4.11 Noise

In general, a long-term increase in noise is considered potentially significant if it substantially increases ambient noise levels at noise-sensitive locations in the vicinity of the project site or along roads serving project-related traffic. Some guidance as to the significance of changes in ambient noise levels is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON), which assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations. The recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Annoyance is a summary measure of the general adverse reaction of people to noise that generates speech interference, sleep disturbance, or interference with the desire for a tranquil environment. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, it has been asserted that they are applicable to all sources of noise described in terms of cumulative noise exposure metrics such as the Ldn or CNEL.

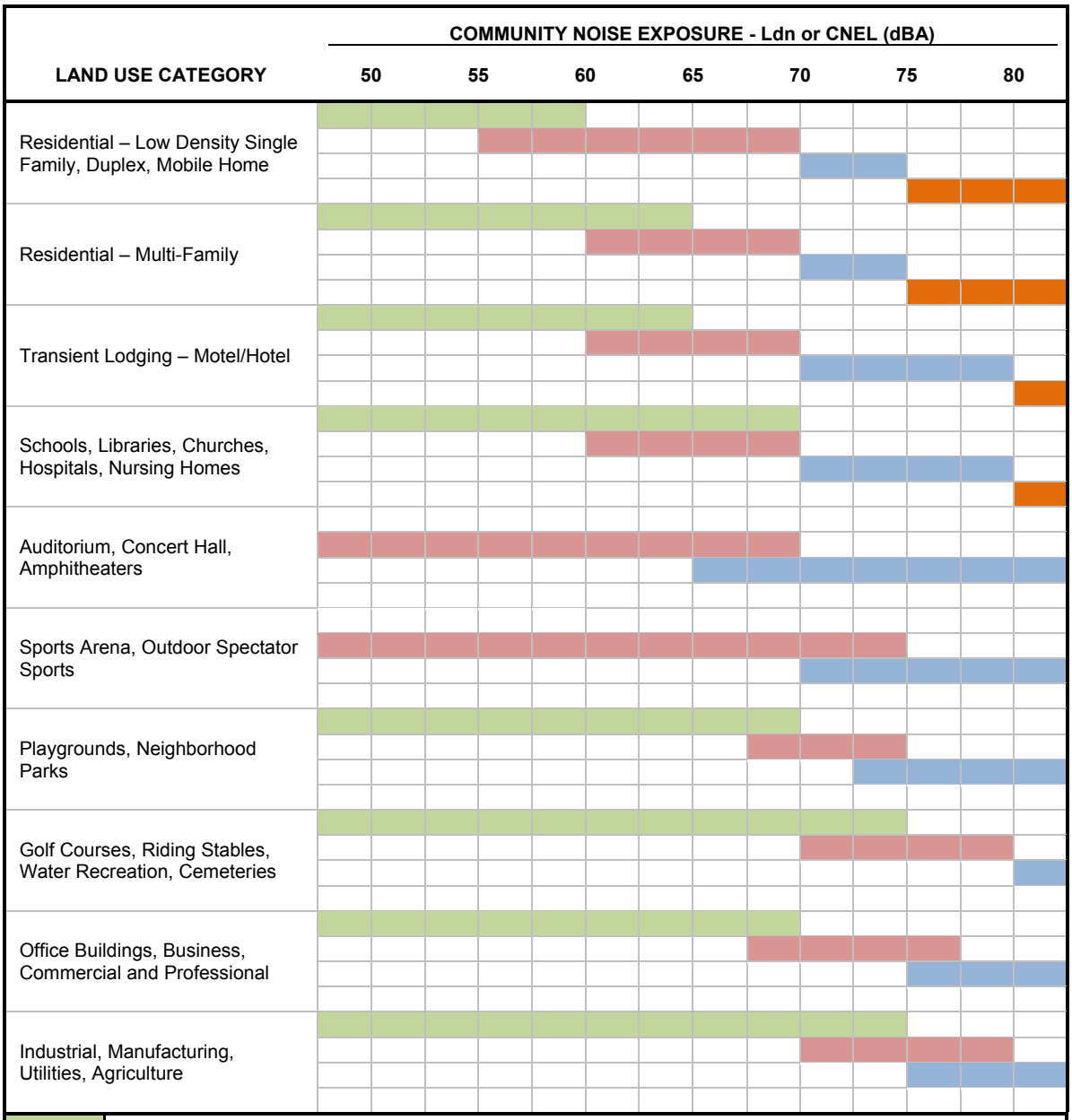
The rationale for the **Table 4.11-1** criteria is that as ambient noise levels increase, the noise resulting from a project is sufficient to cause significant annoyance. The quieter the ambient noise level is, the more increase of noise is allowable before it may cause significant annoyance.

