

3.9 Noise

This section presents the existing noise conditions and evaluates potential impacts associated with noise and vibration levels from construction and operation of the North Bay Water Recycling Program (NBWRP). The analysis is based on review of the guidance developed by regulatory agencies and local noise ordinances and regulations set by the cities and counties in the action area. The Impacts and Mitigation Measures section defines significance criteria used for the impact assessment and presents a discussion of potential project-related impacts. Determination of significance of impacts in this EIR/EIS apply only to CEQA, not to NEPA.

3.9.1 Affected Environment/Setting

Sound is mechanical energy transmitted by pressure waves through a medium such as air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. Sound pressure level is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing, and 120 to 140 dB corresponding to the threshold of pain. The decibel measurement system is a logarithmic unit of measurement, such that a ten-fold change in sound pressure is represented by an increase of 10 dB. Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a result, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies instead of the frequency mid-range. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA).

Noise Exposure and Community Noise

An individual's noise exposure is a measure of the noise experienced by the individual over a period of time. A noise level is a measure of noise at a given instant in time. However, noise levels rarely persist consistently over a long period of time. In fact, community noise varies continuously with time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. Background noise levels change throughout a typical day, but do so gradually,

corresponding with the addition and subtraction of distant noise sources and atmospheric conditions. The addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens) makes community noise constantly variable throughout a day.

These successive additions and deletions of sound to the community noise environment change the community noise level from instant to instant requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

L_{eq} : The equivalent sound level is used to describe noise over a specified period of time, in terms of a single numerical value. The L_{eq} is the constant sound level which would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

L_{max} : The instantaneous maximum noise level measured during the measurement period of interest.

L_{dn} : Day-Night Average Sound Level, or the energy average of the A-weighted sound levels occurring during a 24-hour period, and which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night (“penalizing” nighttime noises). Noise between 10:00 p.m. and 7:00 a.m. is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noises. It should be noted that the L_{dn} is sometimes referred to as the DNL.

CNEL: Similar to the L_{dn} , the Community Noise Equivalent Level (CNEL) adds a 5-dBA *penalty* for the evening hours between 7:00 p.m. and 10:00 p.m.

Effects of Noise on People

The effects of noise on people can be placed into three categories:

- subjective effects of annoyance, nuisance, dissatisfaction;
- interference with activities such as speech, sleep, learning; and
- physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers at industrial plants often experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation exists in the individual thresholds of annoyance, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way the new noise compares to the existing noise levels to which one has adapted: the so called “ambient noise” level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur (Caltrans, 1998):

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference when the change in noise is perceived but does not cause a human response;
- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- A 10-dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. A ruler is a *linear* scale, which has marks corresponding to equal quantities of distance, (i.e., the ratio of successive intervals is equal to one). A *logarithmic* scale is different in that the ratio of successive intervals is not equal to one. Each interval on a logarithmic scale is some common factor larger than the previous interval. A typical ratio is 10, so that the marks on the scale read: 1, 10, 100, 1,000, 10,000, etc., doubling the variable plotted on the x-axis. The human ear perceives sound in a non-linear fashion; hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, rather they combine logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Point sources of noise, including stationary mobile sources such as idling vehicles or onsite construction equipment, attenuate (lessen) at a rate of 7.5 dBA per doubling of distance from the source, assuming that the ground surface between the source and receptor is primarily soft (e.g., dirt, grass, scattered vegetation) (Caltrans, 1998). For the purposes of this analysis, it is assumed that noise from a point source attenuates at a rate of 7.5 dBA per doubling of distance to account for the absorption of noise waves due to soft ground surfaces and intervening features and structures.

Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square amplitude is most frequently used to describe the affect of vibration on the human body. The root mean square amplitude is defined as the average of the squared amplitude of the signal. Decibel notation is commonly used to measure root mean square amplitude. The decibel notation acts to compress the range of numbers required to describe vibration (FTA, 2006). Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration.

Sensitive Receptors

Human response to noise varies considerably from one individual to another. Effects of noise at various levels can include interference with sleep, concentration, and communication, and can cause physiological and psychological stress and hearing loss. Given these effects, some land uses are considered more sensitive to ambient noise levels than others. In general, residences, schools, hotels, hospitals, and nursing homes are considered to be the most sensitive to noise. Places such as churches, libraries, and cemeteries, where people tend to pray, study, and/or contemplate are also sensitive to noise. Commercial and industrial uses are considered the least noise-sensitive.

LGVSD and Novato SD

Regional Noise Environment

Vehicle traffic is the most significant source of noise in the cities of San Rafael and Novato. Roadways in the action area include Highway 101, Rowland Drive, Bel Marin Keys Boulevard, Ignacio Boulevard, and State Route 37 (SR 37). U.S. 101 is the primary noise source and has a 60-dBA contour that extends approximately 4,000 feet from the centerline of the highway (City of Novato, 1996). Noise levels are substantially lower at locations that are shielded from freeway noise by hills than at locations that have a direct exposure to the freeway noise. Aircraft operations at Gness Field also contribute to the noise environment. Other noise sources in the city include emergency medical vehicles, public transit vehicles, power tools, and machinery.

Sensitive Receptors

Sensitive receptors located in the LGVSD and Novato SD service areas that may be impacted by NBWRP include the following:

Schools and Churches. Our Lady of Loretto Church and School, Novato High School, Creekside Village School, Quest Christian Church, Church of Christ, New Life Christian Center and Noah's Arc Pre-School, Unity of Marin Christian Church, Hamilton School, Novato Charter School, and Dunham Academy.

Hospitals/Nursing Homes. The closest health care facility to the Novato WWTP is the Novato Community (Sutter Health) Hospital located east of U.S. 101 on Rowland Boulevard. The closest health care facility to the LGVSD WWTP is the Smith Ranch Care Center located on Silveira Parkway.

Residential. Residential development in the action area includes multiple neighborhoods throughout the cities of Novato and San Rafael. Most of the proposed pipeline that would be located west of U.S. 101 would cross through existing residential neighborhoods. East of U.S. 101, the proposed pipelines would extend through residential neighborhoods located along Olive Avenue, Palm Avenue, Hangar Avenue, and San Pedro Road.

Parks and Recreation. There are a few parks in Novato that are located in close proximity to the action area including Lynwood Hill Park located on Lynnwood Drive, Hill Recreation Area on Hill Road, Arroyo Avichi Park on Taft Court, Olive Park located along Olive Avenue, and Slade Park on Manuel Drive. Parks in San Rafael that would be located within close proximity of the proposed pipeline routes would include the John F. McInnis County Park, China Camp State Park, and Peacock Park.

SVCS D

Regional Noise Environment

According to the City of Sonoma General Plan, the primary noise source within the city is generated by traffic on major roadways such as Highway 12, Leveroni Road, Napa Road, Napa Street, and Eighth Street East. Based on continuous 24-hour measurements obtained in October 2003, major roadways such as those listed above generate 50 to 60 dBA at 50 feet from the roadway centerline. Stationary noise sources found in the city include car washes and commercial loading areas (City of Sonoma, 2006). The County of Sonoma General Plan Noise Element does not specifically address intermittent or short-term construction noises, and a noise ordinance has not yet been adopted by the County.

Proposed facilities associated with the SVCS D are located in the City of Sonoma and in unincorporated areas of Sonoma County. The primary contributors to the noise environment in the action area include vehicle traffic; farm machinery on a seasonal basis; airplane over-flights; sounds emanating from residential neighborhoods, including voices, noises from household appliances, and radio and television broadcasts; and naturally occurring sounds such as wind and wind-generated rustling. Additional noise sources may include electrical and industrial devices and other man-made localized sources in the action area.

The Sonoma Valley and Sonoma Skypark airports, located in unincorporated Sonoma County, influence the County's ambient noise environment. The airports generate intermittent, intrusive noise at nearby sensitive receptors; however, noise from aircrafts is negligible in most of the County. There is no airport located within Sonoma City limits.

Sensitive Receptors

Sensitive receptors located within the SVCS D service area that may be impacted by the NBWRP include the following:

Schools. Altimira Middle School, Sonoma Valley High School, Hanna Boys Center, Sonoma Seventh Day Adventist Church and School, Prestwood Elementary School.

Hospitals/Nursing Homes. The closest health care facility to the action area is Sonoma Valley Hospital at 347 Andrieux Street, located west of Broadway.

Residential. Residential development in the action area includes various single and multi-family residences. The highest density of residences occurs west of Broadway.

