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16 Attorneys for Plaintiffs
17 **DRAKES BAY OYSTER COMPANY and KEVIN LUNNY**

18 UNITED STATES DISTRICT COURT
19 NORTHERN DISTRICT OF CALIFORNIA

20 **DRAKES BAY OYSTER COMPANY,**
21 17171 Sir Francis Drake Blvd
22 Inverness, CA 94937, and

23 **KEVIN LUNNY,**
24 17171 Sir Francis Drake Blvd
25 Inverness, CA 94937

26 Plaintiffs,

27 v.

28 **KENNETH L. SALAZAR,**
in his official capacity as Secretary, U.S.
Department of the Interior,
1849 C Street, NW, Washington, D.C., 20240;
U.S. DEPARTMENT OF THE INTERIOR
1849 C Street, NW, Washington, D.C., 20240;
U.S. NATIONAL PARK SERVICE
1849 C Street, NW, Washington, D.C. 20240;
and **JONATHAN JARVIS,**
in his official capacity as Director, U.S.
National Park Service,
1849 C Street, NW, Washington, D.C. 20240.

Defendants.

Case No. 12-cv-06134-YGR

DECLARATION OF RICHARD STEFFEL IN SUPPORT OF REPLY IN SUPPORT OF MOTION FOR PRELIMINARY INJUNCTION

Date: January 25, 2013

Time: 2:00 p.m.

Court: Oakland Courthouse 5 – 2nd Floor

1 **Counsel List Continued**

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1 I, Richard Steffel, declare as follows:

2 1. I am a Principal at ENVIRON International Corporation, specializing in
3 environmental impact assessments related to air quality and environmental noise. The following
4 facts are based on my own personal knowledge and, if called as a witness, I could and would testify
5 competently thereto.

6 2. I have a BA in Anthropology from Georgia State University (1975) and an MS in
7 Environmental Studies from the University of Montana (1981). I have more than 30 years of
8 experience conducting air quality and/or environmental noise impact and mitigation assessments.
9 (my CV is attached as Exhibit 1 to this document; a list of references cited in this Declaration is
10 attached as Exhibit 2).

11 3. I have reviewed the declarations of Dr. Kurt Fristrup and Mr. Brannon Ketcham
12 submitted by the Defendants, which purport to respond to issues regarding air-borne noise levels
13 associated with removal of the oyster racks. I offer the following responses to their statements and
14 representations of the issues.

15 4. Dr. Fristrup acknowledges that “the accelerated removal scenario involving heavy
16 equipment . . . will generate higher noise levels [than the Lunny-proposed removal process].”
17 Declaration of Dr. Kurt M. Fristrup (Fristrup Dec.) D. 64-3 ¶ 4. But he does not address or respond
18 to the issue of the greater extent of the noise impact “footprint” that these higher levels of noise
19 would cause, nor does he even comment on the noise impacts or to the fact that “any kayakers,
20 hikers, or birds and mammals within about 10,000 feet of the rack removal operation would be
21 subjected to airborne noise levels higher than the 40-42 dBA (Leq) average existing daytime
22 background sound levels.” Declaration of Richard Steffel (Steffel Dec.) D. 37 ¶ 10. Dr. Fristrup
23 does, however, acknowledge that these levels “will plausibly, but temporarily, change the
24 distribution and behavior of animals in Drakes Estero.” Fristrup Dec. D. 64-3 ¶ 4. Thus, Dr.
25 Fristrup agrees noise generated by the equipment required to remove the DBOC oyster racks will
26 be substantial, and that this noise will cause major impacts on the harbor seals in terms of
27 disturbance and displacement.

