4.12 NOISE

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4.12 NOISE

Noise impacts from construction and operation of the Seasonal Storage Project (SSP) facilities are discussed. In addition, noise caused by construction and operational traffic is evaluated. To provide a basis for this evaluation, the Setting section describes the fundamentals of environmental acoustics and the existing noise environment in the vicinity of SSP sites. State and local noise policies are presented to establish the regulatory criteria that the significance of impacts is assessed against.

IMPACTS EVALUATED IN OTHER SECTIONS

All impacts relating to noise are discussed in this section.

SETTING

Fundamentals of Acoustics

Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB) with 0 dB corresponding roughly to the threshold of hearing. Decibels and other acoustical terms are defined in Table 4.12-1.

Most of the sounds that we hear in the environment do not consist of a single frequency, but rather a broad band of frequencies, with each frequency differing in sound level. The intensities of each frequency add together to generate a sound. The method commonly used to quantify environmental sounds consists of evaluating all of the frequencies of a sound in accordance with a filter that reflects the fact that human hearing is less sensitive at low frequencies and extreme high frequencies than in the frequency mid-range. This is called "A" weighting, and the decibel level so measured is called the A-weighted sound level (dBA). In practice, the level of a sound source is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve. Typical A-weighted levels measured in the environment and in industry are shown in Table 4.12-2 for different types of noise.

Although the A-weighted noise level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of noise from distant sources that create a relatively steady background noise in which no particular source is identifiable. To describe the time-varying character of environmental noise, the statistical noise descriptors, L_{01}, L_{10}, L_{50}, and L_{90}, are commonly used. They are the A-weighted noise levels equaled or exceeded during 1%, 10%, 50%, and 90% of a stated time period. A single number descriptor called the L_{eq} is also widely used. The L_{eq} is the average A-weighted noise level during a stated period of time.

In determining the daily level of environmental noise, it is important to account for the difference in response of people to daytime and nighttime noises. During the nighttime, exterior background noises are generally lower than the daytime levels. However, most

household noise also decreases at night and exterior noise becomes very noticeable. Further, most people sleep at night and are very sensitive to noise intrusion. To account for human sensitivity to nighttime noise levels, a descriptor, L_{dn} or DNL (day/night average sound level), was developed. The L_{dn} divides the 24-hour day into the daytime of 7:00 AM to 10:00 PM and the nighttime of 10:00 PM to 7:00 AM. The nighttime noise level is weighted 10 dB higher than the daytime noise level. The Community Noise Equivalent Level (CNEL) is another 24-hour average that includes both an evening and nighttime weighting.

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noise of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA has been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L_{dn}. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57-62 dBA L_{dn} with open windows and 65-70 dBA L_{dn} if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed; those facing major roadways and freeways typically need special glass windows.

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 55 dBA L_{dn}. At an L_{dn} of about 60 dBA, approximately 2 percent of the population is highly annoyed. When the L_{dn} increases to 70 dBA, the percentage of the population highly annoyed increases to about 12 percent of the population. There is, therefore, an increase of about 1 percent per dBA between an L_{dn} of 60-70 dBA. Between an L_{dn} of 70-80 dBA, each decibel increase increases by about 2 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the L_{dn} is 60 dBA, approximately 10 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 2 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 3 percent increase in the percentage of the population highly annoyed.

TABLE 4.12-1
Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted.
L_{02}, L_{08}, L_{25}, L_{50}	The A-weighted noise levels that are exceeded 2%, 8%, 25%, and 50% of the time during the measurement period.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 PM to 10:00 PM and after addition of 10 decibels to sound levels in the night between 10:00 PM and 7:00 AM.
Day/Night Noise Level, L_{dn}	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 PM and 7:00 AM.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

TABLE 4.12-2
Typical Sound Levels Measured in the Environment and Industry

At a Given Distance From Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression
	140		
Civil Defense Siren (100')	130		
Jet Takeoff (200')	120		Pain Threshold
	110	Rock Music Concert	
Pile Driver (50')	100		Very Loud
Ambulance Siren (100')			
	90	Boiler Room	
Freight Cars (50')		Printing Press Plant	
Pneumatic Drill (50')	80	In Kitchen With Garbage Disposal Running	
Freeway (100')			
	70		Moderately Loud
Vacuum Cleaner (10')	60	Data Processing Center	
		Department Store	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')			
	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		
	0		Threshold of Hearing

Existing Noise Environment

The noise environment within the region varies substantially due to the geographic area separating potential storage sites and various noise sources contributing to the local noise environment at each site. The existing ambient noise environment in the study area is primarily comprised of transportation noise sources including surface traffic on local streets and aircraft flyovers from local and regional airports.

A noise monitoring survey was conducted to quantify existing ambient conditions at representative locations that could be adversely affected by the construction or operation of

the SSP. Existing ambient conditions in the region were quantified through long-term noise measurements. These measurements were made in May 2007 by Illingworth & Rodkin, Inc. and were selected to represent the noise environment of sensitive receptors in the vicinity of the SSP sites. The results of the long-term noise measurements are depicted in Figures 4.12-1 to 4.12-4. Data presented on these figures include the hourly average noise level (L_{eq} (hr)) and statistical noise descriptors, consistent with Sonoma County General Plan policies, representing the noise level exceeded two-, eight-, twenty-five-, and fifty-percent of the time (L_{02}, L_{08}, L_{25}, L_{50}). The figures depict the hourly distribution of noise levels over a minimum 24-hour period. Archived noise data, gathered by Illingworth & Rodkin, Inc. during the preparation of the *Incremental Recycled Water Program EIR* and the *Incremental Recycled Water Program Discharge Compliance Project Draft EIR*, supplement these data.

Kelly Farm Sites (KF1, KF2)

Noise data summarized in Figure 4.12-1 represent the noise environment at receptors in the vicinity of the Kelly Farm sites. A long-term noise measurement was made approximately 1,000 feet south of Occidental Road at the southernmost property line of the nearest residential use. Ambient noise levels during the daytime varied from about 45 dBA L_{eq} to 53 dBA L_{eq}. At night, ambient noise levels ranged from 37 dBA L_{eq} to 52 dBA L_{eq}. The day-night average noise level was 54 dBA L_{dn}.

Brown Farm/Alpha Farm Sites (BF1, BF2, and AF)

Receptors nearest the Brown Farm and Alpha Farm sites are typically located adjacent to Llano Road, and are represented by the noise data summarized in Figure 4.12-2. Ambient noise levels during the daytime typically varied from about 58 dBA L_{eq} to 64 dBA L_{eq}. At night, ambient noise levels ranged from 47 dBA L_{eq} to 63 dBA L_{eq}. The day-night average noise level was 63 dBA L_{dn}.