Parks and Recreation. There are a few parks and recreation areas in the action area, including Los Arroyos Golf Club located on Stage Gulch Road, Maxwell Farms Regional Park on El Verano Avenue, Ernie Smith Community Park and Sonoma Golf Club both adjacent to the proposed pipeline on Arnold Drive, Sonoma Plaza located at Broadway and West Napa Street, and Huichica Creek Unit of the Napa-Sonoma Marshes Wildlife Area located on Buchli Station Road.

Public Assembly Buildings. A public assembly building is located at Broadway and Napa Street.

Napa SD

Regional Noise Environment

Generally, areas within unincorporated Napa County are relatively quiet. Typical noise levels range from 20 to 25 dBA at 3 a.m. in isolated areas to 50 dBA near roadways during the day. Noise sources such as small aircraft, vineyard frost fans, diesel pumps in vineyards, heavy vehicle traffic, and train horns occasionally emit noise at levels considerably higher than the ambient levels (Napa County, 1990).

The prevailing environmental noise in the City of Napa is generated by motor vehicles. Automobiles, trucks, buses and motorcycles will most likely continue to be the major sources of noise through the year 2020. The most significant noise sources in Napa are highways (e.g., Highways 29, 121, and 221) and arterial streets (e.g., Jefferson and Trancas Streets, Soscol and Lincoln Avenues, Redwood Road, and the traffic corridor between First and Fourth Streets from Highway 29 through the downtown area).

Sensitive Receptors

Sensitive receptors located in the Napa SD service area that may be affected by noise generated by the NBWRP include the following:

Schools. There are three schools, located in the Napa Valley Unified School District, including Mount George Elementary School located on 2nd Avenue, Silverado Middle School on Coombsville Road, and Wintun School on Wintun Court off Imola Avenue. The Napa County Children's Center, Napa County Community School, and Napa Infant Preschool Program are also located in the action area on Imola Avenue.

Hospitals/Nursing Homes. Napa State Hospital is located in the action area at the corner of Highway 221 and Imola Avenue.

Residential. Residential development in the action area includes neighborhoods situated directly north of Imola Avenue and west of 1st Avenue. Other residential development near the action area includes the development on the west side of Highway 121.

Parks and Recreation. Camille Park located on Shurtleff Avenue and Shurtleff Park on Russell Street are approximately 0.5 miles from the action area. Skyline Park is located less than 0.5 miles south of the action area.

3.9.2 Regulatory Framework

Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while local agencies regulate stationary sources. Local regulation of noise involves implementation of general plan policies and noise ordinance standards. Local general plans tend to identify general principles intended to guide and influence development plans, while local noise ordinances establish standards and procedures for addressing specific noise sources and activities. The policies and regulations associated with noise impacts within the affected jurisdictions are presented in **Appendix 3.9** of this EIR/EIS.

3.9.3 Environmental Consequences/Impacts

As a joint EIR/EIS, the impact analysis considers two baselines; the CEQA baseline standard, which requires a project to review its impacts relative to “change from existing conditions,” as well as the NEPA baseline standard, which requires a comparison between the Action Alternatives and the No Action Alternative. In general, the CEQA impact analysis captures the NEPA impact analysis. Where appropriate the incremental level of impact relative to the NEPA baseline standard should be discussed.

Significance Criteria under CEQA

Based on the *CEQA Guidelines*, a project would have a significant effect on the environment with respect to noise and/or ground-borne vibration if it would result in:

- Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- Exposure of people residing or working in the action area to excessive noise levels (for a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport); or
- Exposure of people residing or working in the action area to excessive noise levels (for a project within the vicinity of a private airstrip).

For the purposes of this EIR/EIS, temporary impacts during construction are considered significant if they would substantially interfere with affected land uses. Substantial interference could result from a combination of factors, including: exposing sensitive receptors to noise levels in excess of regulatory standards or codes, which could result in a considerable nuisance; the generation of substantial (i.e., equal to or greater than 90 dBA) noise levels at sensitive receptor locations lasting long periods of time at any one location (i.e., more than one week); and/or construction activities that would affect noise-sensitive uses during the nighttime.

The project’s long term operational impacts on the ambient noise environment would be considered substantial if it would expose sensitive receptors or other identified land uses to noise levels in excess of regulatory standards or codes. In addition to concerns regarding the absolute noise level that might occur when a new source is introduced into an area, it is also important to consider the existing ambient noise environment. If the ambient noise environment is quiet and the new noise source greatly increases the noise exposure, even though a criterion level might not be exceeded, an impact may occur.

A numerical threshold to identify the point at which a vibration impact occurs has not been identified by local jurisdictions in the applicable standards or municipal codes. In the absence of local regulatory significance thresholds for vibration from construction equipment, it is appropriate to use a California Department of Transportation (Caltrans) identified PPV thresholds for adverse human reaction and risk of architectural damage to buildings, which are 0.010 inches per second and 0.20 inches per second respectively (Caltrans, 2002).

Regarding the last two significance criteria, because NBWRP would not involve the development of noise-sensitive land uses that would be exposed to excessive aircraft noise, there would be no impacts associated with these criteria. Therefore, impacts associated with aviation noise are not addressed further.

Impact 3.9.1: Temporary construction noise. Construction activity would violate standards established in the local general plans or noise ordinances, and/or would adversely affect nearby sensitive receptors. (Less than Significant with Mitigation)

NBWRP would require construction of new pipelines and storage facilities as well as upgrades to existing WWTPs. Pipelines would be installed using a combination of the following methods: trenching; jack and bore tunneling; directional drilling; and pipeline suspension. Storage facilities would be constructed using excavation and earth movement techniques as well as embankment construction and hydro-seeding. Upgrades to existing facilities would include construction of new booster pump stations as well as other infrastructure required to increase tertiary treatment capacity at the WWTPs. These activities would require rough grading and excavation or filling to bring the site to final grade.

Table 3.9-1 demonstrates typical noise levels generated by equipment that would be used during construction of the NBWRP. As shown, equipment noise levels at 50 feet would range between 74 dBA to up to 101 dBA. The highest noise levels would occur during jack and bore tunneling and directional drilling, which would produce noise levels comparable to those generated by pile driving operations and rock drilling operations, respectively. Jack and bore tunneling and directional drilling would only be used to construct pipelines when open cut trenching is not feasible due to limited construction area, geotechnical conditions, or presence of sensitive biological resources such as wetlands or riparian habitat.

No Project Alternative

The NBWRP would not be implemented under the No Project Alternative, therefore no impact would occur. For a discussion of the No Project under future conditions, see No Action Alternative below.

No Action Alternative

Under the No Action Alternative, which includes consideration of future conditions, it is likely that a subset of water recycling projects would be implemented by the Member Agencies on an individual basis, without the benefit of regional coordination or federal funding.

**TABLE 3.9-1
TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVELS**

Equipment	Typical Noise Level (dBA) 50 feet from Source
Air Compressor	81
Backhoe	80
Compactor	82
Crane, Mobile	83
Dozer	85
Grader	85
Jack Hammer	88
Loader	85
Paver	89
Pile Driver (Impact)	101
Rock Drill	98
Roller	74
Saw	76
Truck	88

SOURCE: FTA, 2006.

For comparison to the Action Alternatives, it is estimated that approximately 17.5 miles of new pipeline, 912 HP of pumping capacity, treatment facilities providing 0.5 mgd of tertiary capacity, and approximately 65 AF of storage would be constructed by Member Agencies on an individual basis (see **Chart 3.9-1, No Action**).

Under future baseline (2020) conditions, noise conditions within the region would likely continue being regulated by the local ordinances. Construction and operation of proposed facilities would contribute to noise. However, implementation of **Mitigation Measure 3.9.1**, which includes notifying residences and sensitive receptors of construction activities, locating noise-generating equipment away from sensitive receptors, and limiting the hours of construction, would reduce the impact to a less-than significant-level. A discussion of individual Member Agencies is provided below.

LGVSD/ NMWD

There would be no project facilities constructed under the No Action Alternative; therefore, no impact would occur.

