UTAH TRANSIT AUTHORITY OFFICE OF CAPITAL SERVICES SOP

No. OCS.01.01

NOISE ASSESSMENT AND MITIGATION

1) Purpose

Noise is a significant concern for communities surrounding transit projects. A complete and accurate assessment of noise levels associated with such projects is expected by all concerned. This SOP provides guidance for completing Noise Assessments associated with Utah Transit Authority's (UTA's) Capital Development Projects, both federally funded and locally funded. This policy is based on procedures outlined in the Federal Transit Authority's (FTA's) Transit Noise and Vibration Impact Assessment Manual, September 2018 (FTA, 2018) ("FTA guidance") and in the Utah Department of Transportation's (UDOT's) Noise Abatement policy (UDOT 08A2-01).

When conducting an environmental study for a proposed Capital Development Project, UTA will assess the potential noise impacts associated with the project according to this policy. The Noise Assessment and mitigation will be determined based on the existing land use (i.e. existing sensitive Receptors) in place at the time the draft environmental document for the project has been completed. The Noise Assessment will be included in a stand-alone 'Noise Study Report' and/or the project's environmental document.

2) Definitions

"Capital Development Project" means a project that expands transit service through construction of new or extended rail lines or bus rapid transit systems; or involves the construction of new or replacement transit-related facilities that include structures (e.g. maintenance facilities, pedestrian bridges, parking structures) or other major infrastructure components (intermodal centers, bus hubs, etc.). Capital Development Projects are not transit-oriented development projects and do not apply to ongoing maintenance, state of good repair, safety and security, or information technology projects, unless those projects fit into the definition of Capital Development Projects.

"Benefitted Receptor" means a noise sensitive Receptor that receives a noise reduction of at least 5 dBA. The number of Benefited Receptors will be used in determining if a noise abatement measure has a reasonable cost. For residential land use, the Receptor is a residence.

"dBA" means A-weighted decibel sound levels that represent the overall noise at a receiver that is adjusted in frequency to approximate typical human hearing sensitivity. dBA is the basic noise unit for transit noise analyses.

"Ldn" means the day-night sound level which describes a receiver's cumulative noise exposure from all events over 24 hours, with greater emphasis on noise occurring during evening and nighttime hours. Events between 10 p.m. and 7 a.m. are increased by 10 dB to account for humans' greater nighttime sensitivity to noise. Ldn is used to assess transit noise for residential land uses.

"Noise Assessment" means the process of evaluating and documenting the potential noise impacts associated with a transit project, considering factors such as existing land use and sensitivity of Receptors.

"Noise Mitigation Measures" mean actions taken to reduce or minimize the adverse noise impacts of a project, including treatments at the noise source, along the propagation path, or at the receiver.

"Receptor" means a discrete or representative location of a noise sensitive area(s). For residential land use, the Receptor is a residence.

3) Standard Operating Procedures

A) Evaluating Noise Impacts.

For proposed Capital Development Projects, UTA will evaluate the project's impacts on the noise-sensitive Receptors that may be affected by the project. There are three categories of noise-sensitive land uses, as defined by the FTA guidance:

- Category 1 - High Sensitivity Land Use. Uses where quiet is an essential element of its intended purpose, such as outdoor concert pavilions, national historic landmarks with considerable outdoor use, and land preserved for serenity and quiet. Recording studios and concert halls are also included in this category.;
- Category 2 - Residential Land Use. Residences and buildings where people sleep, including hotels and hospitals; and
- Category 3 - Institutional Land Use. Institutional land uses with both daytime and evening use including schools, theaters, places of worship, and libraries. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds, and recreational facilities are also included in this category. Active use parks are not considered noise sensitive.

FTA recommends considering three levels of analysis for noise sensitive Receptors, depending upon the type and scale of the project, the stage of project development, and the environmental setting. The three levels include screening, a general assessment, and a detailed assessment. A summary of each level is as follows:

Screening: A screening analysis determines if noise-sensitive land uses (or Receptors) are within a certain distance of the project area. If no such noise-sensitive land uses are present, no further noise analysis is necessary. Based on screening distances between the source of noise and the Receptors given in the FTA guidance, Section 4.3, the necessity of further noise analysis is determined. If further analysis is required, more detailed noise analysis should be performed.

General Assessment: A general Noise Assessment applies to projects that show a potential noise impact as a result of the screening analysis. For various smaller projects, a general assessment may suffice to evaluate noise impacts and to propose mitigation measures when necessary. A general assessment may also be used during the alternatives analysis phase of a project. Once noise-sensitive uses have been identified, ambient noise levels at representative Receptor locations must be measured or estimated. The quantified levels are then compared with projected noise levels to calculate the increase in noise due to the project. Following the FTA guidance, Section 4.4, areas are identified where impacts may occur. Mitigation measures are then identified.