28

1 5. Dr. Fristrup asserts that ENVIRON “did not adequately describe the measurement
2 conditions or the operating status of the DBOC equipment to comply with common engineering
3 practice and the requirements of relevant national and international standards” when it provided
4 comments on the Draft Environmental Impact Statement (DEIS) in 2011. Fristrup Dec. D. 64-3 ¶

5 5. Dr. Fristrup fails to acknowledge the following: (1) the ENVIRON sound level measurements
6 were not intended to comprise absolutely definitive representations of DBOC sound sources, but
7 were instead used in ENVIRON comments to prove that DEIS noise levels for DBOC equipment
8 were grossly overstated; (2) NPS rules and policies make it the NPS’s responsibility to take
9 representative measurements for consideration in the noise impact assessment; (3) that after
10 providing direct measurement data disproving overstated source sound level used in the DEIS,
11 ENVIRON comments on the DEIS suggested that NPS use the period between the DEIS and the
12 FEIS to take their own measurements of said equipment, and (4) that the outside peer reviewer for
13 the DEIS concluded that the ENVIRON measurements represented new, actual, informative sound
14 level data regarding the equipment used by DBOC. Rebuttal Declaration of Kevin Lunny Ex. 8.

15 6. Dr. Fristrup also fails to explain why, when he must have known the DBOC
16 equipment noise data were critical to the assessment of potential impacts from DBOC operations,
17 NPS never took the simple step of taking direct measurements instead of relying on truly
18 unrepresentative industrial noise sources to represent these few, discrete, and easily measureable
19 DBOC sources. In fact, there has never been any explanation of this failure of the NPS to carry out
20 its clear responsibility to use the best data available, and Dr. Fristrup carries on with this approach
21 in his declaration.

22 7. Dr. Fristrup indicates ENVIRON direct measurement data of DBOC noise sources
23 “were substantially lower than levels reported by other authoritative reports.” Fristrup Dec. D. 64-
24 3 ¶ 5. I am unaware of any “authoritative reports” regarding the noise generation profile of DBOC
25 equipment beyond the ENVIRON report, which I previously described above. Dr. Fristrup’s
26 statement ignores the fact that the reports he cites were considering unrepresentative, much larger,
27 much louder industrially-sized equipment (e.g., a metal cement mixer filled with rock and gravel
28 to represent a plastic cylinder being turned by a low-power electric motor, and a 70-hp jet ski to

1 represent a 20-hp skiff). Although NPS had plenty of time and clearly more than adequate
 2 resources to take their own definitive sound level measurements of the equipment in question, they
 3 did not. Instead they chose to criticize the only direct measurements of the subject equipment
 4 without asking for additional clarifying information or ever explaining what they perceive the
 5 problem to be with these measurements. This is, I believe, a smokescreen to conjure up uncertainty
 6 where none exists, and in the absence of any alternative explanation, I am forced to conclude that
 7 NPS and Dr. Frstrup’s decision not to take direct source noise measurements may have been
 8 based on the knowledge that using actual representations of DBOC noise sources would *not* have
 9 supported their preconceived (but still unproven) determination that these sources are causing a
 10 major noise impact on the soundscape of Drakes Estero.

11 8. Dr. Frstrup writes, “NPS was able to extract estimates of the noise generated by
 12 DBOC motorboats” and that “[these] estimates were inconsistent with the ENVIRON
 13 measurements, and consistent with the measurements reported elsewhere.” Frstrup Dec. D. 64-3 ¶
 14 5. These statements have been completely discredited by an ENVIRON report submitted to
 15 Secretary Salazar on November 27, 2012, which proved NPS was absolutely *not* able to develop
 16 credible estimates of boat noise levels or that their estimates were in any way representative of
 17 actual DBOC boat noise levels. Waterman Dec. D. 43 Ex. 3, ENVIRON Report at 7, Attachment 1
 18 thereto at 15-19. Contrary to the claim repeated here by Dr. Frstrup that NPS was able to
 19 “unambiguously” detect and characterize the noise generated by DBOC motorboats from
 20 recordings from a remote microphone along the banks of Drakes Estero taken in summer 2009 and
 21 winter 2010, Dr. Goodman’s analysis of the collected data showed that the NPS analysis contained
 22 “so many false positives . . . and false negatives . . . that all of the boat noise data presented in
 23 FEIS Appendix I lack scientific validity.” *Id.*, ENVIRON Report at 7. No one at NPS, including
 24 Dr. Frstrup, has responded to this detailed critique of the soundscape section of the FEIS, and
 25 without some explanation of how these fatally flawed data are actually of any use, repeating the
 26 false claim to suggest that NPS has used this information to prove its case is, at best, disingenuous.