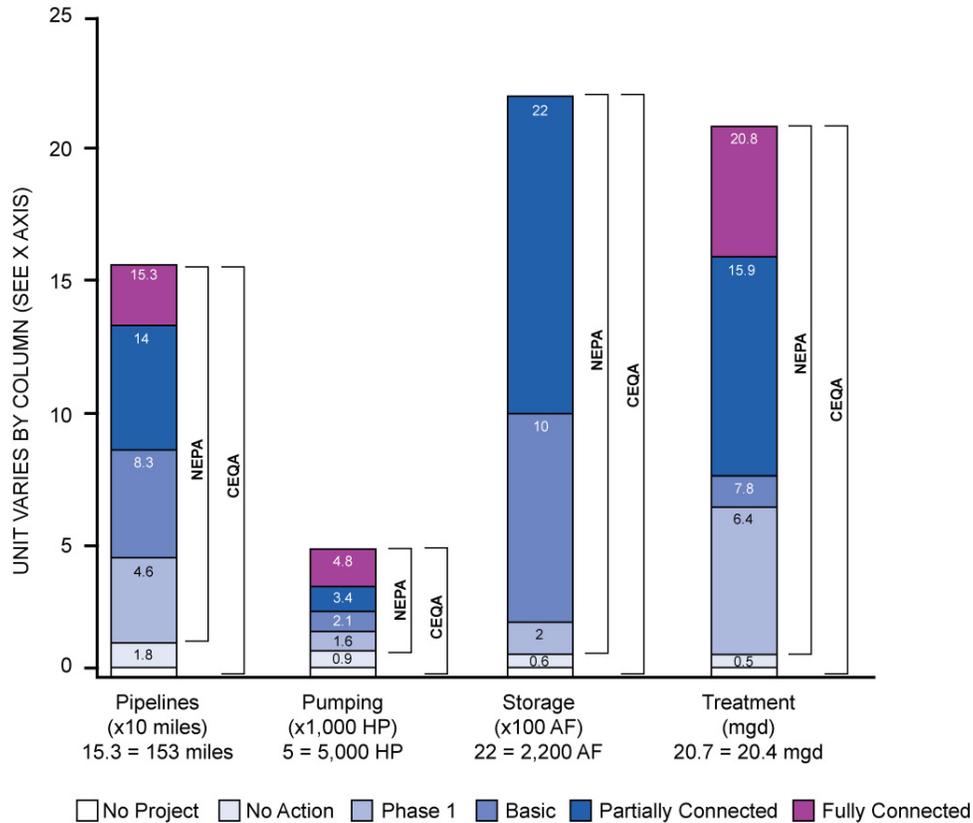
Novato SD/ NMWD and SVCSD

Refer to the discussion under Phase 1 below.

Napa SD

There would be no project facilities constructed under the No Action Alternative; therefore, no impact would occur.

**CHART 3.9-1
COMPARISON OF NEPA AND CEQA BASELINES FOR PROPOSED FACILITIES, BY ALTERNATIVE**



SOURCE: CDM, 2009

Phase 1 (Project level)

Compared to the CEQA Baseline, Phase 1 projects would provide 46 miles of new pipeline, 1,655 HP of pumping capacity, treatment facilities providing 6.4 mgd of tertiary capacity, and 65 AF of storage. Compared to the No Action Alternative (NEPA Baseline), Phase 1 projects would provide 28 miles of new pipeline, 743 HP of pumping capacity, treatment facilities providing 5.9 mgd of tertiary capacity, and no additional storage.

The temporary construction noise impacts associated with the proposed facilities under Phase 1 would be equivalent to and greater than the impacts discussed for the No Action Alternative, in proportion to the facilities constructed under this alternative. A discussion of noise impacts by Member Agency is provided below.

LGVS/NMWD

Under Phase 1, LGVS would upgrade tertiary treatment capacity at the LGVS WWTP and construct a new booster pump station; NMWD would install one of three pipeline options,

described in **Chapter 2, Project Description**, which would connect the LGVSD WWTP Recycled Water Treatment Facility to facilities constructed by NMWD. As shown in Table 3.9-1, equipment used to construct new pipelines would generate substantial noise levels especially when jack and bore tunneling or directional drilling would be required. Furthermore, the proposed pipeline would pass through two different jurisdictions in the LGVSD and would therefore be subject to different noise ordinances depending on the location of the activities.

Some pipeline construction for Options A, B, and C from the LGVSD WWTP would occur in unincorporated Marin County while the remaining in the city of Novato. Pipeline for Options A and C would begin at the existing LGVSD WWTP, approximately 2,000 feet north of residences. Construction for Options A and C would occur within 50 feet of residences where the pipelines connect with the NMWD facilities. Pipeline for Option C, heading north from the WWTP, would be installed along the levee road by Miller Creek to South Oakwood Drive, where it would connect with the Coast Guard Housing Distribution Loop. The Coast Guard Housing Distribution Loop pipeline would pass within 50 feet of residential property lines located along Club View Drive, Bolling Circle, South Oakwood Drive, Hangar Avenue, and Main Gate Road. Noise levels from pipeline construction activity could range up to 101 dBA at these residences from jack and bore tunneling or directional drilling or up to 89 dBA if neither technique is used. Additionally, the new pipeline would pass within close proximity to the Unity in Marin Church located on Palm Drive.

The Marin County Code restricts construction activities to between the hours of 7 a.m. and 6 p.m. on Monday through Friday and between the hours of 9 a.m. and 5 p.m. on Saturdays. Construction activities in Marin County are strictly prohibited on Sundays and holidays. Furthermore, loud noise-generating construction equipment such as backhoes, generators, and jackhammers may only be used from 8 a.m. to 5 p.m. on Monday through Friday. Special exemptions to this rule may occur for public utility projects. In addition to rules set forth in the Marin County Code, the Marin Countywide Plan requires as a condition of permit approval for large construction projects, that construction management shall develop a noise reduction plan and designate a disturbance coordinator to implement the plan.

The City of Novato noise ordinance limits construction hours to between the hours of 7 a.m. and 6 p.m. on weekdays and between the hours of 10 a.m. and 5 p.m. on Saturdays. Construction activities in the city of Novato are not permitted on Sundays or on any federal holidays. Authorized grading activities are only permitted on weekdays when City inspectors are available to monitor activities.

A new pump station would be constructed at the existing LGVSD WWTP. The nearest sensitive receptors to the proposed pump station site are located over 2,000 feet to the southwest. Maximum noise levels at these receptors would be approximately 49 dBA. Therefore, noise increases generated during construction would be barely perceptible at these sensitive receptors. Furthermore, the city of San Rafael's noise ordinance would restrict construction activities to between the hours of 7 a.m. and 6 p.m. on Monday through Friday and between the hours of 9 a.m. and 5 p.m. on Saturdays. Construction activities on Sundays and holidays would be strictly prohibited. In addition, the City's noise ordinance requires that noise levels do not exceed 90 dBA outside of the project plane.

An existing 0.5-million-gallon storage tank located north of the Hangar Avenue and Palm Drive intersection would be rehabilitated to store recycled water. Nearby sensitive receptors would include residences located approximately 500 feet to the east and west of the storage tank. Noise levels at 500 feet would be approximately 64 dBA, which could represent an increase in ambient noise levels. However, construction activities would be required to comply with the City of Novato's noise ordinance as described previously.

As described above, noise levels would be limited to hours set forth in applicable noise ordinances. Construction of pipelines would progress in a linear fashion; thus, receptors would only be exposed to excessive noise levels for a few days. Implementation of **Mitigation Measure 3.9.1** would ensure that the short-term construction noise would not result in significant nuisance impacts by requiring effective sound control devices for stationary construction equipment and by requiring pre-construction notification to nearby residences and sensitive receptors. Implementation of this mitigation measure would ensure that construction noise impacts associated with Phase 1 would be less than significant.

Novato SD/NMWD

Under Phase 1, the Novato SD would construct 9.9 miles of new pipeline to expand its existing service area. Major roadways affected by construction would include Atherton Avenue, Olive Avenue, Redwood Boulevard, DeLong Avenue, Novato Boulevard and S. Novato Boulevard. A large portion of these new pipelines would pass within 50 to 100 feet of existing residential receptors. Other sensitive receptors located near the proposed pipeline route include the Novato Community Hospital, Noah's Ark Preschool, Church of Christ, Montessori School of Novato, Novato United Methodist Church, Pleasant Care Convalescent Hospital, Terry's Teddy Bear Preschool, Hill Middle School, Nova High School, and Olive Elementary School. As shown in **Table 3.9-1**, construction equipment could generate substantial increase in noise levels. Pipeline construction noise levels at 50 to 100 feet can be expected to be up to approximately 101 and 93.5 dBA respectively, assuming that jack and bore tunneling would be required.

Most of the 9.9 miles of new pipeline would be subject to the City of Novato's noise ordinance as defined previously. A small portion of the project located just north of Atherton Avenue would be subject to noise restrictions set forth in the Marin County Code and the Marin Countywide Plan.