Figure 4.12-1 Noise Levels at the North End of Kelly Farm

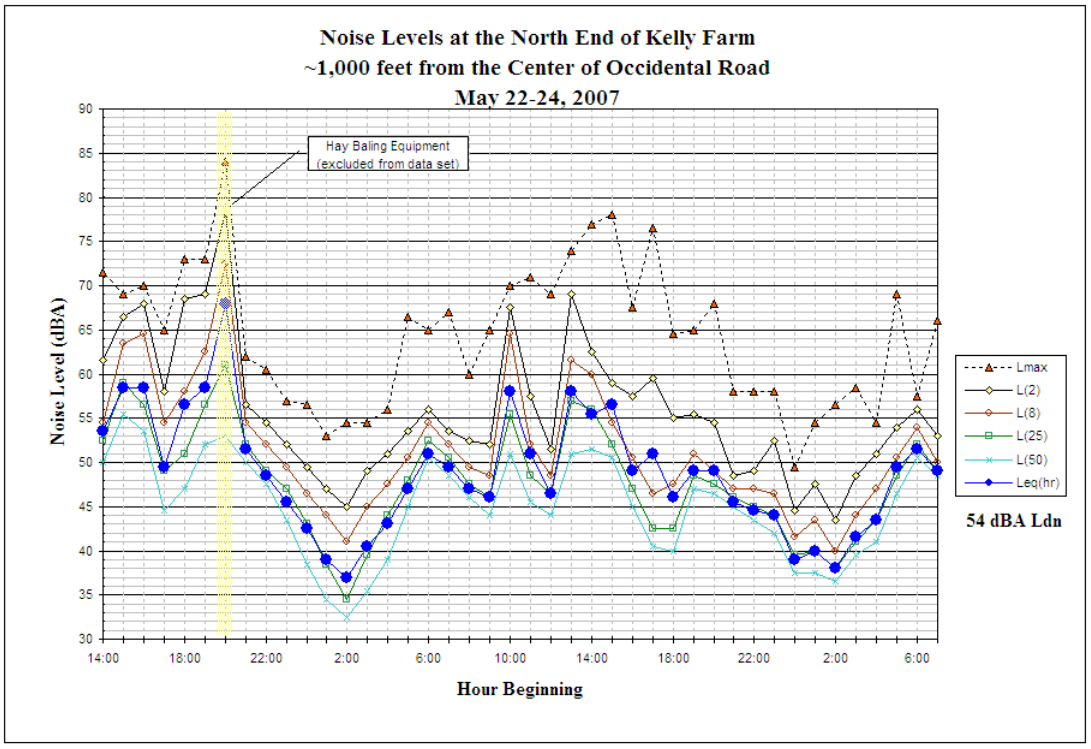
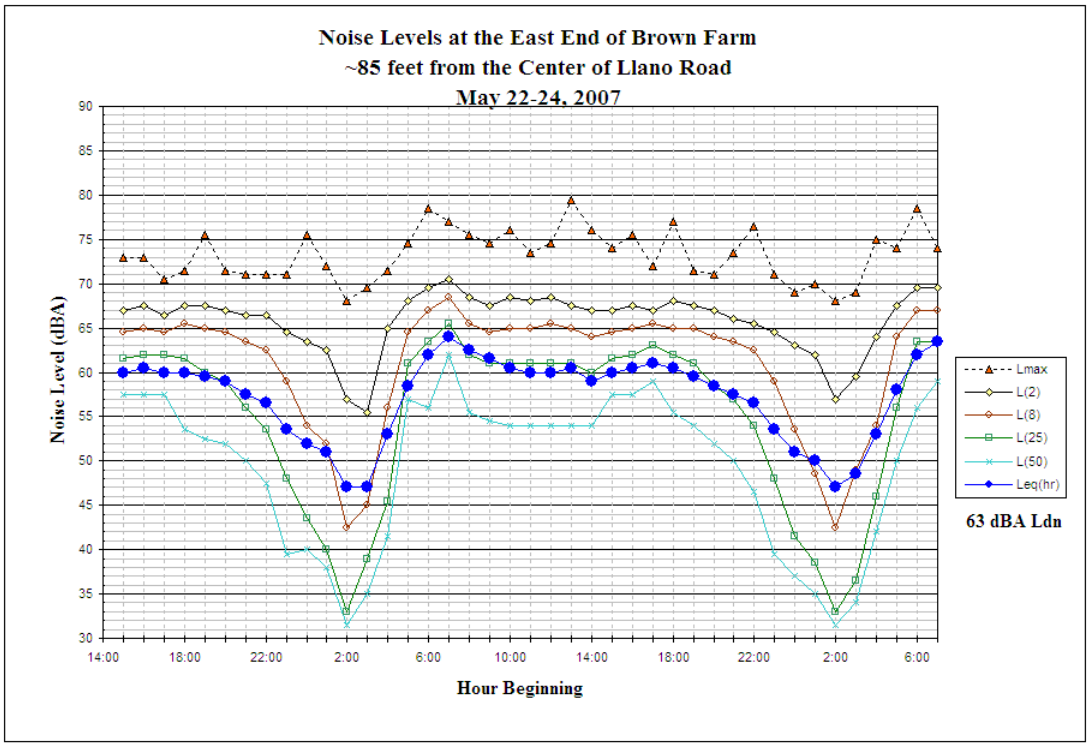


Figure 4.12-2 Noise Levels at the East End of Brown Farm



Regulatory Context

This section identifies the local ordinances and other regulations and guidelines that comprise the regulatory context for noise. General Plan policies related to the noise environment are identified in the next section titled "Goals, Policies, and Objectives."

Sonoma County

The Noise Element of the Sonoma County General Plan contains a goal (Goal NE-1): "to protect people from the harmful effects of exposure to excessive noise and to achieve an environment in which people and land uses may function without impairment from noise." Noise level performance standards in Table 4.12-3 are to be applied as performance standards for noise producing land uses which may affect noise sensitive land uses and vice versa. These standards also apply to other sensitive receptors such as schools, hospitals, rest homes, and long-term medical or mental care facilities. Recently, the Planning Commission has prepared guidelines to address some technical problems with the original standards[1]. Sonoma County does not have a Noise Ordinance to regulate intermittent activities, but often implements these planning guidelines for discretionary projects to regulate noise-producing uses. The Noise Element of the County's General Plan includes the following policy (Policy NE-1c):

- Control non-transportation related noise from new projects. The total noise level resulting from new sources and ambient noise shall not exceed the standards in Table 4.12-3 as measured at the exterior property line of any affected residential land use. Limit exceptions to the following:
  - If the ambient noise level exceeds the standards in Table 4.12-3, adjust the standards to equal the ambient level.
  - Reduce the applicable standards in Table 4.12-3 by 5 dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.
  - Reduce the applicable standards in Table 4.12-3 by 5 decibels if they exceed the ambient level by 10 or more decibels.

[1] Sonoma County Noise Element, from Denise Peter, to the Planning Commission, December 1, 2005.

TABLE 4.12-3
Maximum Allowable Exterior Noise Exposures for Non-transportation Noise Sources (Sonoma County General Plan Table NE-2)

Hourly Noise Metric1	Maximum Exterior Noise Level Standards, dBA	
	Daytime 7 AM to 10 PM	Nighttime 10 PM to 7 AM
L_{50} (30 Minutes)	50	45
L_{25} (15 Minutes)	55	50
L_{08} (5 Minutes)	60	55
L_{02} (1 Minute)	65	60

Source: County of Sonoma, Sonoma County General Plan Noise Element, 1989 revised 1991

Notes:

1 The sound level exceeded n% of the time in any hour. For example, the L_{50} is the value exceeded 50% of the time or 30 minutes in any hour; this is the median noise level. The L_{02} is the sound level exceeded 1 minute in any hour.

City of Santa Rosa

The Noise Element of the Santa Rosa General Plan's primary goal (Goal NS-B) is to "maintain an acceptable community noise level to protect the health and comfort of people living, working, and/or visiting in Santa Rosa, while maintaining a visually-appealing community." Policy NS-B-3 prevents new stationary noise sources from creating a nuisance in existing developed areas. Noise impacts resulting from new projects must be evaluated prior to Project approval.