TABLE 4.11-1
MEASURES OF SUBSTANTIAL INCREASE FOR TRANSPORTATION NOISE EXPOSURE

Ambient Noise Level Without Project (Ldn/CNEL)	Significant Impact Assumed to Occur if the Project Increases Ambient Noise Levels By:
<60 dB	+ 5.0 dB or more
60–65 dB	+ 3.0 dB or more
>65 dB	+ 1.5 dB or more

Source: Federal Interagency Committee on Noise (FICON), 1992.

While projects located on tribal trust land are exempt from local noise-related standards and policies, a discussion of local noise standards and policies is appropriate for potential off-site noise impacts. Specifically, the Noise Element of the *City of Cloverdale General Plan* (2008) uses the Land Use and Noise Compatibility Standards from the State of California General Plan Guidelines as their Exterior noise limits as shown in **Figure 4.11-1**. The City requires construction activity to be limited to the daytime hours of 7:00 a.m. to 6:00 p.m. Monday through Friday, and construction activity is prohibited weekends and holidays.



SOURCE: State of California, Governor's Office of Planning and Research, 1998. *General Plan Guidelines*.

Cloverdale Rancheria Fee-to-Trust and Resort Casino Project. 207737

Figure 4.11-1

Land Use and Noise Compatibility Standards (Exterior)

Noise impacts are assessed based on a comparative analysis of the noise levels resulting from the Proposed Action and alternatives and the noise levels under baseline or existing conditions. Analysis of temporary construction noise effects is based on typical construction phases and equipment noise levels and attenuation of those noise levels due to distances between sensitive receptors in the vicinity and the construction activity. Non-transportation-related noise impacts were assessed by examining the proposed uses on-site. Lastly, traffic noise impacts were estimated using spreadsheets based on the Federal Highway Administration (FHWA) Highway Noise Prediction Model (RD-77-108), for calculating traffic noise levels.

Vibration from construction can be evaluated for potential impacts at sensitive receptors. Typical activities evaluated for potential building damage due to construction vibration include demolition, pile driving, and drilling or excavation in close proximity to structures. The ground-borne vibration can also be evaluated for perception to eliminate annoyance. Vibration propagates according to the following expression, based on point sources with normal propagation conditions:

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

where:

PPV (equip) is the peak particle velocity in in/sec of the equipment adjusted for distance
PPV (ref) is the reference vibration level in in/sec at 25 feet
D is the distance from the equipment to the receiver

The peak particle velocity (PPV) is defined as the maximum instantaneous positive or negative peak of the vibration and is often used in monitoring of blasting vibration because it is related to the stresses experienced by structures.

In order to determine potential for annoyance, the vibration level (Lv) at any distance (D) shall be estimated based on the following equation:

$$L_v(D) = L_v(25\ ft) - 30\log(D/25)$$

4.11.1 Alternative A – Proposed Action

Impact 4.11.1-1: Construction Noise and Vibration (Potentially Significant)

Construction activity noise levels at and near the site would fluctuate depending on the particular type, number, and duration of uses of various pieces of construction equipment. Construction activities associated with Alternative A would involve excavation, grading, and earth movement. Lastly, construction-related material haul trips would raise ambient noise levels along haul routes. The level of increase would depend on the number of haul trips made and types of vehicles used. **Table 4.11-2** shows typical noise levels during different construction stages. **Table 4.11-3** shows typical noise levels produced by various types of construction equipment.

TABLE 4.11-2
TYPICAL CONSTRUCTION NOISE LEVELS

Construction Phase	Noise Level (dBA, Leq) a
Ground Clearing	84
Excavation	89
Foundations	78
Erection	85
Finishing	89

a Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.

SOURCE: U.S. Environmental Protection Agency, Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, 1971.

TABLE 4.11-3
TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Phase	Noise Level (dBA, Leq) a
Dump Truck	88
Portable Air Compressor	81
Concrete Mixer (Truck)	85
Scraper	88
Jack Hammer	88
Dozer	87
Paver	89
Generator	76
Backhoe Finishing	85

SOURCE: Cunniff, Environmental Noise Pollution, 1977.