Two new pump stations associated with the Novato SD would be constructed as part of Phase 1 implementation. The first pump station would be located at the existing Davidson Street WWTP. The nearest sensitive receptors to the WWTP are residences located approximately 150 feet north of the WWTP. Noise levels could be as high as 77 dBA at these receptors. The WWTP is located in the city of Novato and construction would therefore be subject to the noise restrictions for the City as described above. The second pump station would be installed near the intersection of Atherton Avenue and Olive Avenue. There are residential receptors located along Atherton Avenue that could be affected by construction noise. Construction activities at this site would fall under the jurisdiction of unincorporated Marin County, and would be required to abide by Marin County construction noise restrictions as described above.

A 0.5-million gallon storage tank located north of Olive Avenue would be rehabilitated and used for recycled water storage. The nearest sensitive receptor is a residence located approximately 100 feet south of the existing storage tanks. This receptor could be exposed to noise levels up to 81.5 dBA; however construction would be limited by noise restrictions set forth in the City of Novato's municipal code.

As described above, noise levels generated during construction of Phase 1 would be limited by the noise ordinance set forth in the City of Novato Municipal Code and the Marin County Code. The construction activities within the Novato SD would not likely violate a local code or standard. With implementation of **Mitigation Measure 3.9.1**, potential noise impacts from construction activities would be less than significant.

SVCS

Phase 1 would include construction of approximately 5.2 miles of new pipeline to distribute treated wastewater from the SVCS WWTP. The new pipeline alignments would be constructed primarily along existing roads, including: Highway 116 (Stage Gulch Road); Arnold Drive; and Watmaugh Road. There are a number of residential properties located within 50 feet of the western edge of Arnold Drive between Leveroni Road and Watermaugh Road. Broadway is also lined with residential receptors. Other sensitive receptors that could be affected by construction noise include Adele Harrison Middle School, Sonoma Valley High School, Presentation School, and Sonoma Seventh Day Adventist Church. Some of these receptors are located within 100 feet of Broadway. The noise levels would be similar to those discussed under Novato SD above.

The proposed pipelines associated with the SVCS system would be located in the city of Sonoma and in unincorporated Sonoma County. The County of Sonoma General Plan Noise Element does not specifically address intermittent or short-term construction noises, and a noise ordinance has not yet been adopted by the County. However, pursuant to **Mitigation Measure 3.9-1**, construction activities in unincorporated Sonoma County would be limited to between the hours the 7 a.m. and 6 p.m. on weekdays and from 9 a.m. to 5 p.m. on Saturdays. According to the City of Sonoma noise ordinance, construction activities are only permitted between the hours of 8 a.m. and 6 p.m. on Monday through Friday, between 9 a.m. and 6 p.m. on Saturdays, and between 10 a.m. and 6 p.m. on Sundays and holidays. Additionally, pursuant to the City code, noise levels generated by construction equipment must not exceed 90 dBA at any point outside of the construction site. Noise levels generated from jack and bore tunneling and directional drilling could exceed 90 dBA outside of the construction sites and would remain above 90 dBA up to a distance of approximately 150 feet, which would be an apparent violation of the City's municipal code. Depending on the specific locations of the jack and bore and directional drilling locations relative to existing sensitive receptor locations, project impacts could be potentially significant.

A new pump station and pond would be constructed at the existing SVCS WWTP. There are a few residential receptors located within approximately 500 feet of the existing WWTP. Therefore, nearby receptors could be exposed to noise levels as high as 64 dBA. Construction activities would be limited by the City of Sonoma's noise ordinance as defined above.

As described above, noise levels during construction of Phase 1 would be limited to the hours set forth in the City of Sonoma noise ordinance. Implementation of **Mitigation Measure 3.9.1** would further reduce potential noise impacts to less than significant levels, with the exception of jack and bore and hammer bore construction activities, which could remain potentially significant and unavoidable depending on the specific locations of those activities.

Under Phase 1, the Napa Salt Marsh Restoration Project would include construction of one of the three alternative pipelines to the salt ponds as discussed in **Chapter 2, Project Description**). Both the proposed pipeline alignment and the Alternative Routes would traverse areas of cultivated vineyard and open areas. There are no sensitive receptors along the proposed alignment. There is one winery located near Ramal Road and Buchli Station Road that would potentially be affected by construction activities for a short period. A new pump station would be constructed at the existing WWTP. There are a few residential receptors located within approximately 500 feet of the existing WWTP. Therefore, nearby receptors could be exposed to noise levels as high as 64 dBA. Construction activities would be limited by the City of Sonoma's noise ordinance as defined above. As described above, noise levels during construction of Phase 1 would be limited to the hours set forth in the City of Sonoma noise ordinance. Implementation of **Mitigation Measure 3.9.1** would further reduce potential noise impacts to less than significant levels, with the exception of jack and bore and hammer bore construction activities, which could remain potentially significant and unavoidable depending on the specific locations of those activities.

Napa SD

Construction of new pipelines associated with the Napa SD would cause temporary increases in ambient noise levels. The proposed pipelines would primarily be constructed along Imola Avenue, 4th Avenue, Kreuzer Lane, Coombsville Road, Wild Horse Valley Road, First Avenue, Hagen Road, Second Avenue, Third Avenue, East 3rd Avenue, North 3rd Avenue, North Avenue, Olive Hill Lane, Magnolia Drive, Biava Lane, Kirkland Road, La Londe Lane, and Loma Heights Road. There are a number of residences along these roadways that could be impacted by temporary construction noise. Other sensitive receptors located within close proximity of the proposed pipelines include the Napa Children's Center and Mount Saint George Elementary School. The noise levels would be similar to those discussed under Novato SD and SVCSD.

The portion of pipeline that would extend from Highway 29 along Imola Avenue to Soscol Avenue would be located in the City of Napa. The remainder of the proposed pipeline would be within unincorporated Napa County.

Construction activities within the city of Napa are limited to between the hours of 7 a.m. to 7 p.m. on Monday through Friday and between the hours of 8 a.m. and 4 p.m. on weekends and holidays. The City also prohibits start up of machines and equipment prior to 8 a.m. and prohibits delivery of material prior to 7:30 a.m. and after 5:00 p.m. on Monday through Friday. Furthermore, all muffler systems on construction equipment used in the City must be properly maintained and construction and grading equipment must be shut down when not in use.

Construction activities within Napa County are limited to between the hours of 7 a.m. to 7 p.m. Furthermore, it is recommended that when economically and technically feasible, construction noise levels shall not exceed 75 dBA at residential receptors, 80 dBA at commercial receptors, and 85 dBA at industrial receptors. Assuming that there would be residences located within 50 feet of construction activities, it is likely that noise levels at residential receptors would exceed the recommended noise level of 75 dBA, especially if jack and bore tunneling or directional drilling is required near residential receptors. However, due to the nature of the linear nature of pipeline construction, construction equipment would not remain within close proximity to any one receptor for an extended period of time. Furthermore, implementation of **Mitigation Measure 3.9-1** would reduce noise levels and associated nuisance impacts to the maximum extent feasible, resulting in less than significant impacts.

Four new pump stations associated with the Napa SD would be constructed under implementation of Phase 1. These pump stations would be installed adjacent to Imola Avenue, Coombsville Road/Wild Horse Valley Road, East 3rd Avenue, and 3rd Avenue. The pump station on Imola Avenue would be located within close proximity to the Napa Children's Center as well as a number of existing residences. The pump stations on Coombsville Road/Wild Horse Valley Road, East 3rd Avenue, and 3rd Avenue would be located in more rural areas; however, there would still be some residential receptors in the vicinity of the new pump stations. Construction activities associated with these pump stations would be subject to the noise restrictions for Napa County as described previously. As with construction of pipelines, it is likely that these activities would result in noise levels above 75 dBA at residential receptors. However, implementation of **Mitigation Measure 3.9.1** would reduce these impacts to the maximum extent feasible and impacts from pump station construction would be less than significant.

Upgrades to the existing WWTP could result in noise levels from construction equipment. However there are no sensitive receptors located within a mile of the existing WWTP; therefore, these levels would not negatively impact a sensitive receptor.

Alternative 1: Basic System (Program level)

Compared to the CEQA Baseline, the Basic System projects would provide 83 miles of new pipeline, 2,158 HP of pumping capacity, treatment facilities providing 7.8 mgd of tertiary capacity, and 1,020 AF of storage. Compared to the No Action Alternative (NEPA Baseline), Basic System would provide 65 miles of new pipeline, 1,246 HP of pumping capacity, treatment facilities providing 7.3 mgd of tertiary capacity, and 955 AF of storage.