The City of Santa Rosa Municipal Code, Chapter 17-16, Ordinance No. 17-16.20 states that "*It is unlawful for any person to operate any machinery, equipment, pump, fan, air-conditioning apparatus or similar mechanical device in any manner so as to create any noise which would cause the noise level at the property line of any property to exceed the ambient base noise level by more than five decibels*" (Santa Rosa 2004). Table 4.12-4 presents the City's ambient base noise levels.

The City does not have quantitative noise limits for construction activities. However, the City limits construction activities to between the hours of 7 a.m. and 10 p.m. seven days a week. Any activity not in compliance with any provision of the Noise Ordinance will require a special condition permit.

TABLE 4.12-4
City of Santa Rosa Municipal Code Ambient Base Noise Levels

Zone	Daytime Level (dBA)	Evening Level (dBA)	Nighttime Level (dBA)
Single-family Residential	55	50	45
Multi-family Residential	55	55	50
Office and Commercial	60	60	55
Intensive Commercial	65	65	55
Industrial	70	70	70

Source: City of Santa Rosa, City of Santa Rosa Municipal Code 17-16.030, 2004

Construction Noise Limits

Quantitative noise limits for construction activities are not established in local General Plans or Municipal Codes. The State's Office of Noise Control *Model Community Noise Control Ordinance* includes suggested noise limits for construction activities. Table 4.12-5 presents the construction noise limits recommended by the State's Office of Noise Control, which will be used as evaluation criteria for the construction noise analysis for the SSP.

TABLE 4.12-5
Maximum Noise Limits for Construction and Stationary Equipment, L_{eq}

Time	Single-Family Residential	Multi-Family Residential	Mixed-Residential & Commercial
Daily, except Sundays and Legal Holidays, 7 a.m. to 7 p.m.	60 dBA	65 dBA	70 dBA
Daily, 7 p.m. to 7 a.m. and all day Sunday and Legal Holidays	50 dBA	55 dBA	60 dBA

Source: California Department of Health, Office of Noise Control, Model Community Noise Control Ordinance, 1977

Blasting Noise and Vibration Limits

It is possible that the installation of sections of pipeline may require blasting for rock removal. Blasting can generate airborne noise in the form of an overpressure in the atmosphere and ground borne vibration. Normally the overpressure resulting from construction blasting is adequately controlled by properly confining the charge. To confine the charge, rock is packed into the hole above the explosives. The explosives

are buried deep in the ground with a "burden" between the top of the bore hole and the ground surface. These standard techniques normally maintain the overpressure below a level of 130 dB-linear, the safe limit for air-blast overpressures.

When explosive charges detonate in rock, groundborne vibration is created. The U.S. Bureau of Mines has studied various aspects of ground vibration produced during blasting. These studies recommend that the peak particle velocity in the ground be used as the measure of the potential for damage to structures. Peak ground particle velocity is highest near the blast and decreases as the distance from the blast increases analogously to sound propagation through the atmosphere. A peak particle velocity of 0.5 inches per second is a safe limit to protect against minor cosmetic damage such as hairline cracks in plaster or wall board in normal residential and commercial structures[2].

The level of vibration is a function of the weight of the explosive charge that is detonated, and the distance from the point of detonation to the sensitive receptor location. The U.S. Bureau of Mines has developed predictive methods for ground-borne vibration resulting from blasting. An extensive empirical data set has been developed for different types of soil conditions. The parameter used to measure the combination of charge weight and distance is called the scaled distance. The scaled distance is determined by dividing the distance in feet between the point of detonation and the sensitive receptor location (D) by the square of the weight in pounds of the explosive used per detonation (W2). If the scaled distance is less than 60 ft./lb.^{2}, it is possible that ground-borne vibration levels would exceed a peak particle velocity of 0.5 in./sec.

[2] Siskind, D.E., Stagg, M.S., Knopp, J.W., and Dowding, C.H., 1980, *Structure Response and Damage Produced by Ground Vibrations from Surface Blasting, US Bureau Of Mines Report of Investigations 8507.*

GOALS, OBJECTIVES, AND POLICIES

Table 4.12-6 identifies goals, objectives, and policies that provide guidance for development in relation to the noise environment in the Project area. The table also indicates which criterion in the Noise Section is responsive to each set of policies.

TABLE 4.12-6
Goals, Objectives, and Policies – Noise

Adopted Plan Document	Document Section	Document Numeric Reference	Policy	Relevant Evaluation Criteria[1]
Santa Rosa General Plan	Noise Element	Goal NS-B Policy NS-B-3	Maintain an acceptable community noise level to protect the health and comfort of people living, working, and/or visiting in Santa Rosa, while maintaining a visually-appealing community.	1, 3

Source: Santa Rosa 2002

Note: 1. Evaluation criteria are identified in Table 4.12-7.

EVALUATION CRITERIA WITH SIGNIFICANCE THRESHOLDS

The evaluation criteria with significance thresholds are shown in Table 4.12-7 below.

TABLE 4.12-7
Evaluation Criteria with Significance Thresholds – Noise

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
1. Will construction or operation of the SSP generate noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies?	Projected noise levels as measured at the receiving land use based on applicable state or local regulation.	a. Greater than noise level for receiving land use allowable by local ordinance or regulation. b. Construction noise greater than 60 dBA Leq daytime, 55 dBA Leq nighttime.	CEQA Guidelines Appendix G, Checklist Item XI (a). a. Noise Element of the General Plans of Sonoma County and the City of Santa Rosa. City of Santa Rosa Municipal Code, Chapter 17-16. b. California Department of Health, Office of Noise Control Model Community Noise Ordinance.
2. Will SSP construction activities result in generation of excessive ground-borne vibration levels?	Projected vibration levels at receiving land use.	Greater than 0.5 inch/sec. peak particle velocity.	CEQA Guidelines Appendix G, Checklist Item XI (b). U.S. Bureau of Mines Safe limit for normal structures.
3. Will operation of the SSP cause a substantial permanent increase in ambient noise levels above existing levels in the vicinity?	Projected noise levels at receiving land uses with the Project compared to ambient noise levels.	a. Greater than 5 dBA Ldn increase and remaining below "normally acceptable" noise level for affected use, or b. Greater than 3 dBA Ldn increase exceeding the "normally acceptable" level for the affected use.	CEQA Guidelines Appendix G, Checklist Item XI (c). Historical precedent based upon community annoyance studies.
4. Will construction activities and traffic required for the SSP result in a substantial temporary or periodic increase in ambient noise levels above existing levels in the vicinity?	Projected noise levels at the receiving land use with the construction activities compared to existing ambient noise levels.	Greater than 60 dBA Leq and ambient noise environment by 5 dBA Leq or more during daytime.	CEQA Guidelines Appendix G, Checklist Item XI (d). Historical precedent based upon community annoyance studies.

TABLE 4.12-7
Evaluation Criteria with Significance Thresholds – Noise

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
5. Will the SSP expose people to noise in the vicinity of a public or private airport?	Incompatible use located within: a. An adopted airport land use plan; b. Two miles of an airport for which there is no adopted airport land use plan.	Any such use.	CEQA Guidelines Appendix G, Checklist Item XI (e) and Item XI (f).

METHODOLOGY

The noise analysis calculates noise levels that could result from the construction and operation of components (i.e. storage ponds, pump stations) included in SSP alternatives. The significance of the noise impacts from each component is assessed against the applicable evaluation criteria identified in Table 4.12-7.