27 9. Dr. Frstrup states that in spite of the NPS uncertainty regarding the validity of the
 28 ENVIRON sound level measurements of DBOC equipment they nonetheless “retained the

1 ENVIRON values for the FEIS analysis to reveal the range of spatial impacts that would occur
2 under different assumptions for equipment noise levels.” Fristrup Dec. D. 64-3 ¶ 5. This suggested
3 largesse by NPS obscures the false dichotomy represented by this approach that insinuated both
4 greater uncertainty and an unrealistically large range of possible equipment noise levels than
5 actually exist. This artificial complexity could have been completely avoided by direct
6 measurements of DBOC equipment noise, but NPS never took this simple step. I have come to
7 believe this approach was intentionally selected to serve the NPS agenda of suggesting a much
8 larger potential for noise impacts than actually exists.

9 10. Dr. Fristrup notes that ENVIRON has commented several times regarding NPS
10 use of selected noise metrics to provide an indicator of noise impacts and the application of
11 incomplete and misrepresentative data to characterize existing conditions in the study area.
12 Fristrup Dec. D. 64-3 ¶ 6. In the original analysis reported in the DEIS the NPS applied a
13 heretofore unknown noise metric they called “lowest daily ambient level” along with the median
14 (L50) metric from a single measurement location to represent existing ambient noise levels
15 throughout the study area. The L90 was not mentioned, defined, or applied in the DEIS.

16 11. In the FEIS, NPS switched to using the L90 metric (and the L50) as indicators of
17 existing conditions, and used the L90 as the reference point for assessing impacts. Dr. Fristrup
18 claims use of the L90 “conforms to a practice suggested by American Standards Institute S 12.9
19 Part 1.” Fristrup Dec. D. 64-3 ¶ 6.

20 12. While the L90 is tangentially defined by the cited ANSI standard (i.e., as a “time-
21 above” metric and as a potential metric for describing “residual sound”), this ANSI standard does
22 not suggest applying the L90 to assess *impacts* of transient sources such as those represented by
23 DBOC equipment and, especially, the DBOC boats. And even if this standard could be construed
24 to suggest such comparisons, the overly simplistic noise calculations performed by NPS to
25 estimate sound levels at distance from DBOC sources would not be sufficient to make credible
26 determinations regarding the actual potential for impacts. (See further discussion of modeling
27 under paragraph 17, below.)
28

1 13. ENVIRON comments on the DEIS and FEIS suggested using the equivalent sound
2 level (L_{eq}) as the best metric for comparing levels and for discerning the potential for adverse
3 effects on people. This approach was confirmed by the National Research Council of the National
4 Academy of Sciences (NAS) in the their review of the NPS DEIS in which they stated, “[an] L_{eq}
5 measurement gives a more representative value because it accounts for duration, although it tends
6 to overestimate noise in quiet environments because it is sensitive to high amplitude transients.
7 Alternatively, characterizing the variability of sound could also be accomplished using several
8 percentiles (e.g., L_{90} , L_{50} , L_5). Volpe (2011) reports both L_{50} and L_{eq} values, which differ by up to
9 6 dBA, a difference large enough to affect the estimated levels of impact of the alternatives which
10 compare ambient sound levels for equipment similar to those used by DBOC. Assessment of the
11 natural variability of the Drakes Estero soundscapes is essential for providing the proper context in
12 which to analyze the influence of DBOC activities on the soundscapes.” Lunny Dec. D. 40 Ex. 11
13 at 37.