Construction of Alternative A would generate significant amount of noise corresponding to the appropriate phase of building construction and the noise generating equipment used during those phases. The nearest sensitive receptor to the proposed action is a residence approximately 250 feet away on Santana Drive. There are also residences located across Highway 101, the nearest being approximately 500 feet on Otto Boni Drive. Noise from construction activities generally attenuates at a rate of 6 to 7.5 dBA per doubling of distance and thus other sensitive receptors in the vicinity would be exposed to construction noise at incrementally lower levels. Assuming an attenuation rate of 6 dBA per doubling of distance, the residence at 250 feet to construction would be exposed to approximately 75 dBA Leq during excavation, the loudest of the activities that would occur during construction. The residences located about 500 feet on Otto Boni Drive would be exposed to approximately 69 dBA Leq during excavation. This increase in noise due to construction of the proposed action would result in a 10-15 dBA or more increase over existing noise levels at the nearest residence on Santana Drive, and residences located across Highway 101. These construction noise levels would also exceed the City of Cloverdale exterior noise standards. Construction noise would therefore be considered a potentially significant impact without mitigation. However, **Mitigation Measures 4.11.1a** and **4.11.1b** would reduce this impact to less than significant.

Ground-borne vibration from activities that involve the use of heavy equipment for project construction could produce substantial vibration at nearby sensitive receptors. Vibration levels for large bulldozers are typically 0.089 inches/second PPV and 87 RMS at 25 feet (FTA, 2006). Under normal propagation conditions, vibration levels at residences 250 feet from the construction would be 0.003 in/sec PPV and 57 RMS, which are well below the FTA threshold of 0.20 in/sec and the annoyance threshold of 80 RMS; resulting in a less than significant impact.

Lastly, construction-related material haul trips and vehicle traffic to and from construction sites could raise ambient noise levels along construction haul routes, thus affecting sensitive receptors along these routes. In particular, trucks generate noise levels of approximately 85 dBA at 50 feet. At the same time, these trips and their associated noise would be short-term in duration and intermittent over the course of any day where there is construction activity, as opposed to occurring in a constant stream throughout the day. A less than significant impact would result.

Significance after Mitigation: Less than Significant

Impact 4.11.1-2: Operational Noise (Potentially Significant)

Transportation-Related Noise Effects

Alternative A would result in additional traffic on local roadways (see Section 4.8). To assess the impact of traffic on roadside noise levels, noise level projections were made using spreadsheets based on the Federal Highway Administration's (FHWA) Noise Prediction Model for those road segments that would experience the greatest increase in traffic volume and/or that would pass through residential areas.

The results of the modeling effort are shown in **Table 4.11-4** and **4.11-5** for the Existing, Short Term, Short Term Plus Alternatives, Buildout, and Buildout Plus Alternatives scenarios. Weekday peak hour trips were modeled because of the higher amount of traffic that occurs in the area during the weekdays. In analyzing the effects of traffic noise, the general rule is applied that in areas where traffic dominates the noise environment, the L_{eq} during the peak-hour is roughly equivalent (within about 2 dBA) to the L_{dn} at that location.

As seen in **Table 4.11-4** and **4.11-5**, potentially significant noise levels (shown in bold) occur on all instances of Asti Road north of Santana Drive. The nearest residence is located approximately 310 feet from Asti Road; noise levels at the residence would be approximately between 52 and 53 dBA, which is the lower end of the measured ambient noise levels in the area as shown in **Table 3.11-2**. Potentially significant noise increases also occur from when the comparison between short term and existing and the comparison of buildout and existing.

However, these potential impacts would not be caused by Alternative A, but instead by the rise in general traffic in the area, and are further discussed in the cumulative impact analysis (Section 4.16). Thus, future noise levels resulting from the increased traffic would not be substantially greater than the existing ambient noise levels, and the impact associated with increased traffic noise at these residences would be considered less than significant for Alternative A.

TABLE 4.11-4
EXISTING AND SHORT TERM (2015) PM PEAK HOUR TRAFFIC NOISE LEVELS ALONG ROADWAYS IN THE PROJECT VICINITY

	Weekday Peak-Hour Noise Level, 50 ft from centerline, dBA, Leq												
Roadway Segment[1]	**Existing**	**Short Term (2015)**	**Difference**	**Alt A +Short Term**	**Difference between Short Term and Short Term +Alt A**	**Alt B + Short Term**	**Difference between Short Term and Short Term + Alt B**	**Alt C + Short Term**	**Difference between Short Term and Short Term +Alt C**	**Alt D + Short Term**	**Difference between Short Term and Short Term + Alt D**	**Alt E + Short Term**	**Difference between Short Term and Short Term + Alt E**
Treadway Dr. West of Cloverdale Blvd.	62	62	0	62	0	62	0	62	0	62	0	63	1
Asti Rd. North of Santana Dr.	45	47	2	**53**	**6**	**52**	**5**	**52**	**5**	**52**	**5**	**52**	**5**
Santana Dr. East of Asti Rd.	53	53	0	53	0	53	0	53	0	53	0	53	0
US 101 South Ramps North of Citrus Fair Dr.	51	53	2	56	3	55	2	55	2	55	2	57	4
US 101 South Ramps South of Citrus Fair Dr.	57	60	3	62	2	61	1	61	1	61	1	60	0
Cloverdale Blvd. South of Citrus Fair Dr.	67	67	0	67	0	67	1	67	1	67	1	68	1
Citrus Fair Dr. East of Cloverdale Blvd.	64	65	1	66	1	65	0	65	0	65	0	66	1