Noise levels associated with a particular component are determined by identifying the individual noise sources that make up the component, adding them together, and then calculating the effect of distance between the source and the receptor. In addition to distance, there are other factors that provide additional attenuation (reduction) in noise levels, including molecular absorption by the atmosphere, other atmospheric effects such as wind and temperature profiles, ground effects, and barriers. In this analysis, only distance is assumed in the calculation of noise attenuation. Calculated noise levels presented in this analysis represent a credible worst-case scenario.

Construction Noise

Noise impacts from SSP construction activities are a function of the noise generated by construction equipment, the location and sensitivity of nearby land uses, and the timing and duration of the noise-generating activities. Noise levels within and adjacent to the SSP construction areas would increase during the construction period. Construction noise would be temporary and during daytime hours only.

Construction noise would primarily consist of the operation of vehicles and equipment during site clearing, including demolition; grading; foundation preparation; facility and pond construction; and finish work. Representative sound levels for the most common types of construction equipment and usage factors were used to estimate construction noise levels generated by the Project. These data are contained in Federal Highway Administration's (FHWA) Roadway Construction Noise Model, which was used to calculate noise levels during various stages of construction. The usage factors represent the percentage of time that

the equipment would be operating at full power. Table 4.12-8 provides the noise data and usage factors assumed in the assessment of construction noise.

TABLE 4.12-8

CA/T Noise Emission Reference Levels and Usage Factors					
filename: EQUIPLST.xls					
revised: 7/26/05		Acoustical	Spec 721.560	Actual Measured	No. of Actual
	Impact	Use Factor	Lmax @ 50ft	Lmax @ 50ft	Data Samples
Equipment Description	Device ?	(%)	(dBA, slow)	(dBA, slow)	(Count)
				(samples averaged)	
All Other Equipment > 5 HP	No	50	85	-- N/A --	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	-- N/A --	0
Blasting	Yes	-- N/A --	94	-- N/A --	0
Boring Jack Power Unit	No	50	80	83	1
Chain Saw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Batch Plant	No	15	83	-- N/A --	0
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (<25KVA, VMS signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader	No	40	85	-- N/A --	0
Grapple (on backhoe)	No	40	85	87	1
Horizontal Boring Hydr. Jack	No	25	80	82	6
Hydra Break Ram	Yes	10	90	-- N/A --	0
Impact Pile Driver	Yes	20	95	101	11
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	75	23
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarafier	No	20	85	90	2
Paver	No	50	85	77	9
Pickup Truck	No	40	55	75	1
Pneumatic Tools	No	50	85	85	90
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3
Rivit Buster/chipping gun	Yes	20	85	79	19
Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Sand Blasting (Single Nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Shears (on backhoe)	No	40	85	96	5
Slurry Plant	No	100	78	78	1
Slurry Trenching Machine	No	50	82	80	75
Soil Mix Drill Rig	No	50	80	-- N/A --	0
Tractor	No	40	84	-- N/A --	0
Vacuum Excavator (Vac-truck)	No	40	85	85	149
Vacuum Street Sweeper	No	10	80	82	19
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder / Torch	No	40	73	74	5

Blasting Vibrations

Ground-borne vibration resulting from blasting is estimated using methods developed by the U.S. Bureau of Mines. The level of vibration is a function of the weight of the explosive detonation, the type of soil, and the distance between the detonation point and the sensitive receptor location. Normally small charge sizes are used to excavate rock encountered during construction projects. Nonetheless, because pipeline construction may occur in close proximity to sensitive receptors, there is the potential for ground borne vibration to exceed safe limits. Parameters are set forth based on distance and charge size to insure safe blasting vibration levels.

Operational and Maintenance Noise

New pump stations are a potential source of operational and maintenance noise. Noise generated by pump stations was calculated using data contained in Illingworth & Rodkin, Inc. files. Average noise levels (L_{eq}) generated by these facilities were assumed to equal the median noise level (L_{50}). Noise levels for the pumping equipment were projected out to the nearest residences and compared to ambient noise levels to determine whether or not there is the potential for noise levels in excess of local regulatory criteria or the potential for increased day-night average noise levels.

IMPACTS AND RECOMMENDED MITIGATION MEASURES

TABLE 4.12-9
Noise Impacts

Evaluation Criteria	Significance Threshold	Impact	Type of Impact[1]	Level of Significance[2]
12.1. Will construction or operation of the SSP generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	a. Sonoma County standard of 50 dBA L_{50} daytime and 45 dBA L_{50} nighttime. b. City of Santa Rosa Municipal Code limit of 55 dBA L_{eq} daytime, 50 dBA Leq evening, and 45 dBA L_{eq} nighttime. c. Construction noise greater than 60 dBA L_{eq} daytime, 55 dBA L_{eq} nighttime.	Construction noise levels exceed the daytime noise standard of 60 dBA L_{eq}.		
Storage component			C O&M/P	● ❍
Pump Station component *KF1, KF2, BF1, and BF2* *AF*			C/O&M/P C O&M	❍ ● ❍
12.2. Will SSP construction result in generation of excessive ground-borne vibration levels?	Greater than 0.5 in./sec. peak particle velocity.	Vibration levels greater than 0.5 in./sec. peak particle velocity.		
Storage component *Pump Station component*			C C	⊙ ==

TABLE 4.12-9
Noise Impacts

Evaluation Criteria	Significance Threshold	Impact	Type of Impact[1]	Level of Significance[2]
12.3. Will operation of the SSP cause a substantial permanent increase in ambient noise levels above existing levels in the vicinity?	a. Greater than 5 dBA Ldn increase and remaining below "normally acceptable" noise level for affected use b. Greater than 3 dBA Ldn increase and exceeding the "normally acceptable" level for the affected use	Less than significance thresholds	P	❍
12.4. Will construction activities and traffic required for the SSP result in a substantial temporary or periodic increase in ambient noise levels above existing levels in the vicinity?	Greater than 60 dBA L_{eq} and ambient by 5 dBA L_{eq} or more during daytime.	Greater than 60 dBA L_{eq} and ambient by 5 dBA $L_{eq.}$		
Storage component			C	●
Pump Station component *AF*			C	●
KF1, KF2, BF1, and BF2			C	❍
12.5. Will the SSP expose people to noise in the vicinity of a public or private airport?	Any incompatible use within the vicinity of an airport.	None	P	==

Notes: 1. Type of Impact:
C: Construction
O&M: Operation and Maintenance
P: Permanent

2. Level of Significance:
● Significant impact before and after mitigation
⊙ Significant impact before mitigation; less than significant impact after mitigation
❍ Less than significant impact; no mitigation proposed
== No impact

Impact: 12.1. Will construction or operation of the SSP generate noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies?

Analysis: *Storage component - Significant: KF1, KF2, BF1, BF2, and AF*

Noise impacts resulting from construction activities are assessed with respect to the suggested construction noise limits of the State Model Noise Ordinance. Construction is planned during daytime hours only, noise levels that would exceed 60 dBA L_{eq} and the ambient noise environment by 5 dBA L_{eq} or more at nearby receptors would cause a significant impact. Table 4.12-10 presents the construction phase and calculated noise levels resulting from the construction of the Storage component.

TABLE 4.12-10
Estimated Construction Noise Levels for SSP Construction Activities

Construction Phase	L_{eq} Noise Level (dBA) at 50 feet from Construction Site	Distance to 60 dBA L_{eq} Noise Contour (feet)
Demolition/Site Preparation	91	1,770
Excavation/Foundation Construction	87	1,120
Embankment Construction	86	1,000
Miscellaneous	88	1,260

The major noise-generating phases of construction (demolition, site preparation, excavation, foundation preparation, and embankment construction) would occur during construction year 1 beginning in April and ending in November. These activities would resume during construction year 2 in April and end in July. The duration of significant noise generating activities would be at least 12 months. Construction of the Storage component would generate noise levels ranging from 86 to 91 dBA L_{eq} at a distance of 50 feet.