Detailed Assessment: For some projects, a general assessment is not sufficient. If the proposed project is in close proximity to noise-sensitive land uses and substantial impact is indicated, a detailed assessment should be completed. A detailed assessment should also be completed where potentially severe impacts are identified, where projects are near highly noise sensitive sites, or for projects with a high level of scrutiny or controversy. A detailed assessment uses more specific data to predict impacts and assess the effectiveness of mitigation with greater precision. For more information, please refer to the FTA guidance, Section 4.5.

B) Noise Impact Criteria.

In determining the noise impacts from a project, there are two sets of criteria that may be used based on the type of project: the FTA procedures for transit projects, and the Federal Highway Administration (FHWA) noise modeling procedures. In most cases, the FTA procedures will be used for transit projects.

1. Transit Project (Transit Noise Only)

   These projects include bus rapid transit, light rail transit, commuter rail, streetcar, automated guideway transit, and stationary maintenance facilities. Under each of these projects, any noise change associated with the project is strictly from new transit sources, not roadway traffic or other sources, unless the transit project significantly alters either the location or capacity of a roadway. A transit project located adjacent to, or in the median of a roadway would be considered a transit project. The FTA procedures will apply to these types of projects.

   The FTA criteria are given for outdoor noise exposure according to land use category. This includes thresholds for "Severe" and "Moderate" noise impacts based on a comparison of project noise levels (not total future noise levels) and existing noise levels or a noise exposure increase (see Figures 1, 2, and 3).