1 Noise levels were determined using spreadsheets based upon the FHWA Traffic Noise Prediction Model (FHWA RD-77-108) (Barry, T.M. and Regan, J.A., 1978).
2 As described in Table 4.11-1, traffic noise is considered significant if the incremental increase in noise is greater than 5 dBA Leq in a noise environment of 60 dBA CNEL or less, an increase of 3 dBA Leq in a noise environment greater than 60 dBA CNEL, or an increase of 1.5 dBA Leq in a noise environment greater than 65 dBA CNEL.
3 Numbers shown in Bold are considered potentially significant.
4 Asti road was measured 310 feet from the centerline to nearest sensitive receptor

SOURCE: ESA, 2009

TABLE 4.11-5
EXISTING AND BUILDOUT (2030) PM PEAK HOUR TRAFFIC NOISE LEVELS ALONG ROADWAYS IN THE PROJECT VICINITY

	Weekday Peak-Hour Noise Level, 50 ft from centerline, dBA, Leq												
Roadway Segment[1]	**Existing**	**Buildout (2030)**	**Difference**	**Alt A + Buildout**	**Difference between Buildout and Alt A + Buildout**	**Alt B + Buildout**	**Difference between Buildout and Buildout + Alt B**	**Alt C + Buildout**	**Difference between Buildout and Buildout + Alt C**	**Alt D + Buildout**	**Difference between Buildout and Buildout + Alt D**	**Alt E + Buildout**	**Difference between Buildout and Buildout + Alt E**
Treadway Dr. West of Cloverdale Blvd.	62	63	1	63	0	63	0	63	0	63	0	63	0
Asti Rd. North of Santana Dr.	45	50	**5**	**54**	**4**	**54**	**4**	**54**	**4**	**53**	**3**	**54**	**4**
Santana Dr. East of Asti Rd.	53	53	0	53	0	53	0	53	0	53	0	53	0
US 101 South Ramps North of Citrus Fair Dr.	51	56	**5**	57	1	57	1	57	1	57	1	58	2
US 101 South Ramps South of Citrus Fair Dr.	57	63	**6**	64	1	64	1	64	1	64	1	63	0
Cloverdale Blvd. South of Citrus Fair Dr.	67	69	2	69	0	69	0	69	0	69	0	69	0
Citrus Fair Dr. East of Cloverdale Blvd.	64	67	**3**	68	1	68	1	68	1	68	1	68	1

1 Noise levels were determined using spreadsheets based upon the FHWA Traffic Noise Prediction Model (FHWA RD-77-108) (Barry, T.M. and Regan, J.A., 1978).
2 As described in Table 4.11-1, traffic noise is considered significant if the incremental increase in noise is greater than 5 dBA Leq in a noise environment of 60 dBA CNEL or less, an increase of 3 dBA Leq in a noise environment greater than 60 dBA CNEL, or an increase of 1.5 dBA Leq in a noise environment greater than 65 dBA CNEL.
3 Numbers shown in Bold are considered potentially significant.
4 Asti road was measured 310 feet from the centerline to nearest sensitive receptor

SOURCE: ESA, 2009

Non-Transportation Related Noise Effects

Future noise levels at sensitive receptors would likely be similar to existing conditions. An approximate 40 foot landscaped area, 30 foot slope, and a retaining wall will be located in between the proposed hotel/spa garden and the nearest residence on Santana Drive for Alternative A that would attenuate any potential increase in sound associated with operation of Alternative A.

The HVAC system for maintaining comfortable temperatures within the proposed buildings would consist of packaged rooftop air conditioning systems. Such rooftop HVAC units typically generate noise levels of approximately 55 dB at a reference distance of 100 feet from the operating units during maximum heating or air conditioning operations. The noise level of the HVAC if on the edge of the building nearest the sensitive receptors (about 70 feet) would be about 59 dBA at the sensitive receptors. This is a potentially significant impact. **Mitigation Measure 4.11.2** would reduce this impact to less than significant.