14 14. In support of using the L_{90} metric, Dr. Frstrup claims that, “NPS policy focuses
15 on the sustained capacity of the environment to mask sounds.” Frstrup Dec. D. 64-3 ¶ 6. Be that
16 as it may, this approach was not part of the impact criteria defined in the Draft and Final EIS, and
17 such comparisons did not comprise the “major” noise impact determination reported in the FEIS.
18 These “impact” criteria were based on the levels and durations of DBOC noise compared with an
19 estimated existing background level *and* an amount of time DBOC sources exceeded the
20 background in the DEIS. Findings of “major” impacts based on these criteria were questioned in
21 the NAS review of the DEIS, *and/or* for “minor” and “moderate” impacts in the FEIS, which
22 found a high degree of uncertainty associated with stated soundscape impact findings of the DEIS
23 and stated that alternatively, the noise impacts of the continued DBOC operations could be
24 “moderate to minor.” Lunny Dec. D. 40 Ex. 11 at 50. This review may have contributed to the
25 NPS decision to change noise impact metrics – so as to make their goal of finding major impacts
26 achievable.

27 15. Dr. Frstrup claims that, “Although the noise analysis in the FEIS contains
28 considerable detail, its findings are fairly simple to express. DBOC airborne noise sources range

1 from 60-80 dBA, loud enough to interfere with conversation more than 50 feet from the noise
2 source.” Fristrup Dec. D. 64-3 ¶ 6. Neither of these statements is accurate, and both are
3 misleading. The statement regarding DBOC noise levels is an unsubstantiated assertion not
4 supported by any direct measurement data collected by NPS. Direct measurements by ENVIRON
5 of the specific DBOC equipment in question suggest this characterization is a gross overstatement
6 of actual equipment noise levels. No *measured* DBOC equipment noise levels even approached the
7 80-dBA upper end of this supposed range (i.e., the very loudest source reached 70 dBA L_{eq}), and
8 several were less than the low-end of this stated range. In addition, the loudest DBOC sources are
9 more than 50 feet from the water (where curious kayakers might possibly be exposed) and/or,
10 DBOC *could* easily employ mitigation measures that would substantially reduce noise
11 transmission from their equipment. But such mitigation measures were never even mentioned,
12 much less considered by the FEIS. Waterman Dec. D. 43 Ex. 3, ENVIRON Report at 7.
13 Consequently, DBOC equipment noise level already are, or could be reduced to levels where they
14 would not interfere with the conversation of park visitors, or there would be no people near
15 enough this equipment for conversation to be disrupted. Consequently, noise from this equipment
16 would *not* represent an impact as defined in the FEIS. I therefore believe Dr. Fristrup’s statements
17 here are nothing more than another smokescreen to obscure both the immediate issue at hand and
18 the even larger question of the accuracy and utility of the entire noise impact assessment prepared
19 by NPS.

20 16. Dr. Fristrup writes, “Background sound levels in Drakes Estero are about 26 dBA,
21 nearly an order of magnitude lower than the quiet background recommended for primary school
22 classrooms or bedrooms (35 dBA).” Fristrup Dec. D. 64-3 ¶ 7. This comparison is spurious. The
23 measured L_{90} sound level (which was exceeded by other sound levels 90% of the time) *during one*
24 *month at one location* was 26 dBA, but this level is neither representative of true existing levels,
25 nor is there any evidence that it is representative of levels at other locations throughout Drakes
26 Estero. This point was raised in ENVIRON comments on the DEIS, and clearly substantiated in
27 the NAS review of the DEIS which said, “An essential feature of a soundscape is the variation
28 over space and time. However, the environmental sound levels presented within the DEIS were

1 based on measurements taken from a single location (on a bluff above Drakes Estero) over 30 days
2 in late summer. This does not accurately represent the temporal or spatial variability of the project
3 area. Using data from a single month misses variability due to seasonal weather and wind patterns.
4 At the same time, limiting measurements to a single location cannot capture gradients in sound
5 levels with distance from the source. Propagation characteristics are complex in coastal regions
6 and extrapolating a single set of measurements to an area as large as Drakes Estero does not
7 capture this complexity or variability.” Lunny Dec. D. 40 Ex. 11 at 37. In addition, Dr. Frstrup’s
8 comparison to a recommended classroom or bedroom background level of 35 dBA is, at best,
9 misleading, because the recommended levels for such receiving locations are typically based on
10 the L_{eq} metric and *not* the L_{90} NPS is attempting to use to represent existing background
11 conditions in the Drakes Estero. So again, Dr. Frstrup is only serving to confuse and not clarify
12 the issues at hand.