KF1. The nearest receptors to KF1, approximately 400 feet away, would be exposed to construction noise levels ranging from 68 to 73 dBA L_{eq}. At residential receivers approximately 1,000 feet northeast of KF1 along Ver-Ni Road, construction noise levels could reach 60 to 65 dBA L_{eq}. Because these noise levels exceed the daytime noise criterion of 60 dBA L_{eq}, this impact would be significant. Operation and maintenance of KF1 would not generate noise levels in excess of noise criteria.

KF2. The nearest receptors to KF2, north of Ver-Ni Road, approximately 100 feet away, would be exposed to construction noise levels ranging from 80 to 85 dBA L_{eq}. Construction would generate noise levels greater than 60 dBA L_{eq} at receptors located within about 1,770 feet of the construction site. This would be a significant impact. Operation and maintenance of KF2 would not generate noise levels in excess of noise criteria.

BF1. The nearest receptors to BF1, approximately 750 feet away, would be exposed to construction noise levels ranging from 62 to 67 dBA L_{eq}.

Construction would generate noise levels greater than 60 dBA L_{eq} at receptors located within about 1,770 feet of the construction site to the north along Highway 12 and southeast of the site along Llano Road. This would be a significant impact. Operation and maintenance of BF1 would not generate noise levels in excess of noise criteria.

BF2. The nearest receptors to BF2, approximately 500 feet away, would be exposed to construction noise levels ranging from 66 to 71 dBA L_{eq} at residential receivers south of the site along Doyle Road. Construction would generate noise levels greater than 60 dBA L_{eq} at receptors located within about 1,770 feet of the construction site. This would be a significant impact. Residential receivers to the north and east would not experience construction noise levels greater than 60 dBA L_{eq}. Operation and maintenance of BF2 would not generate noise levels in excess of noise criteria.

AF. The nearest receptors to AF, approximately 200 feet away, would be exposed to construction noise levels ranging from 74 to 79 dBA L_{eq} at residential receivers east of the site along Llano Road. Construction would generate noise levels greater than 60 dBA L_{eq} at receptors located within about 1,770 feet of the construction site. This would be a significant impact. Operation and maintenance of AF would not generate noise levels in excess of noise criteria.

Pump Station component - Significant: AF

At AF, a 5-mgd, 60 hp inboard, vertical line-shaft pump station would be constructed within the south embankment of the AF pond. There will be two duty and one stand-by pump installed at the pump station. The pumps would be enclosed in a masonry building to contain noise from the motors.

The nearest receptors to AF, approximately 400 feet away, would be exposed to noise levels of approximately 70 dBA L_{eq} during the construction of the Pump Station component. Because these noise levels would exceed the daytime noise criterion of 60 dBA L_{eq}, this impact would be significant.

Operational noise levels for the nearest receptors to AF are calculated to be 38 dBA L_{50} assuming no attenuation from the pump house or terrain, or excess attenuation as a result of ground or molecular absorption. Noise levels would be expected to be 10 to 15 dBA lower assuming building attenuation provided by the pump house. Noise generated by the pump station would not exceed the daytime or nighttime noise thresholds at the nearest noise-sensitive receptors and the impact would be less than significant.

Pump Station component - Less than Significant: KF1, KF2, BF1, and BF2

Noise generated by construction of the Pump Station components, including the pump stations and belowground power lines would be similar to noise generated by storage pond construction, but would be of shorter duration. Operational noise would primarily result from the inboard pump stations. Operational noise is subject to the Noise Performance Standards set forth in the Noise Element of the Sonoma County. Because the equipment could

operate continuously 24-hours per day and the noise environment at rural residential receptors is 10 dBA or more below the thresholds, the allowable noise level at the nearest residential receptors is 45 dBA L_{50} during the daytime and 40 dBA L_{50} during the nighttime.

KF1. At the KF1 site, a 7 million gallons per day (mgd), 80 hp (hp) pump station would be constructed at the northeast corner of the pond to drain the recycled water in the storage pond back into the Subregional System. Two duty and one stand-by pump would be installed at the pump station. The pumps would be enclosed in a masonry building to contain noise from the motors. Electrical power would be provided to the pump station via a new 1,200 foot long below-ground electrical power line extending from PG&E's existing on-site power pole.

The nearest receptors to KF1, approximately 1,200 feet away, would be exposed to construction noise levels of approximately 60 dBA L_{eq}. Noise levels would not exceed the daytime noise criterion of 60 dBA L_{eq}, and this impact would be less-than-significant. The nearest receptors to KF1 would be exposed to operational noise levels calculated to be 39 dBA L_{50} assuming no noise attenuation from the pump house or terrain, or excess attenuation as a result of ground or molecular absorption. Noise levels would be expected to be 10 to 15 dBA lower assuming building attenuation provided by the pump house. Noise generated by the pump station would not exceed the daytime or nighttime noise thresholds at the nearest noise-sensitive receptors and, therefore, the impact is less than significant.

KF2. At KF2, a 7-mgd, 80 hp pump would be located at the southwest corner of the pond. There will be two duty and one stand-by pump installed at the pump station. The pumps would be enclosed in a masonry building to contain noise from the motors. Electrical power would be provided to the pump station via a new 2,300 foot long below-ground electrical power line extending from PG&E's existing on-site power pole.

The nearest receptors to KF2, approximately 1,200 feet away, would be exposed to construction noise levels of approximately 60 dBA L_{eq}. Because these noise levels would not exceed the daytime noise criterion of 60 dBA L_{eq}, This impact would be less than significant.

Operational noise levels for the nearest receptors to KF2 are calculated to be 39 dBA L_{50} assuming no attenuation from the pump house or terrain, or excess attenuation as a result of ground or molecular absorption. Noise levels would be expected to be 10 to 15 dBA lower assuming building attenuation provided by the pump house. Noise generated by the pump station would not exceed the daytime or nighttime noise thresholds at the nearest noise-sensitive receptors and the impact would be less than significant.

BF1. At BF1, a 5-mgd, 60 hp pump station would be located at the northeast end of the pond to drain the pond back into the Subregional System. There will be two duty and one stand-by pump installed at the pump station. The pumps would be enclosed in a masonry building to contain noise from the

motors. Electrical power would be provided to the pump station via a new 500 foot long below-ground electrical power line extending from PG&E's existing on-site power pole.

The nearest receptors to BF1, approximately 1,800 feet away, would be exposed to noise levels of approximately 57 dBA L_{eq} during the construction of the Pump Station component. Because these noise levels would not exceed the daytime noise criterion of 60 dBA L_{eq}, This impact would be less than significant.

Operational noise levels for the nearest receptors to BF1 are calculated to be 36 dBA L_{50} assuming no attenuation from the pump house or terrain, or excess attenuation as a result of ground or molecular absorption. Noise levels would be expected to be 10 to 15 dBA lower assuming building attenuation provided by the pump house. Noise generated by the pump station would not exceed the daytime or nighttime noise thresholds at the nearest noise-sensitive receptors and the impact is less than significant.