Significance after Mitigation: Less than Significant

4.2.2 Alternative B – Reduced Hotel and Casino

Impact 4.11.2-1: Construction Noise and Vibration (Potentially Significant)

Construction activity noise levels for Alternative B would be similar to Alternative A. Construction of Alternative B would generate significant amount of noise corresponding to the appropriate phase of building construction and the noise generating equipment used during those phases. As discussed for Alternative A, the nearest sensitive receptor to the proposed action is a residence approximately 250 feet away on Santana Drive. There are also residences located across Highway 101, the nearest being approximately 500 feet on Otto Boni Drive. Noise from construction activities generally attenuates at a rate of 6 to 7.5 dBA per doubling of distance and thus other sensitive receptors in the vicinity would be exposed to construction noise at incrementally lower levels. Assuming an attenuation rate of 6 dBA per doubling of distance, the residence at 250 feet to construction would be exposed to approximately 75 dBA Leq during excavation, the loudest of the activities that would occur during construction. The residences located about 500 feet on Otto Boni Drive would be exposed to approximately 69 dBA Leq during excavation. This increase in noise due to construction of the proposed action would result in a 10-15 dBA or more increase over existing noise levels at the nearest residence on Santana Drive, and residences located across Highway 101. These construction noise levels would also exceed the City of Cloverdale exterior noise standards. Construction noise would therefore be considered a potentially significant impact without mitigation. However, **Mitigation Measures 4.11.1a** and **4.11.1b** would reduce this impact to less than significant.

Ground-borne vibration from activities that involve the use of heavy equipment for project construction could produce substantial vibration at nearby sensitive receptors. Vibration levels for large bulldozers are typically 0.089 inches/second PPV and 87 RMS at 25 feet (FTA, 2006). Under normal propagation conditions, vibration levels at residences 250 feet from the construction

would be 0.003 in/sec PPV and 57 RMS, which are well below the FTA threshold of 0.20 in/sec and the annoyance threshold of 80 RMS; resulting in a less than significant impact.

Lastly, construction-related material haul trips and vehicle traffic to and from construction sites could raise ambient noise levels along construction haul routes, thus affecting sensitive receptors along these routes. In particular, trucks generate noise levels of approximately 85 dBA at 50 feet. At the same time, these trips and their associated noise would be short-term in duration and intermittent over the course of any day where there is construction activity, as opposed to occurring in a constant stream throughout the day. A less than significant impact would result.

Significance after Mitigation: Less than Significant

Impact 4.11.2-2: Operational Noise (Potentially Significant)

Transportation-Related Noise Effects

As with Alternative A, Alternative B would result in additional traffic on local roadways (see Section 4.8). **Table 4.11-4** and **4.11-5** summarize the Existing, Short Term, Short Term Plus Alternatives, Buildout, and Buildout Plus Alternatives scenarios. Weekday peak hour trips were modeled because of the higher amount of traffic that occurs in the area during the weekdays. In analyzing the effects of traffic noise, the general rule is applied that in areas where traffic dominates the noise environment, the L_{eq} during the peak-hour is roughly equivalent (within about 2 dBA) to the L_{dn} at that location.

As seen in **Table 4.11-4** and **4.11-5**, potentially significant noise levels (shown in bold) occur on all instances of Asti Road north of Santana Drive. The nearest residence is located approximately 310 feet from Asti Road; noise levels at the residence would be approximately between 52 and 53 dBA, which is the lower end of the measured ambient noise levels in the area as shown in **Table 3.11-2**. Potentially significant noise increases also occur from when the comparison between short term and existing and the comparison of buildout and existing.

However, these potential impacts would not be caused by Alternative B, but instead by the rise in general traffic in the area, and are further discussed in the cumulative impact analysis (Section 4.16). Thus, future noise levels resulting from the increased traffic would not be substantially greater than the existing ambient noise levels, and the impact associated with increased traffic noise at these residences would be considered less than significant for Alternative B.

Non-Transportation Related Noise Effects

As with Alternative A, future noise levels at sensitive receptors would likely be similar to existing conditions. An approximate 40 foot landscaped area, 30 foot slope, and a retaining wall will be located in between the proposed hotel/spa garden and the nearest residence on Santana Drive for Alternative B that would attenuate any potential increase in sound associated with operation.

The HVAC system for maintaining comfortable temperatures within the proposed buildings would consist of packaged rooftop air conditioning systems. Such rooftop HVAC units typically generate noise levels of approximately 55 dB at a reference distance of 100 feet from the operating units

during maximum heating or air conditioning operations. The noise level of the HVAC if on the edge of the building nearest the sensitive receptors (about 70 feet) would be about 59 dBA at the sensitive receptors. This is a potentially significant impact. **Mitigation Measure 4.11.2** would reduce this impact to less than significant.