The temporary construction noise impacts associated with the proposed facilities under the Basic System would be equivalent to and greater than the impacts discussed for Phase 1, in proportion to the facilities constructed under this alternative. However, implementation of **Mitigation Measure 3.9.1** would reduce these impacts to less than significant. A discussion of temporary construction noise impacts by Member Agency is provided below.

LGVSD/NMWD

In addition to impacts associated with construction of Phase 1, the Basic System would require additional upgrades to the existing LGVSD WWTP and rehabilitation of one existing 0.5 million gallon reservoir in the southern portion of the Novato Urban Recycled Water Action area. Equipment used during these activities would generate temporary substantial noise levels; however, use of this equipment would be regulated by noise restrictions set forth in applicable noise ordinances. Therefore, with implementation of **Mitigation Measure 3.9.1** for the additional components, the impacts would be less than significant.

Novato SD/NMWD

The Basic System would include additional pipeline to extend the Novato SD service area to the northern and central portions of the Novato Urban Recycled Water Action area, including the Stone Tree Golf Course. This new pipeline would generally follow Highway 37 and would pass by a few residential receptors located within close proximity to Stone Tree Golf Course, thereby temporarily increasing noise levels at these residences. However, construction activities would be limited by the City of Novato and Marin County noise ordinances as described above. Furthermore, implementation of **Mitigation Measure 3.9.1** would reduce any additional impacts to a less than significant level.

One existing 0.5-million gallon reservoir in the northern portion of the Novato Urban Recycled Water Action area would be rehabilitated for recycled water use and upgrades would be made to the existing Novato SD WWTP. Equipment used during these activities could generate temporary substantial noise levels; however, use of this equipment would be regulated by applicable noise ordinances. With implementation of **Mitigation Measure 3.9.1**, impacts would be less than significant.

SVCS

In addition to pipelines constructed under Phase 1, the pipeline along Arnold Drive would extend north to bring recycled water towards the Sonoma Valley Golf Club. Along Arnold Drive, construction equipment would pass within close proximity to a number of existing residents as well as the Little Shepherd Pre-School and Altimira Middle School. As mentioned previously, County of Sonoma has not set noise limitations for construction activities. However, **Mitigation Measure 3.9.1** would restrict construction activities to daytime hours within unincorporated areas of Sonoma County. With implementation of **Mitigation Measure 3.9.1**, the impacts would be less than significant, with the exception of jack and bore and hammer bore construction activities, which could remain potentially significant depending on the specific locations of those activities.

A new recycled water pond would be constructed near the existing SVCS WWTP. Please refer to the discussion under Phase 1. With implementation of **Mitigation Measure 3.9.1**, the impact would be less than significant.

Napa SD

The Basic System would include construction of additional pipeline to serve the Carneros East Service Area. This pipeline would primarily cross through agricultural and open space lands and

would therefore be unlikely to affect a sensitive receptor. In addition to new pipeline, existing ponds at the Napa SD WWTP would be reconfigured for recycled water storage. As mentioned previously, there are no sensitive receptors within a mile of the Napa SD WWTP. Please refer to the discussion under Phase 1. Implementation of **Mitigation Measure 3.9.1** would further reduce any potential impacts.

Alternative 2: Partially Connected System (Program level)

Compared to the CEQA Baseline, the Partially Connected System would provide 139 miles of new pipeline, 3,454 HP of pumping capacity, treatment facilities providing 15.9 mgd of tertiary capacity, and 2,220 AF of storage. Compared to the No Action Alternative (NEPA Baseline), the Partially Connected System would provide 122 miles of new pipeline, 2,542 HP of pumping capacity, treatment facilities providing 15.4 mgd of tertiary capacity, and 2,155 AF of storage.

The temporary construction noise impacts associated with the proposed facilities under the Partially Connected System would be equivalent to and greater than the impacts discussed for the Basic System, in proportion to the facilities constructed under this alternative. As with Phase 1 and the Basic System, implementation of **Mitigation Measure 3.9.1** would reduce impacts to a less-than-significant level. A discussion of temporary construction noise impacts by Member Agency is provided below.

LGVSD/NMWD

Under the Partially Connected System, the existing LGVSD pipeline system would be extended to serve the Peacock Gap Golf Course Reuse Area. This pipeline would extend within close proximity to a number of residents, schools and churches located on or near North San Pedro Drive as well as residents located near the Peacock Gap Golf Course. Therefore, temporary increases in noise levels from construction activities could negatively impact these receptors. Portions of the proposed pipeline would fall under the jurisdiction of the city of San Rafael; however, most of the pipeline would be located in unincorporated Marin County. As discussed previously, the City of San Rafael requires that construction noise levels do not exceed 90 dBA at any point outside the property line. Therefore, if jack and bore tunneling or directional drilling would be required within 150 feet of the construction site boundary, impacts would be potentially significant. Implementation of **Mitigation Measure 3.9.1** would reduce impacts to the most extent feasible.

An existing 0.5-million gallon drinking water reservoir near the Peacock Gap Golf Course would be rehabilitated for recycled water storage. Construction activities associated with reservoir rehabilitation would be limited by noise restrictions set forth by the Marin County Code. Therefore, with implementation of **Mitigation Measure 3.9.1** impacts would be less than significant.

Novato SD/NMWD

Novato SD would install additional pipelines to serve the northern, central and western portions of the Novato Urban Recycled Water Action area. New pipeline heading north from Hill Road and Diablo Avenue would traverse through an existing residential community and would potentially pass within close proximity to a number of schools and churches. New pipeline heading south from Main Gate Road would also be likely to pass through existing residential

neighborhoods. These new pipelines would be located in either the city of Novato or Marin County and would therefore be subject to the noise ordinances for these jurisdictions. As with Alternative 1, construction noise impacts would be less than significant with implementation of **Mitigation Measure 3.9.1**.

Two existing 0.5-million gallon drinking water reservoirs in the northern and western portions of the Novato Urban Recycled Water Action area would be rehabilitated for recycled water storage. Construction equipment used for rehabilitation could result in substantial noise levels that would have the potential to affect a sensitive receptor; however, these activities would be limited by applicable noise ordinances. Furthermore, implementation of **Mitigation Measure 3.9.1** would reduce any potentially significant noise impacts to less than significant.

SVCS D

Under the Partially Connected System, SVCS D would construct additional pipeline to serve the Carneros West service area as well as the Southern Sonoma Valley service area. New pipeline in the Carneros West service area would transverse through primarily agricultural and open space lands. The Napa County noise ordinance would limit construction activities associated with the Carneros East pipeline. New pipeline used to serve the Southern Sonoma Valley service area would generally pass through rural and agricultural areas, only passing within close proximity to a few residential receptors. This pipeline would fall under the jurisdiction of Sonoma County. With implementation of **Mitigation Measure 3.9.1**, impacts from construction of these pipelines would be less than significant.

SVCS D would construct a new storage pond near the existing SVCS D WWTP and would also develop additional system storage in the Carneros Service Area. These activities could generate substantial noise levels; however with implementation of **Mitigation Measure 3.9.1** impacts would be less than significant.

Napa SD

Napa SD would extend service to the Napa MST service area under implementation of the Partially Connected System. This would require construction of a new pipeline that would potentially pass within close proximity to existing residential receptors. Construction activities would generate substantial noise levels; however the Napa County noise ordinance would restrict these levels. Implementation of **Mitigation Measure 3.9.1** would reduce impacts to less than significant.

In addition to new pipelines, Napa SD would construct a new 1.5-million gallon storage reservoir in the MST area. Construction activities associated with the proposed reservoir could impact a number of sensitive receptors depending on where the reservoir is located; however, construction activities used to develop the new reservoir would be required to comply with all applicable noise ordinances. Furthermore, implementation of **Mitigation Measure 3.9.1** would reduce impacts to less than significant.

Alternative 3: Fully Connected System (Program level)

Compared to the CEQA Baseline, the Fully Connected System would provide 153 miles of new pipeline, 5,021 HP of pumping capacity, treatment facilities providing 20.8 mgd of tertiary capacity, and 2,220 AF of storage. Compared to the No Action Alternative (NEPA Baseline), the Fully Connected System would provide 135 miles of new pipeline, 3,907 HP of pumping capacity, treatment facilities providing 20.3 mgd of tertiary capacity, and 2,155 AF of storage.

The temporary construction noise impacts under the Fully Connected System would be equivalent to and greater than the impacts discussed for the Partially Connected System, in proportion to the facilities constructed under this alternative. However, with implementation of **Mitigation Measure 3.9.1** these impacts would be less than significant. A discussion of temporary construction noise impacts by Member Agency is provided below.