13 17. Dr. Frstrup writes, “Industrial noise sources – like DBOC equipment – have huge
14 spatial footprints in quiet natural environments.” Frstrup Dec. D. 64-3 ¶ 7. This is an
15 unsubstantiated, grossly exaggerated, misleading statement. The NPS has no evidence supporting
16 the contention that DBOC noise sources are similar to what would typically be regarded as
17 “industrial” sources, and simply saying it does not make it so. NPS has taken no direct
18 measurements of this equipment and has instead relied on unrepresentative estimates of much
19 larger and louder noise sources to overstate noise from these sources. The only direct
20 measurements of these noise sources by ENVIRON indicate they are relatively minor sources that
21 do not rise to the level of what would typically be considered an “industrial” source. But using
22 inflated source values, NPS performed very simplistic calculations that they then construe to
23 grossly overstate both the levels and durations of noise events. ENVIRON strongly suggested
24 replacing this simplistic approach by performing actual noise modeling using correct
25 representations of the noise sources in its comments on the DEIS. Waterman Dec. D. 43 Ex. 3 at 3.
26 NAS suggested a similar approach based on their review of the DEIS, saying, “There are many
27 propagation models available to model sound from a source to a receiver. The DEIS provides
28 sound levels from motorboats and associated consequences. The committee assumes simple

1 spherical spreading was used for these calculations, as this method was used elsewhere in the
2 DEIS. Simple spherical spreading is often not the most accurate model to use. In addition,
3 consequences for communication disruption within 50 feet of a source would only realistically
4 impact DBOC staff near the source. Kayakers or park visitors would be unlikely to spend time in
5 such close proximity to DBOC activities and sources. It would be more accurate to show
6 propagation model results from sources in different places around the area of DBOC operations to
7 more accurately illustrate propagation between sources and potential receivers.” Lunny Dec. D. 40
8 Ex. 11 at 38. But NPS ignored these suggestions and maintained their simplistic and grossly
9 exaggerated estimates of DBOC noise. I disagree with this approach and with the conclusions they
10 reached using it.

11 18. Mr. Ketcham does not respond to the issue of potential noise impacts from the
12 oyster rack removal process in the discussion of soundscape in his declaration. Ketcham Dec. D.
13 64-2 ¶ 38. Instead, he attempts to refute the discussion in my and Dr. Corey Goodman’s comments
14 on the FEIS regarding the NPS’s misuse of their own noise impact criteria, which are based on
15 defined amounts of time that sources of interest exceed background levels. Mr. Ketcham asserts
16 that we misunderstood the impact criteria in saying that noise impacts must be assessed based on
17 noise received at a single location instead of being considered based on noise emitted into the
18 project study area as a whole. I disagree with his assertion because it makes no sense for NPS to
19 argue that noise causes impacts due to potential interference with normal conversation, while at
20 the same time saying the impact determination can be based on noise emitted anywhere within the
21 Drakes Estero. For noise to have the potential to cause an impact at all, it must first be perceived
22 by a receiver. If either the noise emitting source or the noise receiver is moving during the noise
23 event, or if the source and receiver are separated by great distance, the amount of noise received
24 and the potential impact of that noise will be very different than if the source and receiver are close
25 enough for the noise to interfere with conversation during the entirety of the noise event.

26 19. The noise impact criteria to be applied in this assessment were redefined in the
27 FEIS as follows:
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1 Intensity definitions for noise levels are rendered in terms of speech interference in order to
 2 interpret decibel values in relation to familiar, everyday experiences for park visitors and
 3 public stakeholders. . . . Intensity definitions based on function consequences to human
 4 communication also serve as reasonable proxies for the magnitude of human-caused noise
 5 inference with animal behavior.