Significance after Mitigation: Less than Significant

4.2.3 Alternative C –Reduced Casino

Impact 4.11.3-1: Construction Noise and Vibration (Potentially Significant)

Construction activity noise levels for Alternative C would be similar to Alternative A. Construction of Alternative C would generate significant amount of noise corresponding to the appropriate phase of building construction and the noise generating equipment used during those phases. As discussed for Alternative A, the nearest sensitive receptor to the proposed action is a residence approximately 250 feet away on Santana Drive. There are also residences located across Highway 101, the nearest being approximately 500 feet on Otto Boni Drive. Noise from construction activities generally attenuates at a rate of 6 to 7.5 dBA per doubling of distance and thus other sensitive receptors in the vicinity would be exposed to construction noise at incrementally lower levels. Assuming an attenuation rate of 6 dBA per doubling of distance, the residence at 250 feet to construction would be exposed to approximately 75 dBA Leq during excavation, the loudest of the activities that would occur during construction. The residences located about 500 feet on Otto Boni Drive would be exposed to approximately 69 dBA Leq during excavation. This increase in noise due to construction of the proposed action would result in a 10-15 dBA or more increase over existing noise levels at the nearest residence on Santana Drive, and residences located across Highway 101. These construction noise levels would also exceed the City of Cloverdale exterior noise standards. Construction noise would therefore be considered a potentially significant impact without mitigation. However, **Mitigation Measures 4.11.1a** and **4.11.1b** would reduce this impact to less than significant.

Ground-borne vibration from activities that involve the use of heavy equipment for project construction could produce substantial vibration at nearby sensitive receptors. Vibration levels for large bulldozers are typically 0.089 inches/second PPV and 87 RMS at 25 feet (FTA, 2006). Under normal propagation conditions, vibration levels at residences 250 feet from the construction would be 0.003 in/sec PPV and 57 RMS, which are well below the FTA threshold of 0.20 in/sec and the annoyance threshold of 80 RMS; resulting in a less than significant impact.

Lastly, construction-related material haul trips and vehicle traffic to and from construction sites could raise ambient noise levels along construction haul routes, thus affecting sensitive receptors along these routes. In particular, trucks generate noise levels of approximately 85 dBA at 50 feet. At the same time, these trips and their associated noise would be short-term in duration and intermittent over the course of any day where there is construction activity, as opposed to occurring in a constant stream throughout the day. A less than significant impact would result.

Significance after Mitigation: Less than Significant

Impact 4.11.3-2: Operational Noise (Potentially Significant)

Transportation-Related Noise Effects

As with Alternative A, Alternative C would result in additional traffic on local roadways (see Section 4.8). **Table 4.11-4** and **4.11-5** summarize the Existing, Short Term, Short Term Plus Alternatives, Buildout, and Buildout Plus Alternatives scenarios. Weekday peak hour trips were modeled because of the higher amount of traffic that occurs in the area during the weekdays. In analyzing the effects of traffic noise, the general rule is applied that in areas where traffic dominates the noise environment, the L_{eq} during the peak-hour is roughly equivalent (within about 2 dBA) to the L_{dn} at that location.

As seen in **Table 4.11-4** and **4.11-5**, potentially significant noise levels (shown in bold) occur on all instances of Asti Road north of Santana Drive. The nearest residence is located approximately 310 feet from Asti Road; noise levels at the residence would be approximately between 52 and 53 dBA, which is the lower end of the measured ambient noise levels in the area as shown in **Table 3.11-2**. Potentially significant noise increases also occur from when the comparison between short term and existing and the comparison of buildout and existing.

However, these potential impacts would not be caused by Alternative C, but instead by the rise in general traffic in the area, and are further discussed in the cumulative impact analysis (Section 4.16). Thus, future noise levels resulting from the increased traffic would not be substantially greater than the existing ambient noise levels, and the impact associated with increased traffic noise at these residences would be considered less than significant for Alternative C.

Non-Transportation Related Noise Effects

As with Alternative A, future noise levels at sensitive receptors would likely be similar to existing conditions. An approximate 40 foot landscaped area, 30 foot slope, and a retaining wall will be located in between the proposed hotel/spa garden and the nearest residence on Santana Drive for Alternative C that would attenuate any potential increase in sound associated with operation.

The HVAC system for maintaining comfortable temperatures within the proposed buildings would consist of packaged rooftop air conditioning systems. Such rooftop HVAC units typically generate noise levels of approximately 55 dB at a reference distance of 100 feet from the operating units during maximum heating or air conditioning operations. The noise level of the HVAC if on the edge of the building nearest the sensitive receptors (about 70 feet) would be about 59 dBA at the sensitive receptors. This is a potentially significant impact. **Mitigation Measure 4.11.2** would reduce this impact to less than significant.

