

February 21, 2017

Mr. Blake Araki
Raging River Quarry LLC
6101 Preston Fall City Road SE
Fall City, WA 98024

Re: Monthly Provisional Operations
Compliance Noise Monitoring – 3-Day Results and Overall Summary
Revision to February 6, 2017 Report

Dear Blake,

As you requested, Ramboll Environ US Corporation (Ramboll Environ) has completed the month of compliance noise monitoring with a three-day monitoring event of operations at the Raging River Quarry (RRQ) from January 25 - 27, 2017. This measurement is the final measurement event required by King County DDES during one month of provisional operations. Details and results of the sound level measurement follow.

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Applicable Noise Limits

The site and surrounding properties are located in unincorporated King County and are subject to the noise limits outlined in Chapter 12.86 of the King County Code (KCC 12.86).

Because the quarry operates during daytime hours only (i.e., between 7 AM and 10 PM), the hourly noise limits at the nearby rural-residential properties are an L_{eq} of 57 dBA and an L_{max} of 72 dBA.

Sound Level Equipment

For the measurements taken January 25 – 27, 2017, Ramboll Environ deployed two Larson Davis LxT (Class 1) sound level meters and one Brüel & Kjær 2250 (B&K2250) Class 1 sound level meter for the sound level measurements. All of the meters were set to record 1-second histories, and the B&K2250 meter was also set to record audio. The meters were field calibrated immediately prior to the measurement and calibrated at the factory within the previous year. The microphones were mounted on tripods at a height of approximately 5 feet above ground.

All of the measurements during the five provisional noise monitoring events were taken using either Larson Davis LxT or B&K2250 meters, set up as described above.

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Measurement Locations

Sound levels were measured at the following three locations representing the adjacent properties to the quarry site:

- **Location 1** – on the southeast boundary of the McClain property and the Raging River Quarry property
- **Location 2** – on the northern boundary of the Shimmel property (formerly known as the Johnson property), near the log pile on the Trisko property
- **Location 3** – on the northern boundary of the Shimmel property (formerly known as the Johnson property), east of Location 2.

Measurement Details

The sound level measurements at all three locations were conducted over three days of operation on January 25 - 27, 2017, with hourly Leqs and Lmaxs calculated from the 1-second data. At SLM3, the sound level meter ran out of available memory at approximately noon on January 26, 2017, and no data was captured until the meter was serviced the following morning, January 27, at approximately 9 AM.

The temperatures during the measurement period were in the mid-40s °F with no rain.

Quarry Equipment in Operation

During the sound level measurement period (January 25 - 27, 2017), the following equipment was in operation:

January 25, 2017

7 to 8:30 AM: truck loading, casting material at 50 foot elevation

8:30 to 9:30 AM: truck loading, casting material at 50 foot elevation, drill firing up and walking along outer road to get in position to drill

9:30 AM to 1:30 PM: truck loading, casting material at 50 foot elevation, drill operating at the 150 foot elevation

1:30 PM to 3 PM: truck loading, casting material at 50 foot elevation, drill operating at the 150 foot elevation, crushing plant turning on and off due to belt repair

3 to 5 PM: trucking loading (until 3:45 PM), casting material at 50 foot elevation, drill operating at the 150 foot elevation, full crushing plant operations

5 to 7 PM: casting material at 50 foot elevation, full crushing plant operations

January 26, 2017

7 to 8:30 AM: truck loading, casting material at 100 foot elevation

8:30 to 10:30 AM: truck loading, casting material at 100 foot elevation, rock breaker operating at quarry floor

10:30 AM to 4 PM: truck loading, casting material at 100 foot elevation, full crushing plant operations

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4 PM to 7 PM: casting material at 50 foot elevation, full crushing plant operations

January 27, 2017

7 to 8:30 AM: truck loading, excavator stripping overburden at 200 foot elevation, powder truck loading drilled holes

8:30 to 9:30 AM: truck loading, excavator stripping overburden at 200 foot elevation, rock breaker operating at quarry floor, powder truck loading drilled holes

9:30 AM to 3:30 PM: truck loading, excavator stripping overburden at 200 foot elevation, powder truck loading drilled holes, full crushing plant operations

3:30 to 4:30 PM: blasting at the quarry, no machinery operating or truck loading

4:30 to 7 PM: casting material at 150 foot elevation, full crushing plant operations

Sound Level Measurement Results

The sound level measurement results for each SLM location are presented in the following tables. For hours where compliance with the limits is not initially demonstrated, we reviewed the audio recordings to identify the noise source that caused the elevated levels. If the elevated sound level was from a source that is exempt from the noise limits, we then provide the estimated sound level after removal of the exempt source.