LGVSD/NMWD

Additional upgrades at the LGVSD WWTP could generate temporary noise increase. However, as discussed above for the other alternatives, these impacts would be limited by applicable noise ordinances. Furthermore, with implementation of **Mitigation Measure 3.9.1** impacts would be less than significant.

Novato SD/NMWD

Upgrades to the Novato SD WWTP could generate temporary noise increase from use of heavy duty equipment. However, as discussed above for the other alternatives, these impacts would be limited by applicable noise ordinances. Furthermore, with implementation of **Mitigation Measure 3.9.1** impacts would be less than significant.

SVCS

SVCS would construct an additional pipeline segment to connect to the Novato SD, thereby connected all four systems. This pipeline would be constructed through the Sears Point area and would not pass by a large number of sensitive receptors. As mentioned previously, Sonoma County has not adopted a noise ordinance; therefore the construction activities associated with this additional length of pipeline would be subject to the City of Sonoma noise ordinance. With implementation of **Mitigation Measure 3.9.1** impacts would be less than significant.

Napa SD

Upgrades to the Napa SD WWTP could generate temporary noise increase from use of heavy duty equipment. However, as discussed above for the other alternatives, there are no sensitive receptors located within close proximity to the facility. Furthermore, with implementation of **Mitigation Measure 3.9.1** impacts would be less than significant.

Mitigation Measures

Mitigation Measure 3.9.1: The appropriate Member Agency shall develop and implement a Construction Noise Reduction Plan that requires, at a minimum, the following:

- The contractor shall locate all stationary noise-generating equipment, including hammer bore and drill rigs, as far as possible from nearby noise-sensitive receptors. Stationary noise sources located within 500 feet of noise-sensitive receptors shall be equipped with noise reducing engine housings, and the line of sight between such sources and nearby sensitive receptors shall be blocked by portable acoustic barriers.
- The contractor shall assure that construction equipment with internal combustion engines have sound control devices at least as effective as those provided by the original equipment manufacturer. No equipment shall be permitted to have an unmuffled exhaust.
- All construction activities within unincorporated Sonoma County shall be limited to between the hours of 7 a.m. and 6 p.m. on weekdays and between 9 a.m. and 5 p.m. on Saturdays.
- Residences and other sensitive receptors within 200 feet of a construction area shall be notified of the construction schedule in writing, at least two weeks prior to the commencement of construction activities. This notice shall indicate the allowable hours of construction activities as specified by the applicable local jurisdiction or as defined by this mitigation measure. The construction contractor shall designate a noise disturbance coordinator who would be responsible for responding to complaints regarding construction noise. The coordinator shall determine the cause of the complaint and ensure that reasonable measures are implemented to correct the problem. A contact number for the noise disturbance coordinator shall be conspicuously placed on construction site fences and entrances and included in the construction schedule notification sent to nearby residences and sensitive receptors.

Impact Significance after Mitigation: Less than Significant.

Impact 3.9.2: Temporary vibration impacts. Construction activities could expose sensitive receptors to excessive ground-borne vibration levels. (Less than Significant with Mitigation)

Building damage is typically the primary issue concerning temporary construction impacts from vibration. Construction activities that may result in temporary vibration impacts include jack and bore tunneling and directional drilling. These construction techniques would be used when open trenching is not feasible due to limited construction area, geotechnical conditions, or presence of sensitive biological resources such as wetlands or riparian habitat.

Table 3.9-2 displays typical vibration levels associated with jack and bore tunneling and directional drilling. Sturdy buildings constructed with reinforced-concrete, steel or timber can typically be exposed to PPV levels of up to 0.50 inches per second without being damaged; however, more fragile buildings can be damaged by a PPV level of 0.12 inches per second (FTA, 2006). As shown, jack and bore tunneling could cause damage to sturdy structures within 25 feet of the construction site or to fragile structures within 75 to 100 feet of the construction site. Therefore, impacts from vibration generated during jack and bore tunneling would be potentially significant. Directional drilling activities would not cause ground borne vibrations that could cause structural damage to existing buildings; therefore, directional drilling activities would have a less-than-significant impact in regards to vibration.

**TABLE 3.9-2
VIBRATION VELOCITIES FOR CONSTRUCTION EQUIPMENT**

Distance (feet)	Peak Particle Velocity (inches per second)	
	Jack and Bore ^a	Directional Drilling ^b
25	0.644	0.089
50	0.228	0.031
75	0.124	0.017
100	0.081	0.011
150	0.044	0.006

^a Peak particle velocities from jack and bore operations were assumed to be comparable to impact pile driving techniques.

^b Peak particle velocities from directional drilling operations were assumed to be comparable to drilling techniques.

SOURCE: FTA, 2006.

No Project Alternative

The NBWRP would not be implemented under the No Project Alternative, therefore no impact would occur. For a discussion of the No Project under future conditions, see No Action Alternative below.

No Action Alternative

Under the No Action Alternative, which includes consideration of future conditions, it is likely that a subset of water recycling projects would be implemented by the Member Agencies on an individual basis, without the benefit of regional coordination or federal funding. Therefore, there would be a decreased chance that jack and bore tunneling would cause damage to existing structures. Nevertheless, if jack and bore tunneling would be employed within 100 feet of a fragile structure or 25 feet of a sturdy structure, impacts would be potentially significant.

For comparison to the Action Alternatives, it is estimated that approximately 17.5 miles of new pipeline, 912 HP of pumping capacity, treatment facilities providing 0.5 mgd of tertiary capacity, and approximately 65 AF of storage would be constructed by Member Agencies on an individual basis (see Chart 3.9-1, No Action).

Under future baseline (2020) conditions, noise conditions within the region would likely continue being regulated by the local ordinances. Operation of proposed facilities could contribute to noise. However implementation of **Mitigation Measure 3.9.2**, which includes development and implementation of a Construction Vibration Mitigation Plan and the use of trenchless technology, would reduce the impact to less-than-significant-level. A discussion of individual Member Agencies is provided below.

LGVS/NMWD

There would be no project facilities constructed under the No Action Alternative; therefore, no impact would occur.

Novato SD/ NMWD and SVCSD

Refer to the discussion above and **Mitigation Measure 3.9.2**.

Napa SD

There would be no project facilities constructed under the No Action Alternative; therefore, no impact would occur.

Phase 1 (Project level)

Compared to the CEQA Baseline, Phase 1 projects would provide 46 miles of new pipeline, 1,655 HP of pumping capacity, treatment facilities providing 6.4 mgd of tertiary capacity, and 65 AF of storage. Compared to the No Action Alternative (NEPA Baseline), Phase 1 projects would provide 28 miles of new pipeline, 743 HP of pumping capacity, treatment facilities providing 5.9 mgd of tertiary capacity, and no additional storage.

Under Phase 1, LGVSD would upgrade tertiary treatment capacity at the LGVSD and construct a new booster pump station; NMWD would install one of three pipeline options, described in **Chapter 2, Project Description**, which would connect the LGVSD WWT Recycled Water Treatment Facility to facilities constructed by NMWD. The temporary vibration impacts associated with the proposed facilities under Phase 1 would be equivalent to and greater than the impacts discussed for the No Action Alternative, in proportion to the facilities constructed under this alternative.

Most of the pipeline, for all options, under Phase 1 would be installed along existing roadways and would not require use of jack and bore tunneling. However, if jack and bore tunneling would be required near existing structures, impacts from ground borne vibration would be potentially significant. Implementation of **Mitigation Measure 3.9.2** would require the construction contractor to use alternatives to jack and bore tunneling when activities would take place within 100 feet of an existing structure. If use of other trenchless technologies such as directional drilling or pipeline suspension would not be feasible, the contractor would be required to develop a Construction Vibration Mitigation Plan to ensure that no structures would be damaged by proposed activities. With implementation of **Mitigation Measure 3.9.2**, impacts would be less than significant. A discussion of temporary vibration impacts by Member Agency is provided below.

LGVSD/NMWD

Under Phase 1, impacts associated with construction of pipelines at stream crossings would be similar to those discussed above. The impacts would occur in primarily residential areas and open recreational areas. With implementation of **Mitigation Measure 3.9.2**, impacts would be less than significant.

Novato SD/NMWD

A jack and bore crossing under U.S. 101 from Rowland Boulevard to Redwood Boulevard is proposed as part of Novato SD's Phase 1 projects. This crossing would be located within close

proximity to a number of existing structures and would therefore have a potentially significant vibration impact. Please refer to the discussion under LGVSD.

SVCS and Napa SD

Please see discussion above.