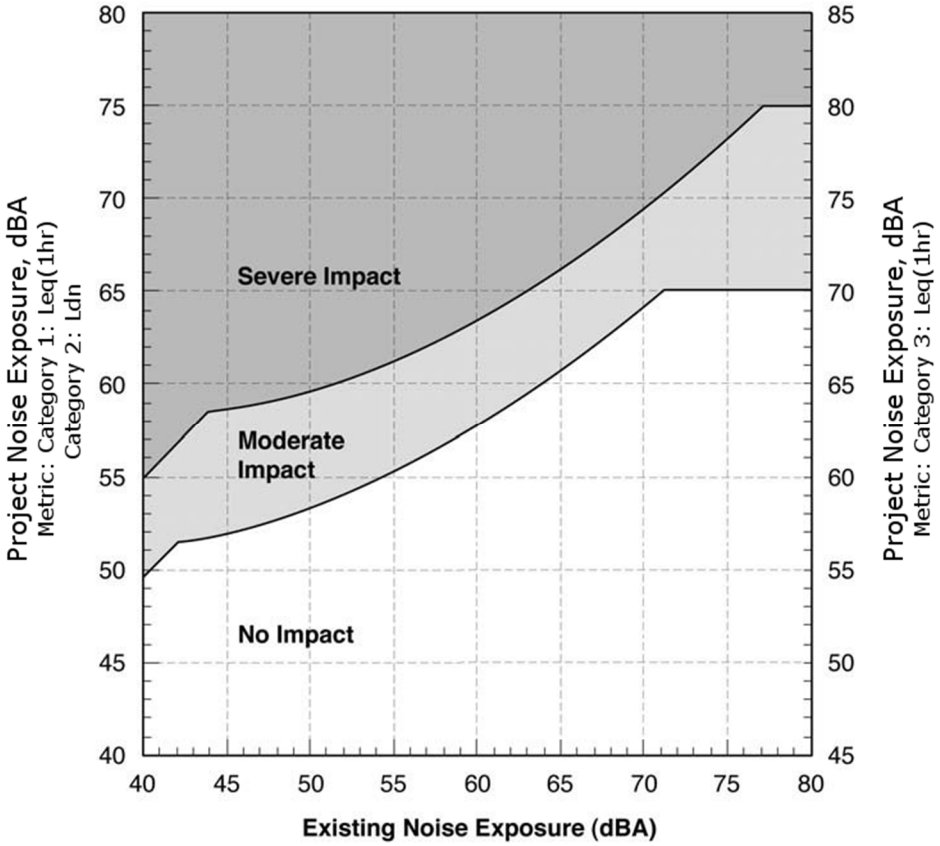

Figure 1. FTA's Noise Impact Criteria for Transit Projects

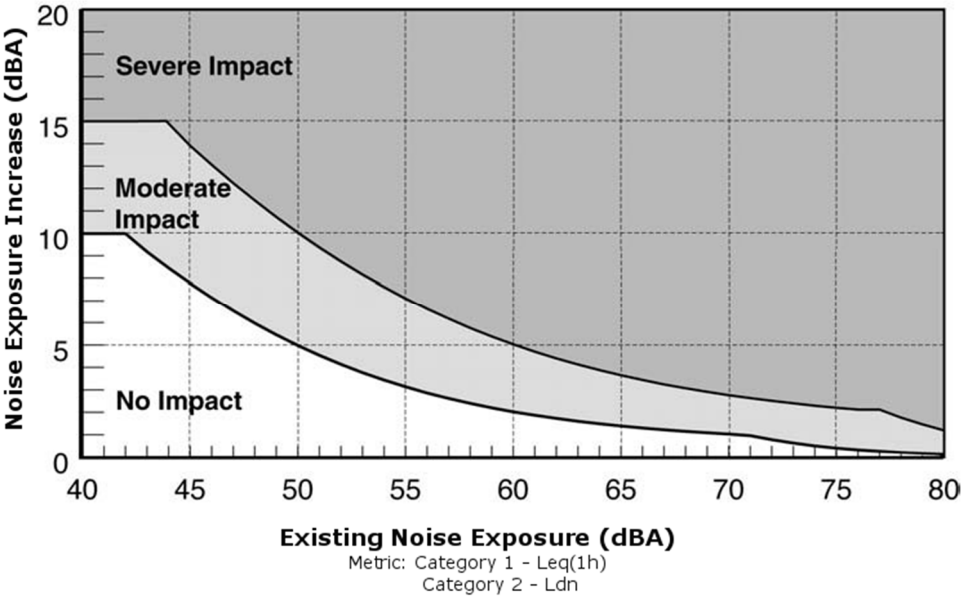

Figure 2. FTA's Increase in Cumulative Noise Levels Allowed (Land Use Category 1 and 2)

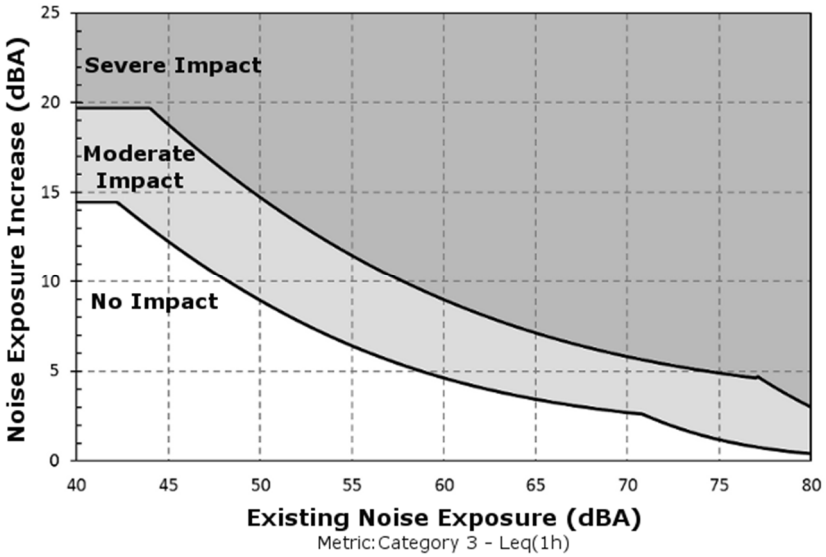

Figure 3. FTA's Increase in Cumulative Noise Levels Allowed (Land Use Category 3)

No Impact: Project-generated noise in the No Impact range is not likely to cause community annoyance. Noise projections in this range are considered acceptable and mitigation is not required.

Moderate Impact: Project-generated noise in the Moderate Impact range is considered to cause impact at the threshold of measurable annoyance. The change in cumulative noise levels in this range is noticeable to most people, but may not be sufficient to cause a strong, adverse reaction from those affected. Noise levels in the Moderate Impact range require consideration and adoption of mitigation measures when it is considered reasonable and feasible.

Severe Impact: Project-generated noise in the Severe Impact range is likely to cause a high level of community annoyance. Noise projections in this range represent the most compelling need for mitigation. Impacts in this range have the greatest adverse impact on the community. Mitigation should be incorporated into the project unless truly extenuating circumstances prevent it.

2. Multimodal Project (Transit and Highway Noise)
   Multimodal refers to projects that include changes to both transit and highway components resulting in project noise comprised of both highway and transit noise sources. Typical examples of multimodal projects include new highway construction providing general-purpose lanes as well as dedicated bus and high occupancy vehicle (HOV) lanes, and rail transit projects that involve changes to the highway travel lanes or existing highway noise barriers.