BF2. At BF2, a 5-mgd, 60 hp vertical line-shat pump station would be constructed at the southwest corner of the BF2 pond. There would be two duty and one stand-by pump installed at the pump station. The pumps would be enclosed in a masonry building to contain noise from the motors. Electrical power would be provided to the pump station via a new 1,200 foot long below-ground electrical powerline extending from PG&E's existing on-site power pole.

The nearest receptors to BF2, approximately 1,600 feet away, would be exposed to noise levels of approximately 58 dBA L_{eq} during the construction of the Pump Station component. Noise levels would not exceed the daytime noise criterion of 60 dBA L_{eq}, and this impact would be less than significant.

Operational noise levels for the nearest receptors to BF2 are calculated to be 36 dBA L_{50} assuming no attenuation from the pump house or terrain, or excess attenuation as a result of ground or molecular absorption. Noise levels would be expected to be 10 to 15 dBA lower assuming building attenuation provided by the pump house. Noise generated by the pump station would not exceed the daytime or nighttime noise thresholds at the nearest noise-sensitive receptors and the impact would be less than significant.

Mitigation: *Pump Station component: KF1, KF2, BF1, and BF2*

No mitigation is needed.

Storage component: KF1, KF2, BF1, BF2, and AF
Pump Station component: AF

3.4.3 Construction Noise Control Measures

After Mitigation: *Storage component - Significant: KF1, KF2, BF1, BF2, and AF*
Pump Station component – Significant: AF

Mitigation Measure 3.4.3 requires that the Construction Manager ensure that construction noise control measures are implemented to minimize noise disturbances at sensitive receptors during construction activities. Such noise control measures include use of newer equipment with noise abatement features; weekly construction equipment inspections; use of hydraulic tools instead of pneumatic impact tools, where possible; notification of sensitive noise receptors in advance of construction; and routing heavy truck trips to avoid residences or businesses, when feasible. Construction noise impacts would be reduced substantially for receivers with implementation of these noise controls measures; however, they may not reduce noise levels to a less-than-significant level.

Impact: **12.2. Will SSP construction result in generation of excessive ground-borne vibration levels?**

Analysis: *Storage component - Significant: KF1, KF2, BF1, BF2, and AF*

Blasting generates ground-borne vibration levels and may be required to remove rock within ponds and along the pipeline alignment. The blasting of rock could occur near existing sensitive receptors and ground-borne vibration levels could exceed a peak particle velocity of 0.5 in./sec. This construction technique would be infrequently employed. This is a significant impact.

Pump Station component - No Impact: KF1, KF2, BF1, BF2, and AF

The pump station is not expected to encounter subsurface rock that would need removal by blasting. The relocation of power poles is not expected to encounter subsurface rock. Therefore the Pump Station component would not generate ground-borne vibration levels.

Mitigation: *Pump Station component: KF1, KF2, BF1, BF2, and AF*

No mitigation is needed.

Storage component: KF1, KF2, BF1, BF2, and AF

3.4.3 Construction Noise Control Measures

After Mitigation: *Storage component – Less than Significant: KF1, KF2, BF1, BF2, and AF*

This mitigation measure would reduce the impact to less than significant by reducing groundborne vibration levels below 0.5 in./sec. peak particle velocity. The construction manager shall limit the size of the explosive charge such that the scaled distance is 60 ft./lb.^{2} or greater. This is accomplished by using millisecond delays and multiple charges where scaled distances would otherwise be less than 60 ft./lb^2. Blasting would also be limited to daylight hours. Standard blasting techniques would be used, including adequate depth of overburden and proper stemming to minimize blast overpressures.

Impact: 12.3. Will operation of the SSP cause a substantial permanent increase in ambient noise levels above existing levels in the vicinity?

Analysis: *Storage component - Less than Significant: KF1, KF2, BF1, BF2, and AF*

The Storage component would not have any noise impacts, as it involves no substantial sources of environmental noise.

Pump Station component - Less than Significant: KF1, KF2, BF1, BF2 and, AF

The operation of the Pump Station component would result in noise levels below those in County General Plan policies, as identified in Impact 12.1 above. Compliance with these noise performance standards would ensure that the operation of the pump station would not result in a substantial increase in ambient noise levels at sensitive receivers in the vicinity.

Mitigation: No mitigation is needed.

Impact: 12.4. Will construction activities and traffic required for the SSP result in a substantial temporary or periodic increase in ambient noise levels above existing levels in the vicinity?

Analysis: *Storage component - Significant: KF1, KF2, BF1, BF2, and AF*

Construction of each pond would generate noise levels ranging from 86 to 91 dBA L_{eq} at a distance of 50 feet, and would generate noise levels greater than 60 dBA L_{eq} at receptors located within approximately 1,770 feet of the construction site.

During peak earthmoving periods, it is assumed that the Project would generate approximately 200 one-way truck trips. Truck trips would be evenly distributed throughout the day (25 trips per hour assuming 8 hour day). Construction traffic noise levels were calculated with the Caltrans' $L_{eq}V2$ traffic noise model. The predicted noise level was then compared to the ambient noise level in the vicinity of the pond sites. Construction traffic is calculated to generate an hourly noise level of 63 dBA L_{eq} at a distance of 50 feet from the center of the access road serving the site.

KF1. The nearest receptors, approximately 400 feet away, would be exposed to construction noise levels ranging from 68 to 73 dBA L_{eq}. Construction noise levels could reach 60 to 65 dBA L_{eq} at residential receivers northeast of the site along Ver-Ni Road. These noise levels would substantially exceed existing daytime ambient noise levels. This would be a significant impact.

Construction traffic would access the site via a new gravel access road from Highway 12. The access road would be constructed along the perimeter of the pond approximately 300 feet of residential receivers south and east of the Project site. Hourly average noise levels generated by construction traffic would be 53 dBA L_{eq} at the nearest receptors. Construction traffic would not generate noise levels that would exceed 60 dBA L_{eq} and the ambient noise

environment by more than 5 dBA L_{eq} and would not substantially increase daily average noise levels. The impact from construction traffic would be less than significant.

KF2. The nearest receptors, north of Ver-Ni Road, approximately 100 feet away, would be exposed to construction noise levels ranging from 80 to 85 dBA Leq. These noise levels would substantially exceed existing daytime ambient noise levels. This would be a significant impact.

Construction traffic would access the site via a new gravel access road from Highway 12. The access road would be constructed along the perimeter of the pond approximately 150 feet of residential receivers east of the Project site. Hourly average noise levels generated by construction traffic would be 57 dBA L_{eq} at the nearest receptors. Construction traffic would not generate noise levels that would exceed 60 dBA L_{eq} and the ambient noise environment by more than 5 dBA L_{eq} and would not substantially increase daily average noise levels. The impact from construction traffic would be less than significant.

BF1. The nearest receptors, approximately 750 feet away, would be exposed to construction noise levels ranging from 62 to 67 dBA L_{eq}. These noise levels would substantially exceed existing daytime ambient noise levels. This would be a significant impact.

Construction traffic would access the site via a new gravel access road from Llano Road. The access road would be constructed along the perimeter of the pond approximately 750 feet of residential receivers north of the Project site. Hourly average noise levels generated by construction traffic would be 47 dBA L_{eq} at the nearest receptors. Construction traffic would not generate noise levels that would exceed 60 dBA L_{eq} and the ambient noise environment by more than 5 dBA L_{eq} and would not substantially increase daily average noise levels. The impact from construction traffic would be less than significant.

BF2. The nearest receptors, approximately 500 feet away, would be exposed to construction noise levels ranging from 66 to 71 dBA L_{eq} at residential receivers south of the site along Doyle Road. These noise levels would substantially exceed existing daytime ambient noise levels. This would be a significant impact.