Alternative 1: Basic System (Program level)

Compared to the CEQA Baseline, the Basic System projects would provide 83 miles of new pipeline, 2,158 HP of pumping capacity, treatment facilities providing 7.8 mgd of tertiary capacity, and 1,020 AF of storage. Compared to the No Action Alternative (NEPA Baseline), Basic System would provide 65 miles of new pipeline, 1,246 HP of pumping capacity, treatment facilities providing 7.3 mgd of tertiary capacity, and 955 AF of storage.

The temporary vibration impacts associated with the proposed facilities under the Basic System would be equivalent to and greater than the impacts discussed for Phase 1, in proportion to the facilities constructed under this alternative. A discussion of temporary vibration impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/NMWD, SVCS, Napa SD

Implementation of the Basic System would include construction of an additional 24 miles of new pipeline not included as part of Phase 1. Most of this additional pipeline would be installed in rural or undeveloped lands where use of jack and bore tunneling to construct the additional pipeline would be less likely to cause damage to existing structures. However, if jack and bore tunneling would be required near existing structures, impacts from ground borne vibration would be potentially significant. As with Phase 1, implementation of **Mitigation Measure 3.9.2** would reduce impacts from the Basic System construction to less than significant.

Alternative 2: Partially Connected System (Program level)

Compared to the CEQA Baseline, the Partially Connected System would provide 139 miles of new pipeline, 3,454 HP of pumping capacity, treatment facilities providing 15.9 mgd of tertiary capacity, and 2,220 AF of storage. Compared to the No Action Alternative (NEPA Baseline), the Partially Connected System would provide 122 miles of new pipeline, 2,542 HP of pumping capacity, treatment facilities providing 15.4 mgd of tertiary capacity, and 2,155 AF of storage.

The temporary vibration impacts associated with the proposed facilities under the Partially Connected System would be equivalent to and greater than the impacts discussed for the Basic System, in proportion to the facilities constructed under this alternative. A discussion of temporary vibration impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/NMWD, SVCS, Napa SD

The impacts associated with Partially Connected System would be essentially equivalent to the impacts discussed for the Basic System; however, the Partially Connected System would include construction of an additional 57 miles of new pipeline. A significant portion of this pipeline

would pass within close proximity to existing structures. Therefore, use of jack and bore tunneling during construction of this additional pipeline would have an increased potential to cause damage to existing structures in the area. Implementation of **Mitigation Measure 3.9.2** would reduce these impacts to less than significant.

Alternative 3: Fully Connected System (Program level)

Compared to the CEQA Baseline, the Fully Connected System would provide 153 miles of new pipeline, 5,021 HP of pumping capacity, treatment facilities providing 20.8 mgd of tertiary capacity, and 2,220 AF of storage. Compared to the No Action Alternative (NEPA Baseline), the Fully Connected System would provide 135 miles of new pipeline, 3,907 HP of pumping capacity, treatment facilities providing 20.3 mgd of tertiary capacity, and 2,155 AF of storage.

The temporary vibration impacts under the Fully Connected System would be equivalent to and greater than the impacts discussed for the Partially Connected System, in proportion to the facilities constructed under this alternative. A discussion of temporary vibration impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/NMWD, SVCSD, Napa SD

Most of the new pipeline proposed under the Fully Connected Alternative would be constructed in rural or undeveloped areas. Therefore, it is unlikely that jack and bore tunneling from the Fully Connected System would have an increased risk of causing damage to existing structures. Implementation of **Mitigation Measure 3.9.2** would help ensure that ground borne vibrations would not cause damage to existing structures and impacts would be less than significant.

Mitigation Measure

Mitigation Measure 3.9.2: The appropriate Member Agency will implement the following measure:

The construction contractor shall use a trenchless technology (e.g., horizontal directional drill, lateral drilling, etc.) other than jack and bore when there are structures within 100 feet of the proposed activities. If the construction contractor provides the Member Agency with acceptable documentation indicating that alternative trenchless technology is not feasible for the crossing, the contractor shall develop and implement a Construction Vibration Mitigation Plan to minimize construction vibration damage using all reasonable and feasible means available, including siting the jack and bore as far a possible from all nearby structures. The plan shall provide a procedure for establishing thresholds and limiting vibration values for potentially affected structures based on an assessment of each structure's ability to withstand the loads and displacements due to construction vibrations. The plan should also include the development of a vibration monitoring plan to be implemented during construction of particular crossing.

Impact Significance after Mitigation: Less than Significant

Impact 3.9.3: Permanent increases to ambient noise levels. Operational activities could permanently generate noise levels above existing ambient levels in the vicinity of sensitive receptor locations. (Less than Significant with Mitigation)

Operation of the facilities included in the NBWRP would not require extensive operation and maintenance activities. Therefore, operational noise levels resulting from mobile sources as a result of employee commute trips or material haul trip would not be expected to increase ambient noise levels in the project vicinity. Impacts would be less than significant from all vehicle trips associated with operation and maintenance of the NBWRP.

New recycled water pipelines would be located beneath the ground and would not generate noise that would be audible at sensitive receptors. Therefore, operational noise impacts from the pipelines would be less than significant.

New storage facilities developed under the NBWRP would involve passive storage of recycled water and would therefore not generate noise levels that could increase existing ambient noise levels. Therefore, operation of all new storage facilities constructed as part of the NBWRP would have a less than significant impact on ambient noise levels.

Distribution and booster pump stations could generate noise levels that would have the potential to permanently increase ambient noise levels. **Table 3.9.3** shows typical noise levels generated by operation of pumps at various distances. These values are based on the assumption that a typical pump produces a noise level of up to 76 dBA at 50 feet from the source.

**TABLE 3.9-3
TYPICAL NOISE LEVELS FROM OPERATION OF NEW PUMP STATIONS**

Distance (Feet)	Noise Level (dBA) ^a
50	76.0
100	68.5
250	58.5
500	51.0
1000	43.5
2000	35.9

^a Noise levels are based on how noise attenuates across a soft site.

SOURCE: FTA, 2006.

No Project Alternative

The NBWRP would not be implemented under the No Project Alternative, therefore no impact would occur. For a discussion of the No Project under future conditions, see No Action Alternative below.

No Action Alternative

Under the No Action Alternative, which includes consideration of future conditions, it is likely that a subset of water recycling projects would be implemented by the Member Agencies on an individual basis, without the benefit of regional coordination or federal funding.

Under future baseline conditions (2020), noise conditions within the region would likely continue being regulated by the local ordinances. For comparison to the Action Alternatives, it is estimated that approximately 17.5 miles of new pipeline, 912 HP of pumping capacity, treatment facilities providing 0.5 mgd of tertiary capacity, and approximately 65 AF of storage would be constructed by Member Agencies on an individual basis (see Chart 3.9-1). However, implementation of **Mitigation Measure 3.9.3** would reduce potentially significant impacts to less-than-significant levels. A discussion of individual Member Agencies is provided below.

LGVSD/NMWD

There would be no project facilities constructed under the No Action Alternative, therefore no impact would occur

Novato SD/NMWD and SVCSD

Refer to the discussion above and **Mitigation Measure 3.9.3**.

Napa SD

There would be no project facilities constructed under the No Action Alternative, therefore no impact would occur

Phase 1 (Project level)

Compared to the CEQA Baseline, Phase 1 projects would provide 46 miles of new pipeline, 1,655 HP of pumping capacity, treatment facilities providing 6.4 mgd of tertiary capacity, and 65 AF of storage. Compared to the No Action Alternative (NEPA Baseline), Phase 1 projects would provide 28 miles of new pipeline, 743 HP of pumping capacity, treatment facilities providing 5.9 mgd of tertiary capacity, and no additional storage.

The ambient noise impacts associated with the proposed facilities under Phase 1 would be equivalent to and greater than the impacts discussed for the No Action Alternative, in proportion to the facilities constructed under this alternative. A discussion of ambient noise impacts by Member Agency is provided below.

LGVSD/NMWD

Implementation of Phase 1 would require modifications at the LGVSD WWTP, and installation of a new booster pump station at the existing LGVSD WWTP. The nearest residential receptors that could potentially be affected by operation of NBWRP components at the WWTP site are located approximately 2,000 feet south west of the WWTP. As demonstrated in Table 3.9.3, noise levels generated by typical pump stations would be approximately 35.9 dBA at these receptors. Therefore, noise generated by the new pump station would not exceed the City of San Rafael's

exterior noise level standards of 50 dBA during daytime hours and 40 dBA during nighttime hours at residential receptors. The impact associated with the pump station would be less than significant.