Table 1. SLM1 – McClain Property Sound Levels (dBA)

Wednesday, January 25, 2017			
Time	Leq	Lmax	Major Noise Sources
7 – 8 AM	49	62	
8 – 9 AM	50	63	
9 – 10 AM	52	67	
10 – 11 AM	51	62	
11 AM – Noon	51	65	
Noon – 1 PM	51	61	
1 – 2 PM	54	63	
2 – 3 PM	53	69	
3 – 4 PM	55	71	
4 – 5 PM	54	70	
5 – 6 PM	53	63	
6 – 7 PM	51	61	

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Thursday, January 26, 2017				
7 – 8 AM		49	56	
8 – 9 AM		50	67	
9 – 10 AM		51	67	
10 – 11 AM		53	65	
11 AM – Noon		53	60	
Noon – 1 PM			NA ^(a)	
1 – 2 PM			NA ^(a)	
2 – 3 PM		55	64	
3 – 4 PM		53	63	
4 – 5 PM		55	60	
5 – 6 PM		54	65	
6 – 7 PM		52	58	
Friday, January 27, 2017				
Time		Leq	Lmax	Major Noise Sources
7 – 8 AM		50	64	
8 – 9 AM		53	67	
9 – 10 AM		53	66	
10 – 11 AM		53	66	
11 AM – Noon		53	63	
Noon – 1 PM		53	64	
1 – 2 PM		52	62	
2 – 3 PM		53	60	
3 – 4 PM	With Extraneous	53	84	Warning horns (4), blast, no machinery operating or truck loading
	Extraneous Removed	51	70	Removed warning horns, blast, and loud airplane
4 – 5 PM		51	70	
5 – 6 PM		54	62	
6 – 7 PM		52	66	
^(a) Stopped meter for servicing.				

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Table 2. SLM2 – Shimmel Property Sound Levels (dBA)

Wednesday, January 25, 2017			
Time	Leq	Lmax	Major Noise Sources
7 – 8 AM	48	62	
8 – 9 AM	50	66	
9 – 10 AM	52	67	
10 – 11 AM	52	67	
11 AM – Noon	51	69	
Noon – 1 PM	51	60	
1 – 2 PM	54	62	
2 – 3 PM	54	62	
3 – 4 PM	55	64	
4 – 5 PM	55	70	
5 – 6 PM	53	65	
6 – 7 PM	51	60	
Thursday, January 26, 2017			
Time	Leq	Lmax	Major Noise Sources
7 – 8 AM	47	57	
8 – 9 AM	49	68	
9 – 10 AM	50	68	
10 – 11 AM	53	67	
11 AM – Noon	53	64	
Noon – 1 PM	55	63	
1 – 2 PM	56	67	
2 – 3 PM	55	63	
3 – 4 PM	53	64	
4 – 5 PM	54	64	
5 – 6 PM	54	60	
6 – 7 PM	52	61	

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Friday, January 27, 2017				
7 – 8 AM		48	63	
8 – 9 AM		53	69	
9 – 10 AM		53	67	
10 – 11 AM		53	66	
11 AM – Noon		53	62	
Noon – 1 PM		53	62	
1 – 2 PM		52	59	
2 – 3 PM		53	62	
3 – 4 PM	With Extraneous	52	77	Warning horns (4), blast, no machinery operating or truck loading
	Extraneous Removed	50	67	Removed warning horns, blast, and loud airplane
4 – 5 PM		51	72	
5 – 6 PM		53	62	
6 – 7 PM		51	65	

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Table 3. SLM3 – Shimmel Property (East of SLM2) Sound Levels (dBA)

Wednesday, January 25, 2017				
Time		Leq	Lmax	Major Noise Sources
7 – 8 AM		48	67	
8 – 9 AM	With Extraneous	54	73	Bird chirping, truck loading, casting material at 50 foot elevation, drill firing up and walking along outer road to get in position to drill
	Extraneous Removed	54	70	Removed bird chirping
9 – 10 AM		57	72	
10 – 11 AM		57	72	
11 AM – Noon	With Extraneous	56	73	Truck loading, casting material at 50 foot elevation, drill operating
	Extraneous Removed	56	72	Removed backup alarm
Noon – 1 PM		55	71	
1 – 2 PM		59	69	Truck loading, casting material at 50 foot elevation, drill operating, crushing plant turning on and off due to belt repair
2 – 3 PM		58	69	
3 – 4 PM		60	71	
4 – 5 PM	With Extraneous	59	76	Casting material at 50 foot elevation, drill operating, full crushing plant operations, drillers repairing drill
	Extraneous Removed	59	65	Removed drillers repairing drill and backup alarms
5 – 6 PM		57	69	
6 – 7 PM		54	66	
Thursday, January 26, 2017				
7 – 8 AM		46	59	
8 – 9 AM		50	69	
9 – 10 AM		51	69	
10 – 11 AM		56	71	
11 AM – Noon		57	67	
Noon – 7 PM		NA ^(a)	NA ^(a)	