Construction traffic would access the site via a new gravel access road from Llano Road. The access road would be constructed along the perimeter of the pond approximately 500 feet of residential receivers south of the Project site. Hourly average noise levels generated by construction traffic would be 50 dBA L_{eq} at the nearest receptors. Construction traffic would not generate noise levels that would exceed 60 dBA L_{eq} and the ambient noise environment by more than 5 dBA L_{eq} and would not substantially increase daily average noise levels. The impact from construction traffic would be less than significant.

AF. The nearest receptors, approximately 200 feet away, would be exposed to construction noise levels ranging from 74 to 79 dBA Leq at residential receivers east of the site along Llano Road. These noise levels would substantially exceed existing daytime ambient noise levels. This would be a significant impact.

Construction traffic would access the site via a new gravel access road from Llano Road. The access road would be constructed along the perimeter of the pond approximately 200 feet of residential receivers east of the Project site. Hourly average noise levels generated by construction traffic would be 56 dBA L_{eq} at the nearest receptors. Construction traffic would not generate noise levels that would exceed 60 dBA L_{eq} and the ambient noise environment by more than 5 dBA L_{eq} and would not substantially increase daily average noise levels. The impact from construction traffic would be less than significant.

Pump Station component - Significant: AF

The construction traffic volume necessary to bring workers, materials, and equipment to the site to construct the Pump Station component would be less than the construction traffic volume analyzed above for the Storage component at AF. However, construction traffic would generate noise levels that would exceed 60 dBA Leq and the ambient noise environment by more than 5 dBA Leq. The impact would be significant.

Pump Station component - Less than Significant: KF1, KF2, BF1, and BF2

The construction traffic volume necessary to bring workers, materials, and equipment to the site to construct the Pump Station component would be less than the construction traffic volume analyzed above for the Storage component at each site. Construction traffic would not generate noise levels that would exceed 60 dBA Leq and the ambient noise environment by more than 5 dBA Leq and would not substantially increase daily average noise levels. The impact would be less than significant.

Mitigation: *Pump Station component: KF1, KF2, BF1, and BF2*

No mitigation is needed.

Storage component: KF1, KF2, BF1, BF2 and AF
Pump Station component: AF

3.4.3 Construction Noise Control Measures

After Mitigation: *Storage component - Significant: KF1, KF2, BF1, BF2, and AF*
Pump Station component – Significant: AF

Construction noise impacts would be reduced substantially for receivers with implementation of the equipment noise controls and administrative measures specified above. Application of the construction noise mitigation measure

would reduce the construction noise impacts upon nearby sensitive receptors; however, it would not reduce these to a less-than-significant level.

Impact: 12.5. Will the SSP expose people to noise in the vicinity of a public or private airport?

Analysis: *Storage component - No Impact: KF1, KF2, BF1, BF2, and AF*

A review of noise data generated by aircraft operations at nearby airports (i.e., Sonoma County Airport and the City of Healdsburg Municipal Airport) indicates that proposed facilities would be compatible with aircraft noise. Storage sites KF1, KF2, BF1, BF2, and AF are located well outside of each airport's 65 dBA CNEL noise contour. Persons working at the sites would not be exposed to excessive aircraft noise.

Pump Station component - No Impact: KF1, KF2, BF1, BF2, and AF

A review of noise data generated by aircraft operations at nearby airports (i.e., Sonoma County Airport and the City of Healdsburg Municipal Airport) indicates that proposed facilities would be considered compatible with aircraft noise. Storage sites KF1, KF2, BF1, BF2, and AF are located well outside of each airport's 65 dBA CNEL noise contour. Persons working at the sites would not be exposed to excessive aircraft noise.

Mitigation: No mitigation is needed

No Project Alternative

Impact: 12.1 through 12.5. Will the No Project Alternative cause noise impacts based on evaluation criteria 1 through 5?

Analysis: *No Impact*

The No Project Alternative would not result in noise impacts, as it involves no new construction or operations.

Mitigation: No mitigation is needed

CUMULATIVE IMPACTS

Impact: 12.1C. Will construction or operation of the SSP and cumulative projects generate noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies?

Analysis: *Construction – Significant Operation – Less-than-Significant* Project construction activities occurring at SSP sites may occur within the same time period as other nearby cumulative projects. Although Mitigation Measure 3.4.3 would reduce SSP construction noise impacts, construction noise impacts would be cumulatively significant if cumulative projects are constructed during the Seasonal Storage construction period and the

cumulative projects would generate similar levels of noise. No further mitigation has been identified to reduce the project's contribution to cumulative impacts besides the mitigation identified under the Project analysis. Cumulative operational noise impacts are not expected given the distance between the SSP facilities themselves, and the distance between Seasonal Storage facilities and cumulative projects in the vicinity. Operational noise levels resulting from proposed pumping facilities would be low at the nearest sensitive receivers (below 45 dBA L_{eq}). Where cumulative projects would increase ambient noise levels, the noise generated by the SSP would not be cumulatively considerable. Noise generated by the operation of the SSP would not result in a significant cumulative impact.

The County of Sonoma is in the process of updating their General Plan. The Draft General Plan 2020 for Sonoma County includes revisions to policy NE-1c, which is related to non-transportation related noise from new projects. Policy NE-1c is summarized below.

Policy NE-1c: Control non-transportation related noise from new projects. The total noise level resulting from new sources shall not exceed the standards in Table NE-2 as measured at the exterior property line of any adjacent noise sensitive land use. Limit exceptions to the following:

(1) If the ambient noise level exceeds the standard in Table NE-2, adjust the standard to equal the ambient level, up to a maximum of 5 dBA above the standard, provided that no measurable increase (i.e. +/- 1.5 dBA) shall be allowed.

(2) Reduce the applicable standards in Table NE-2 by five dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises, such as pile drivers and dog barking at kennels.

(3) Reduce the applicable standards in Table NE-2 by 5 decibels if the proposed use exceeds the ambient level by 10 or more decibels.

(4) For short term noise sources which are permitted to operate no more than six days per year, such as concerts or race events, the allowable noise exposures shown in Table NE-2 may be increased by 5 dB. These events shall be subject to a noise management plan including provisions for maximum noise level limits, noise monitoring, complaint response and allowable hours of operation. The plan shall address potential cumulative noise impacts from all events in the area.

(5) Noise levels may be measured at the location of the outdoor activity area of the noise-sensitive land use, instead of the exterior property line of the adjacent noise-sensitive land use where:

(a) The property on which the noise sensitive use is located has already been substantially developed pursuant to its existing zoning, and,

(b) There is available open land on those noise-sensitive lands for noise attenuation.

This exception may not be used on vacant properties which are zoned to allow noise-sensitive uses.

Should the modified policy be adopted, it would not change the significance level of the SSP. Project construction noise levels would remain significant after mitigation. No further mitigation has been identified that could reduce the Project's contribution to this cumulative impact beyond that already achieved through project mitigation.

Mitigation: No additional feasible mitigation has been identified.

After Mitigation: *Significant – KF1, KF2, BF1, BF2, and AF*

All feasible mitigation efforts that have been identified have been made applicable to the direct project impacts, and no further mitigation is available for cumulative impacts. Impacts, therefore, are significant and unavoidable.

Impact: 12.2C. Will SSP and cumulative projects construction result in generation of excessive ground-borne vibration levels?