Novato SD/NMWD

Two new pump stations associated with the Novato SD would be constructed under Phase 1 implementation. The first pump station would be located at the existing Davidson Street WWTP. The nearest sensitive receptors to the Davidson Street WWTP are residences located approximately 150 feet north of the WWTP. Noise levels could be as high as 64.1 dBA at the nearest receptors. This new pump station would be located in the City of Novato, which limits exterior noise levels at residential receptors to 60 dBA during daytime hours and 45 dBA during nighttime hours. Therefore, the new pump station would have the potential to violate exterior noise standards and impacts would be potentially significant.

The second pump station would be installed near the intersection of Atherton Avenue and Olive Avenue. The new pump station could be located with 100 feet of residential receptors located along Atherton Avenue. The Marin County Code does not set exterior noise level standards; however, it can be assumed that noise levels of 68.5 dBA at nearby receptors would be potentially significant and could result in an increase in ambient noise levels.

Implementation of **Mitigation Measure 3.9.3** would reduce potentially significant impacts from new pump stations by reducing noise levels by a minimum of 20 dBA. Therefore, the impacts would be less than significant with mitigation.

SVCS D

A new pump station would be constructed at the existing SVCS D WWTP. There are a few residential receptors located within approximately 500 feet of the existing WWTP. As demonstrated in Table 3.9-3, receptors at 500 feet could be exposed to noise levels up to 51 dBA from operation of the proposed pump station. This would exceed the County of Sonoma's noise level standards of 50 dBA during daytime hours and 45 dBA during nighttime hours. Implementation of **Mitigation Measure 3.9.3** would reduce noise levels by a minimum of 20 dBA, thereby reducing the impacts from the new pump station to less than significant.

Napa SD

Four new pump stations associated with the Napa SD would be installed under implementation of Phase 1. These pump stations would be located on Imola Avenue, Wild Horse Valley Road, East 3rd Avenue and 3rd Avenue. The pump station on Imola Avenue would be located within a few hundred feet of residential receptors. Therefore, assuming worst-case conditions, nearby residences would be exposed to noise levels of 68.5 dBA from pump station operations. These noise levels would be well above the Napa County exterior noise levels of 55 dBA during daytime hours and 45 during nighttime hours at suburban residential receptors. Therefore, the impacts would be potentially significant.

The pump stations on Coombsville Road/Wild Horse Valley Road, East 3rd Avenue and 3rd Avenue would be located primarily in the rural areas of the County; however, they would still have the potential to be located within close proximity to rural residences. Assuming that residential receptors are located within 100 feet of the proposed pump station, these receptors could be exposed to noise levels of up to 68.5 dBA. Such noise levels would be well above the Napa County exterior noise level limits of 50 dBA during daytime hours and 45 dBA during nighttime hours at rural residential receptors. Therefore, the impacts would be potentially significant. Implementation of **Mitigation Measure 3.9-3** would reduce impacts from pump operations. to less than significant levels.

Alternative 1: Basic System (Program level)

Compared to the CEQA Baseline, the Basic System projects would provide 83 miles of new pipeline, 2,158 HP of pumping capacity, treatment facilities providing 7.8 mgd of tertiary capacity, and 1,020 AF of storage. Compared to the No Action Alternative (NEPA Baseline), Basic System would provide 65 miles of new pipeline, 1,246 HP of pumping capacity, treatment facilities providing 7.3 mgd of tertiary capacity, and 955 AF of storage.

The ambient noise impacts associated with the proposed facilities under the Basic System would be equivalent to and greater than the impacts discussed for Phase 1, in proportion to the facilities constructed under this alternative. A discussion of ambient noise impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/NMWD, SVCSD, Napa SD

Implementation of the Basic System would increase power from new and existing pump stations by approximately 460 horsepower more than required under implementation of Phase 1. Operation of new and upgraded pump stations could result in increases to ambient noise levels at existing sensitive receptors depending on where the stations are located with respect to sensitive receptors. Implementation of **Mitigation Measure 3.9.3** would ensure that all new and upgraded pump stations would be designed and located so they would not violate applicable noise standards at nearby residences. Therefore, any potentially significant impacts from operation of new and upgraded pump stations would be mitigated to less than significant levels.

Alternative 2: Partially Connected System (Program level)

Compared to the CEQA Baseline, the Partially Connected System would provide 139 miles of new pipeline, 3,454 HP of pumping capacity, treatment facilities providing 15.9 mgd of tertiary capacity, and 2,220 AF of storage. Compared to the No Action Alternative (NEPA Baseline), the Partially Connected System would provide 122 miles of new pipeline, 2, 542 HP of pumping capacity, treatment facilities providing 15.4 mgd of tertiary capacity, and 2,155 AF of storage.

The ambient noise impacts to proposed facilities under the Partially Connected System would be equivalent to and greater than the impacts discussed for the Basic System, in proportion to the facilities constructed under this alternative. A discussion of ambient noise impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/ NMWD, SVCSD, Napa SD

Implementation of the Partially Connected System would increase power from new and existing pump stations by almost 1,600 horsepower above that required under implementation of the Basic System. Operation of new or upgraded pump stations could result in increases to ambient noise levels at existing sensitive receptors; therefore, impacts would be potentially significant. However, with implementation of **Mitigation Measure 3.9.3**, impacts would be less than significant.

Alternative 3: Fully Connected System (Program level)

Compared to the CEQA Baseline, the Fully Connected System would provide 153 miles of new pipeline, 5,021 HP of pumping capacity, treatment facilities providing 20.8 mgd of tertiary capacity, and 2,220 AF of storage. Compared to the No Action Alternative (NEPA Baseline), the Fully Connected System would provide 135 miles of new pipeline, 3,907 HP of pumping capacity, treatment facilities providing 20.3 mgd of tertiary capacity, and 2,155 AF of storage.

The ambient noise impacts under the Fully Connected System would be equivalent to and greater than the impacts discussed for the Partially Connected System, in proportion to the facilities constructed under this alternative. A discussion of impacts by Member Agency is provided below.

LGVSD/NMWD, Novato SD/NMWD, SVCSD, Napa SD

The Fully Connected System would require approximately 1,360 horsepower of additional pumping capabilities than required under implementation of the Partially Connected System. This additional capacity would be achieved through upgrades to existing pump stations along with construction of new pump stations. Operation of new and upgraded facilities could result in permanent increases to ambient noise levels and would have the potential to violate an applicable noise ordinance. However, implementation of **Mitigation Measure 3.9.3** would reduce these impacts to less than significant.

Mitigation Measure

Mitigation Measure 3.9.3: The appropriate Member Agency shall implement the following measure:

- All new pump stations shall be located within enclosed structures with adequate setback and screening to achieve acceptable regulatory noise standards for industrial uses as well as to achieve acceptable levels at the property lines of nearby residences, as determined by the applicable local jurisdiction. Noise enclosures shall be designed to reduce equipment noise levels by at least 20 dBA.

Impact after Significance: Less than Significant.

3.9.4 Impact Summary by Service Area

Table 3.9-4 provides a summary of potential land use impacts associated with implementation of the NBWRP.

**TABLE 3.9-4
POTENTIAL IMPACTS AND SIGNIFICANCE – NOISE**

Proposed Action	Impact by Member Agency Service Areas			
	LGVSD/ NMWD	Novato SD/ NMWD	SVCSO	Napa SD/ Napa County
Impact 3.9.1: Temporary increase in noise levels.				
No Project Alternative	NI	NI	NI	NI
No Action Alternative	NI	LSM	LSM	NI
Phase 1	LSM	LSM	LSM	LSM
Alternative 1	LSM	LSM	LSM	LSM
Alternative 2	LSM	LSM	LSM	LSM
Alternative 3	LSM	LSM	LSM	LSM
Impact 3.9.2: Temporary vibration.				
No Project Alternative	NI	NI	NI	NI
No Action Alternative	NI	LSM	LSM	NI
Phase 1	LSM	LSM	LSM	LSM
Alternative 1	LSM	LSM	LSM	LSM
Alternative 2	LSM	LSM	LSM	LSM
Alternative 3	LSM	LSM	LSM	LSM
Impact 3.9.3: Permanent increases to ambient noise levels.				
No Project Alternative	NI	NI	NI	NI
No Action Alternative	NI	LSM	LSM	NI
Phase 1	LTS	LSM	LSM	LSM
Alternative 1	LSM	LSM	LSM	LSM
Alternative 2	LSM	LSM	LSM	LSM
Alternative 3	LSM	LSM	LSM	LSM

NI = No Impact

LTS = Less than Significant impact, no mitigation required

LSM = Less than Significant with Mitigation

3.9.5 References

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