   Evaluate multimodal projects for impact according to the project noise source by project segment. FHWA's Noise Assessment methods are used to inform FTA's National

Environmental Policy Act (NEPA) evaluation only for segments where highway noise levels change due to the transit project. These projects are not necessarily subject to FHWA provisions at 23 CFR part 772. The determination of whether a project is subject to FHWA procedures at 23 CFR part 772 depends upon the specific circumstances of a project. A proposed transit project that would share an existing highway right-of-way (ROW) is not necessarily a FHWA defined multimodal project. A transit project that meets all three of the following criteria is not considered a multimodal project subject to 23 CFR part 772.

- FTA is the lead agency in the NEPA process and FHWA's limited participation is as a cooperating agency.
- The main transportation purpose of the project, as stated in the purpose and need statement of the NEPA document, is transit-related and not highway-related.
- No Federal-aid highway funds are being used to fund the project.

For segments of the project outside the highway corridor, use FTA criteria and methods. For more information, please refer to the FTA guidance, Section 4.1.

C) Types of Noise Mitigation Measures.
Noise Mitigation Measures should be selected from those listed in the FTA guidance, Section 4.5, Step 7. Project noise levels should then be recalculated at affected areas with the mitigation measures incorporated. Mitigation may be applied at three locations:

- At the noise source;
- Along the source-to-receiver propagation path; or
- At the receiver.

Treating noise at the source: Wheel truing is part of on-going maintenance procedures for all UTA rail vehicles. In addition, UTA has developed vehicle noise specifications for both their light rail and commuter rail vehicles. These specifications will be followed to minimize noise impacts from project vehicles. Furthermore, horns on rail vehicles have been re-configured to redirect horn noise down the corridor, thereby reducing noise impacts on nearby Receptors. At pedestrian crossings, electronic bells may be used so that the sound level can be adjusted as necessary.

Quiet zones reduce noise impacts by eliminating the need to sound train horns at public highway-rail grade crossings. UTA cannot apply for or establish quiet zones – they must be established by the local municipality in accordance with the Federal Railroad Administration (FRA) requirements – but UTA is committed to work with the local communities to help them attain quiet zone status. For new Capital Development Projects that are rail transit projects in areas under FRA jurisdiction, UTA will work with the local municipalities to install appropriate safety measures at public and private grade crossings along the project corridor sufficient for the local municipality to be able to apply for quiet zone status. If quiet zones are implemented, both transit and freight train horns will only need to be sounded if the train operator perceives a safety emergency.

Treating noise along the propagation path: Noise barriers are effective at mitigating noise when they break the line of sight between the source and the receiver. The necessary height

of the barrier depends on such factors as the source height, the receiver height, the location of the barrier and the distance from the source and receiver to the barrier. The length of the barrier is also important to its effectiveness. The barrier must be long enough to block noise from a moving train along most of its visible path relative to the receivers.

Treating noise at the receiver: This method is employed when noise barriers are not reasonable and feasible. Treatment measures include caulking and sealing gaps in the building façade and installing new doors and windows rated for sound reduction. To be considered cost effective, sound insulation treatment should provide a minimum of 5 decibels noise reduction in the interior of the building and provide an interior noise level of 45 dBA Ldn or less. In many cases, the existing sound insulation of a building may already meet the 45 dBA Ldn interior noise criterion. It is recommended that sound insulation testing be conducted to determine if the existing sound insulation is sufficient or what additional measures would be required to meet the interior criterion.

D) Determining the Need for Mitigation.
Per the FTA guidance, mitigation of adverse impacts must be incorporated when the proposed mitigation represents a reasonable public expenditure after considering the impacts of the action and the benefits of the proposed mitigation measures.

1. Severe Impacts
   Severe impacts have the greatest adverse impact on the community, and mitigation should be strongly considered, unless there are significant reasons, such as safety concerns, that would prevent the implementation of mitigation.
2. Moderate Impacts
   Moderate impacts have the potential for effects on the community and mitigation should be considered. UTA considers the following factors to determine when mitigation would be considered at the Moderate impact level (for more detail, see the FTA guidance, Section 2.3):
   - Number of noise-sensitive Receptors affected;
   - Increase over existing noise levels;
   - Noise sensitivity of the property;
   - Effectiveness of the mitigation measures;
   - Feasibility of the mitigation measures;
   - Fairness and equity of the mitigation measures;
   - Neighborhoods with ambient noise levels already heavily influenced by transportation noise, especially the same type of noise source as the project;
   - Community views;
   - Special protection provided by law (such as certain Section 4(f) properties); and
   - Implementation cost

Cost is an important consideration in reaching decisions about Noise Mitigation Measures. As recommended by the FTA guidance, Section 2.3, UTA will gauge the reasonableness of the cost of mitigation by considering UDOT's Noise Abatement policy cost threshold for roadway projects. per Benefited Receptor.