Significance after Mitigation: Less than Significant

4.2.4 Alternative D –Casino Only

Impact 4.11.4-1: Construction Noise and Vibration (Potentially Significant)

Construction activity noise levels for Alternative D would be similar to Alternative A. Construction of Alternative D would generate significant amount of noise corresponding to the appropriate phase of building construction and the noise generating equipment used during those phases. As discussed for Alternative A, the nearest sensitive receptor to the proposed action is a residence approximately 250 feet away on Santana Drive. There are also residences located across Highway 101, the nearest being approximately 500 feet on Otto Boni Drive. Noise from construction activities generally attenuates at a rate of 6 to 7.5 dBA per doubling of distance and thus other sensitive receptors in the vicinity would be exposed to construction noise at incrementally lower levels. Assuming an attenuation rate of 6 dBA per doubling of distance, the residence at 250 feet to construction would be exposed to approximately 75 dBA Leq during excavation, the loudest of the activities that would occur during construction. The residences located about 500 feet on Otto Boni Drive would be exposed to approximately 69 dBA Leq during excavation. This increase in noise due to construction of the proposed action would result in a 10-15 dBA or more increase over existing noise levels at the nearest residence on Santana Drive, and residences located across Highway 101. These construction noise levels would also exceed the City of Cloverdale exterior noise standards. Construction noise would therefore be considered a potentially significant impact without mitigation. However, **Mitigation Measures 4.11.1a** and **4.11.1b** would reduce this impact to less than significant.

Ground-borne vibration from activities that involve the use of heavy equipment for project construction could produce substantial vibration at nearby sensitive receptors. Vibration levels for large bulldozers are typically 0.089 inches/second PPV and 87 RMS at 25 feet (FTA, 2006). Under normal propagation conditions, vibration levels at residences 250 feet from the construction would be 0.003 in/sec PPV and 57 RMS, which are well below the FTA threshold of 0.20 in/sec and the annoyance threshold of 80 RMS; resulting in a less than significant impact.

Lastly, construction-related material haul trips and vehicle traffic to and from construction sites could raise ambient noise levels along construction haul routes, thus affecting sensitive receptors along these routes. In particular, trucks generate noise levels of approximately 85 dBA at 50 feet. At the same time, these trips and their associated noise would be short-term in duration and intermittent over the course of any day where there is construction activity, as opposed to occurring in a constant stream throughout the day. A less than significant impact would result.

Significance after Mitigation: Less than Significant

Impact 4.11.4-2: Operational Noise (Potentially Significant)

Transportation-Related Noise Effects

As with Alternative A, Alternative D would result in additional traffic on local roadways (see Section 4.8). **Table 4.11-4** and **4.11-5** summarize the Existing, Short Term, Short Term Plus

Alternatives, Buildout, and Buildout Plus Alternatives scenarios. Weekday peak hour trips were modeled because of the higher amount of traffic that occurs in the area during the weekdays. In analyzing the effects of traffic noise, the general rule is applied that in areas where traffic dominates the noise environment, the L_{eq} during the peak-hour is roughly equivalent (within about 2 dBA) to the L_{dn} at that location.

As seen in **Table 4.11-4** and **4.11-5**, potentially significant noise levels (shown in bold) occur on all instances of Asti Road north of Santana Drive. The nearest residence is located approximately 310 feet from Asti Road; noise levels at the residence would be approximately between 52 and 53 dBA, which is the lower end of the measured ambient noise levels in the area as shown in **Table 3.11-2**. Potentially significant noise increases also occur from when the comparison between short term and existing and the comparison of buildout and existing.

However, these potential impacts would not be caused by Alternative D, but instead by the rise in general traffic in the area, and are further discussed in the cumulative impact analysis (Section 4.16). Thus, future noise levels resulting from the increased traffic would not be substantially greater than the existing ambient noise levels, and the impact associated with increased traffic noise at these residences would be considered less than significant for Alternative D.

Non-Transportation Related Noise Effects

As with Alternative A, future noise levels at sensitive receptors would likely be similar to existing conditions. The distance extends to approximately 190 feet of landscaped area, and a 30 foot slope located between the casino and the nearest residence on Santana Drive for Alternative D that would attenuate any potential increase in sound associated with operation.

The HVAC system for maintaining comfortable temperatures within the proposed buildings would consist of packaged rooftop air conditioning systems. Such rooftop HVAC units typically generate noise levels of approximately 55 dB at a reference distance of 100 feet from the operating units during maximum heating or air conditioning operations. The noise level of the HVAC if on the edge of the building nearest the sensitive receptor (about 120 feet) would be about 53 dBA. This is a potentially significant impact. **Mitigation Measure 4.11.2** would reduce this impact to less than significant.