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Friday, January 27, 2017				
Time		Leq	Lmax	Major Noise Sources
7 – 10 AM		NA ^(a)	NA ^(a)	
10 – 11 AM		57	71	
11 AM – Noon		57	64	
Noon – 1 PM		57	65	
1 – 2 PM		56	67	
2 – 3 PM		57.7	69	Truck loading, excavator stripping overburden at 200 foot elevation, powder truck loading drilled holes, full crushing plant operations
3 – 4 PM	With Extraneous	56	85	Warning horns (4), blast, no machinery operating or truck loading
	Extraneous Removed	52	68	Removed warning horns, blast, and loud airplane
4 – 5 PM	With Extraneous	55	74	Casting material at 150 foot elevation, full crushing plant operations
	Extraneous Removed	55	72	Removed unidentifiable noise – not a quarry source, so it's likely something else
5 – 6 PM		57.7	66	Casting material at 150 foot elevation, full crushing plant operations
6 – 7 PM		55	71	
^(a) Sound level meter out of memory. No data captured.				

At SLM1 and SLM2, all of the measured sound levels were below the noise limit, after extraneous sources or exempt sources were removed.

At SLM3, there were several hours where the measured Leq exceeded 57 dBA or the measured Lmax exceeded 72 dBA. Review of the audio during the hours with elevated sound levels indicated that backup alarms, warning horns, blasting, drilling, and crushing plant operations were the dominant noise sources during these time periods. Occasional bird chirping or aircraft also contributed to the measured sound levels, when present. Removal of the exempt (e.g., backup alarm, blast, warning horn) and extraneous (e.g., bird chirping, aircraft) noise sources lowered the sound levels during several hours to levels below the noise limits. However, the measured sound levels during several hours continue to be higher than the hourly Leq limit of 57 dBA.

Review of the data for January 25, 2017 indicates that the measured sound levels exceeded 57 dBA during some hours when full crushing operations were conducted concurrently with drilling

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operations. My discussions with you indicated that the standard drill rig used previously on the site was being repaired and was not available, and that a larger and louder drill rig was being used instead. This louder drill rig appeared to result in slightly higher sound levels, although the measured sound levels during those hours when drilling occurred without crushing operations did not exceed the 57-dBA noise limit.

Review of the data for January 27, 2017 indicates that two hours of measured sound levels exceeded 57 dBA during full crushing operations concurrent with other quarry activities. However, the measured levels during both hours (between 2 and 3 PM and again between 5 and 6 PM) were 57.7 dBA, which is within the 1-dBA range of error of Class 1 sound level meters. Therefore, these levels would not be considered out of compliance with the noise limit of 57 dBA.

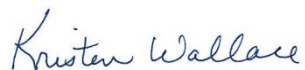
In summary, at SLM3, the hours when the larger drill rig was operating concurrently with full crushing operations resulted in hourly Leq levels that exceeded the noise limit of 57 dBA.

Conclusion

After removal of non-quarry related noise sources and/or exempt noise sources (i.e., warning horns, blast, and backup alarms), the resulting measured sound levels demonstrate compliance with the County noise limits during RRO's three day monitoring period for all hours at SLM1 and SLM2 and for all except a few hours at SLM3. The measured levels at the Shimmel/Trisko boundary at SLM3 exceeded the Leq limit on January 25th between 1PM and 4PM and on January 27th between 2PM to 3PM and 5PM to 6PM, when drilling was occurring concurrently with full crushing operations. This is consistent with the results during Week 4 which indicate that drilling during full crushing operations occasionally results in levels exceeding the hourly Leq limit of 57 dBA. Therefore, we recommend that RRO restrict full crushing operations when drilling is occurring until such time as sound levels from these simultaneous activities can be shown to be in compliance.

Please call me (425-412-1807) if you have any questions regarding the above material.

Yours sincerely,

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