Analysis: *Less than Significant*

Blasting could occur on an infrequent basis as a result of SSP to remove rock within ponds and along the pipeline alignment. Mitigation Measure 3.4.3, Construction Noise Control Measures, would fully mitigate impacts of blasting by limiting charge sizes, blasting hours, and utilizing appropriate stemming depths.

Construction of cumulative projects in the vicinity may also produce perceptible groundborne vibration at nearby receivers during certain activities. It is highly unlikely that groundborne vibration generated by SSP and cumulative projects would occur at a particular receiver at the same time. In addition, other projects also would be subject to blasting controls, so no significant cumulative impact would occur.

Mitigation: No mitigation is needed.

Impact: 12.3C. Will operation of the SSP and cumulative projects cause a substantial permanent increase in ambient noise levels above existing levels in the vicinity?

Analysis: *Less than Significant*

Cumulative operational noise impacts are not expected given the distance between the SSP facilities and cumulative projects in the vicinity. Operational noise levels resulting from proposed pumping facilities would be low at the nearest sensitive receivers (below 45 dBA Leq). Where cumulative projects would increase ambient noise levels, the noise generated by the SSP would not be cumulatively considerable. Noise generated by the operation of the SSP would not substantially increase ambient noise levels at nearby receivers and would not result in a significant cumulative impact.

Mitigation: No mitigation is needed.

Impact: 12.4C. Will construction activities and traffic required for the SSP and cumulative projects result in a substantial temporary or periodic increase in ambient noise levels above existing levels in the vicinity?

Analysis: *Significant*

Although Mitigation Measure 3.4.3 would reduce SSP construction noise impacts, project construction activities occurring at SSP sites may occur within the same time period as other nearby cumulative projects. Construction traffic associated with the Project may also occur within the same time period as other nearby cumulative projects. Significant construction noise impacts would be cumulatively significant if cumulative projects are constructed during the Seasonal Storage construction period and the cumulative projects would generate similar levels of noise. No further mitigation has been identified to reduce the project's contribution to cumulative impacts besides the mitigation identified under the Project analysis.

Mitigation: No additional feasible mitigation has been identified.

After Mitigation: *Significant – KF1, KF2, BF1, BF2, and AF*

All feasible mitigation efforts that have been identified by the City have been made applicable to the direct project impacts, and no further mitigation is available for cumulative impacts. Impacts, therefore are significant and unavoidable.

Impact: 12.5C. Will the SSP and cumulative projects expose people to noise in the vicinity of a public or private airport?

Analysis: No Impact

A review of future noise contour projections of nearby airports indicates that proposed facilities would be located at sites considered compatible with aircraft noise. Persons working at the sites would not be exposed to excessive aircraft noise.

Mitigation: No mitigation is needed.

SUMMARY OF SIGNIFICANT IMPACTS AND MITIGATION MEASURES

TABLE 4.12-11

Summary of Significant Impacts and Mitigation Measures – Noise

Impact	Level of Significance	Mitigation Measure
KF1		
12.1 Construction of the Storage component may generate noise levels in excess of standards.	●	3.4.3 Construction Noise Control Measures
12.2 Storage component construction may result in generation of excessive ground-borne vibration levels.	⊙	3.4.3 Construction Noise Control Measures
12.4 Construction activities and traffic required for the Storage component may result in a substantial temporary increase in ambient noise levels.	●	3.4.3 Construction Noise Control Measures
12.1C. Construction of the SSP and cumulative projects could generate noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies.	●	3.4.3 Construction Noise Control Measures
12.4C. Construction activities and traffic required for the SSP and cumulative projects could result in a substantial temporary or periodic increase in ambient noise levels above existing levels in the vicinity.	●	3.4.3 Construction Noise Control Measures
KF2		
12.1 Construction of the Storage component may generate noise levels in excess of standards.	●	3.4.3 Construction Noise Control Measures
12.2 Storage component construction may result in generation of excessive ground-borne vibration levels.	⊙	3.4.3 Construction Noise Control Measures
12.4 Construction activities and traffic required for the Storage component may result in a substantial temporary increase in ambient noise levels.	●	3.4.3 Construction Noise Control Measures

TABLE 4.12-11
Summary of Significant Impacts and Mitigation Measures – Noise

Impact	Level of Significance	Mitigation Measure
12.1C. Construction of the SSP and cumulative projects could generate noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies.	●	3.4.3 Construction Noise Control Measures
12.4C. Construction activities and traffic required for the SSP and cumulative projects could result in a substantial temporary or periodic increase in ambient noise levels above existing levels in the vicinity.	●	3.4.3 Construction Noise Control Measures
BF1		
12.1 Construction of the Storage component may generate noise levels in excess of standards.	●	3.4.3 Construction Noise Control Measures
12.2 Storage component construction may result in generation of excessive ground-borne vibration levels.	⊙	3.4.3 Construction Noise Control Measures
12.4 Construction activities and traffic required for the Storage component may result in a substantial temporary increase in ambient noise levels.	●	3.4.3 Construction Noise Control Measures
12.1C. Construction of the SSP and cumulative projects could generate noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies.	●	3.4.3 Construction Noise Control Measures
12.4C. Construction activities and traffic required for the SSP and cumulative projects could result in a substantial temporary or periodic increase in ambient noise levels above existing levels in the vicinity.	●	3.4.3 Construction Noise Control Measures

TABLE 4.12-11
Summary of Significant Impacts and Mitigation Measures – Noise

Impact	Level of Significance	Mitigation Measure
BF2		
12.1 Construction of the Storage component may generate noise levels in excess of standards.	●	3.4.3 Construction Noise Control Measures
12.2 Storage component construction may result in generation of excessive ground-borne vibration levels.	⊙	3.4.3 Construction Noise Control Measures
12.4 Construction activities and traffic required for the Storage component may result in a substantial temporary increase in ambient noise levels.	●	3.4.3 Construction Noise Control Measures
12.1C. Construction of the SSP and cumulative projects could generate noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies.	●	3.4.3 Construction Noise Control Measures
12.4C. Construction activities and traffic required for the SSP and cumulative projects could result in a substantial temporary or periodic increase in ambient noise levels above existing levels in the vicinity.	●	3.4.3 Construction Noise Control Measures
AF		
12.1 Construction of the Storage component may generate noise levels in excess of standards.	●	3.4.3 Construction Noise Control Measures
12.1 Construction of the Pump Station component may generate noise levels in excess of standards.	●	3.4.3 Construction Noise Control Measures
12.2 Storage component construction may result in generation of excessive ground-borne vibration levels.	⊙	3.4.3 Construction Noise Control Measures
12.4 Construction activities and traffic required for the Storage component may result in a substantial temporary increase in ambient noise levels.	●	3.4.3 Construction Noise Control Measures

TABLE 4.12-11

Summary of Significant Impacts and Mitigation Measures – Noise

Impact	Level of Significance	Mitigation Measure
12.4 Construction activities and traffic required for the Pump Station component may result in a substantial temporary increase in ambient noise levels.	●	3.4.3 Construction Noise Control Measures
12.1C. Construction of the SSP and cumulative projects could generate noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies.	●	3.4.3 Construction Noise Control Measures
12.4C. Construction activities and traffic required for the SSP and cumulative projects could result in a substantial temporary or periodic increase in ambient noise levels above existing levels in the vicinity.	●	3.4.3 Construction Noise Control Measures

Notes: Level of Significance:

●: Significant impact before and after mitigation

⊙: Significant impact before mitigation; less than significant impact after mitigation

PREPARERS AND REFERENCES

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