Another important consideration is engineering, safety, access, and maintenance issues. Safe sight distances for vehicles or pedestrians crossing tracks/transit guideway should be considered. If any of these issues are substantial enough to preclude good safety and maintenance practices, the abatement measure may be deemed not feasible.

Also, local governments may have ordinances in place that restrict the height of fences and walls along property lines. The UTA will comply with these ordinances or work with the local municipalities to get exceptions where possible.

E) Mitigation Criteria.
Based on the considerations above, UTA has determined that noise mitigation will be considered, subject to the reasonableness criteria below, for Capital Development Projects when one of the following thresholds have been exceeded:

- Locations where a Severe impact is identified.
- Locations where there is a Moderate impact, and the existing noise level is 65 dBA Ldn or higher.
- Locations where there is a Moderate impact with an increase of 3 dB or more over the existing noise levels due to the project.
- Locations where the predicted increase in noise over the existing level is less than 3 dB and the location is adjacent to an area with either "Severe" or "Moderate" impact with an increase of 3 dBA or greater, and the inclusion of the adjacent properties would provide a logical and equitable terminus to the mitigation.

Because noise barriers are the most common type of noise mitigation for transit projects, UTA will use the following criteria to evaluate whether noise abatement is reasonable and feasible for a project's impacted receivers:

- For Category 2 land use, the cost for the proposed noise barrier will not exceed the maximum cost threshold per Benefited Receptor in the UDOT Noise Policy ($30,000 in 2020 dollars – to be updated as needed);
- For Category 1 and 3 land uses, the reasonableness of cost for the proposed noise barrier will be determined on a case-by-case basis;
- The noise barrier will achieve at least a 5 dB noise reduction for at least 50% of impacted Receptors; and
- There are no substantial safety or maintenance issues caused by the noise abatement.

The type of barrier to be applied will be determined at final design and will depend on the site location and terrain. If noise barriers are not feasible, mitigation may include sound insulation. Sound insulation mitigation will also be subject to the most recent UDOT noise abatement cost threshold per Benefited Receptor.

F) Public Involvement for Noise Barrier Installation.
Input from the affected public and relevant government agencies during the environmental study process and the project design phase will be considered in determining the implementation of Noise Mitigation Measures, specifically regarding the installation of noise barriers. There have been cases where noise barriers were rejected by community members because of perceived adverse visual effects. To address this concern, UTA will allow

landowners who do not wish to have a noise barrier constructed adjacent to their property to petition against it. If a majority of the benefitted receivers wish to eliminate the noise barrier, UTA will not construct the barrier. It is the responsibility of the advocates for eliminating noise barriers to provide proof of a majority agreement to UTA. UTA will contact all affected owners if the elimination of noise barriers has been approved.

If the impacted property owners vote to reject construction of a noise barrier, the noise barrier will not be constructed as part of the project and their area will not be reconsidered for future noise abatement unless a future transportation project causes new noise impacts. This point will be emphasized at public meetings and highlighted in mailers.

4) Cross-References

- Board of Trustees Policy No. 3.3 Capital Development Project Implementation
- Corporate Policy 4.4.1 Environmental Protection Policy
- UDOT 08A2-001 Noise Abatement

This Office SOP was reviewed by UTA's Environmental Compliance and Sustainability Manager on March 12, 2024, and approved by David Hancock on 5/1/2024. This SOP takes effect on the latter date.

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David Hancock
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David Hancock
Chief Capital Services Officer

Approved as to form and content:

DocuSigned by:
Mike Bell
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Counsel for the Authority

History

Date	Action	Owner
8/2010	Adopted - Noise Assessment and Mitigation Policy, version 1	Environmental Manager
9/27/2010	Renumbered - Noise Assessment and Mitigation Policy, version 1 to Capital Development SOP No. 002	Environmental Manager
5/3/2018	Updated - No. 002 Noise Assessment and Mitigation Procedures SOP	Environmental Manager
5/1/2024	Renumbered - No. 002 Noise Assessment and Mitigation Procedures to OCS.01.01 Noise Assessment and Mitigation Office SOP	NEPA Project Administrator
5/1/2024	Revised - OCS.01.01 Noise Assessment and Mitigation Office SOP to add clarification for mitigation requirements.	NEPA Project Administrator