Significance after Mitigation: Less than Significant

4.2.5 Alternative E – Commercial Retail-Office Space

Impact 4.11.5-1: Construction Noise and Vibration (Potentially Significant)

Construction activity noise levels for Alternative E would be similar to Alternative A. Construction of Alternative E would generate significant amount of noise corresponding to the appropriate phase of building construction and the noise generating equipment used during those phases. As discussed for Alternative A, the nearest sensitive receptor to the proposed action is a residence approximately 250 feet away on Santana Drive. There are also residences located across Highway 101, the nearest

being approximately 500 feet on Otto Boni Drive. Noise from construction activities generally attenuates at a rate of 6 to 7.5 dBA per doubling of distance and thus other sensitive receptors in the vicinity would be exposed to construction noise at incrementally lower levels. Assuming an attenuation rate of 6 dBA per doubling of distance, the residence at 250 feet to construction would be exposed to approximately 75 dBA Leq during excavation, the loudest of the activities that would occur during construction. The residences located about 500 feet on Otto Boni Drive would be exposed to approximately 69 dBA Leq during excavation. This increase in noise due to construction of the proposed action would result in a 10-15 dBA or more increase over existing noise levels at the nearest residence on Santana Drive, and residences located across Highway 101. These construction noise levels would also exceed the City of Cloverdale exterior noise standards. Construction noise would therefore be considered a potentially significant impact without mitigation. However, **Mitigation Measures 4.11.1a** and **4.11.1b** would reduce this impact to less than significant.

Ground-borne vibration from activities that involve the use of heavy equipment for project construction could produce substantial vibration at nearby sensitive receptors. Vibration levels for large bulldozers are typically 0.089 inches/second PPV and 87 RMS at 25 feet (FTA, 2006). Under normal propagation conditions, vibration levels at residences 250 feet from the construction would be 0.003 in/sec PPV and 57 RMS, which are well below the FTA threshold of 0.20 in/sec and the annoyance threshold of 80 RMS; resulting in a less than significant impact.

Lastly, construction-related material haul trips and vehicle traffic to and from construction sites could raise ambient noise levels along construction haul routes, thus affecting sensitive receptors along these routes. In particular, trucks generate noise levels of approximately 85 dBA at 50 feet. At the same time, these trips and their associated noise would be short-term in duration and intermittent over the course of any day where there is construction activity, as opposed to occurring in a constant stream throughout the day. A less than significant impact would result.

Significance after Mitigation: Less than Significant

Impact 4.11.5-2: Operational Noise (Potentially Significant)

Transportation-Related Noise Effects

As with Alternative A, Alternative E would result in additional traffic on local roadways (see Section 4.8). **Table 4.11-4** and **4.11-5** summarize the Existing, Short Term, Short Term Plus Alternatives, Buildout, and Buildout Plus Alternatives scenarios. Weekday peak hour trips were modeled because of the higher amount of traffic that occurs in the area during the weekdays. In analyzing the effects of traffic noise, the general rule is applied that in areas where traffic dominates the noise environment, the L_{eq} during the peak-hour is roughly equivalent (within about 2 dBA) to the L_{dn} at that location.

As seen in **Table 4.11-4** and **4.11-5**, potentially significant noise levels (shown in bold) occur on all instances of Asti Road north of Santana Drive. The nearest residence is located approximately 310 feet from Asti Road; noise levels at the residence would be approximately between 52 and 53 dBA, which is the lower end of the measured ambient noise levels in the area as shown in **Table 3.11-2**. Potentially significant noise increases also occur from when the comparison between short term and existing and the comparison of buildout and existing.

However, these potential impacts would not be caused by Alternative E, but instead by the rise in general traffic in the area, and are further discussed in the cumulative impact analysis (Section 4.16). Thus, future noise levels resulting from the increased traffic would not be substantially greater than the existing ambient noise levels, and the impact associated with increased traffic noise at these residences would be considered less than significant for Alternative E.

Non-Transportation Related Noise Effects

As with Alternative A, future noise levels at sensitive receptors would likely be similar to existing conditions. There would be approximately 260 feet of landscaped area between the proposed warehouse and the nearest residence on Santana Dive for Alternative E that would attenuate any potential increase in sound associated with operation.

The HVAC system for maintaining comfortable temperatures within the proposed buildings would consist of packaged rooftop air conditioning systems. Such rooftop HVAC units typically generate noise levels of approximately 55 dB at a reference distance of 100 feet from the operating units during maximum heating or air conditioning operations. The noise level of the HVAC if on the edge of the building nearest the sensitive receptor (about 260 feet) would be about 45 dBA. This is a potentially significant impact. **Mitigation Measure 4.11.2** would reduce this impact to less than significant.

Significance after Mitigation: Less than Significant

References

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