase" as a noise level increase of 30-dBA or greater between existing and future (design year) conditions. Residences predicted to experience an extraordinary increase due to the construction of a project are eligible to receive special considerations for noise abatement.
When considering noise abatement options for transportation improvement projects, those areas that "warrant" consideration of noise abatement are typically evaluated to determine if any "feasible" and "reasonable" noise mitigation techniques are available. As per FHWA/ODOT guidance, noise mitigation "feasibility" deals primarily with engineering and acoustical considerations. Generally, feasible noise mitigation must provide a minimum of 5 dBA noise level reductions (when compared to unmitigated noise levels) and must not introduce any significant safety, drainage, access, or maintenance issues. While mitigation should achieve a minimum noise reduction of 5 dBA, attempts should be made to achieve "substantial" noise reductions in the average noise level for benefiting dwelling units. The design goal is an 8-dBA average reduction for front-row receptors, where possible [5].

Noise mitigation "reasonableness" is a more subjective criterion than "feasibility" and implies that common sense and good judgment were applied in arriving at a decision. The determination of noise mitigation reasonableness considers many factors including, noise abatement benefits; cost of abatement; views of impacted residences; absolute noise levels; change in noise levels; development along the highway corridor; and environmental impacts of abatement construction. The above listing is not intended to be all encompassing, but rather, to indicate some of the factors that should be considered in determining the reasonableness of proposed noise abatement measures. FHWA stresses that reasonableness should be determined through a rational, open process which utilizes a method flexible enough to meet individual situations yet firm enough to be uniformly and consistently applied [4].

As per ODOT, to be considered reasonable, the cost of noise mitigation cannot exceed $35,000 per benefited residential unit and must be determined to be acceptable to the affected property owners. Noise mitigation which complies with ODOT's allowable cost index and is accepted by affected property owners is typically incorporated into the project design. There is no reasonableness criterion for Special Land Uses, which represent nonprofit institutional noise-sensitive uses such as churches, hospitals, libraries, parks, recreation areas, and schools. ODOT will consider noise abatement for all Special Land Uses on a case by case basis.

If a community opposes the construction of a given noise barrier, the community may alternatively choose vegetation in lieu of a noise barrier. Vegetation is not considered noise abatement and is offered as a visual barrier to the roadway. Spending on vegetation in lieu of a noise barrier is limited to not more than $125 per lineal foot.

These are the main decision-making criteria defined by ODOT policy and procedures. The procedure document also defines many other details, procedures, and specific items to ensure consistent application and decision making throughout the state. Those details have not been expanded upon here; however, a complete copy of the ODOT Noise Procedure has been included in **Appendix E**.

The standards for noise mitigation feasibility and reasonableness are required by FHWA, and specifically defined by ODOT. These standards will be consistently applied and referenced by this study, when considering the potential for "alternative" noise mitigation options to provide feasible and reasonable noise reductions. The noise mitigation measures discussed in subsequent sections of this report are applicable to both Type I and Type II Transportation Improvement Projects within the state of Ohio. However the benefits and costs of a given mitigation measure may vary more significantly between Type I and Type II projects, due to variation in work requirements associated with new construction (Type I) and retrofit (Type II) noise abatement.