6 For short-term impacts, percentages are based on the percentage of time during a year
 7 (taking into consideration 24 hours a day) that human-made noise impacts the ambient
 8 soundscape. For long-term impacts, percentages are based on the percentage of time during
 9 the 10-year SUP term (taking into consideration 24 hours a day) that human-made noise
 10 impacts the ambient soundscape

11 [Soundscape impacts are defined as follows]

12 **Negligible:** The impact is not detectable or measurable.

13 **Minor:** Human-caused noise would be at a level (less than 35 dBA) that enables normal
 14 voice conversation at distances exceeding 32 feet, *and/or* the natural soundscape is
 15 interfered with less than 5 percent of the time.

16 **Moderate:** Human-caused noise would be at a level that enables normal voice
 17 conversation at distances greater than 16 feet (less than 41 dBA) and less than 32 feet
 18 (greater than 35 dBA), *and/or* the natural soundscape is interfered with 5 to 10 percent of
 19 the time.

20 **Major:** Human-caused noise would be at a level (greater than 41 dBA) that requires
 21 elevated vocal effort for communication between people separated by 16 feet, *and* the
 22 natural soundscape is interfered with more than 10 percent of the time.

23 Goodyear Dec. Ex. 3 at 444-45 (emphasis added). Note that the first two “and/or” were simply
 24 “and” in the DEIS. Because these impact criteria are at least partially based on interference with
 25 normal conversation, it is clear that for such impacts to occur there must be a receiver present,
 26 which means the accumulated time used to assess impact *must be* for a single location. And
 27 contrary to Ketcham, I would argue a similar requirement for any portion of the soundscape,
 28 because without a receiver there is no impact, so again the cumulative exposure must be based on

1 sound levels over time at a single location. And as shown in a previous submittal, DBOC sources
2 *do not* rise to the level of impact based on cumulative noise duration. Waterman Dec. D. 43 Ex. 3,
3 ENVIRON Report at 4-7. This same conclusion is echoed by the findings of the DEIS review by
4 the NAS, which found a high degree of uncertainty associated with stated findings of impact and
5 that alternatively, the noise impacts of the continued DBOC operations could be “moderate to
6 minor.” Lunny Dec. D. 40 Ex. 11 at 50.

7 20. In contrast with the typical noise levels from DBOC equipment sources that do not
8 actually result in anything more than occasional, short-term, temporary, and minor noise impacts to
9 the soundscape within Drakes Estero, the noise associated with removing the oyster racks, would
10 cause major noise impacts, as acknowledged by Dr. Fristrup. In my opinion, the oyster rack
11 demolition process would cause greater noise impacts within the Estero than anything the oyster
12 farm’s operational noises have probably ever caused, and certainly while the facility has been
13 operated by DBOC. For these reasons, I urge granting of the injunction to prevent such demolition
14 until such time as the larger legal issues in this case have been resolved.

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1 I declare under penalty of perjury under the laws of the United States and the State of
2 California that the foregoing is true and correct.

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4 Executed this 14th day of January, 2013, in Lynnwood, Washington.

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Richard Steffel

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EXHIBIT 1



Richard Steffel | Principal

Lynnwood, Washington

+ 1 425 412 1808 | rsteffel@environcorp.com

Richard Steffel has over 30 years of experience evaluating environmental impacts and possible mitigation measures related to mobile and area sources of air pollution. His experience includes 19 years conducting transportation and general conformity assessments under state and federal air quality rules for a variety of transportation projects, transit and transit-oriented development projects and new and redevelopment projects that required project-level air quality conformity assessments. Additionally, he has over 20 years of experience conducting and managing a wide variety of environmental noise compliance, impact and mitigation assessments. These have included numerous evaluations of roadway, transit and development projects which have had to comply with state and local noise rules and/or federal and state noise impact and mitigation criteria established by the Federal Transit Administration, the Federal Highway Administration, the Department of Housing and Urban Development and various western state transportation agencies. Additionally, he has conducted numerous air and noise studies for new and modified marine shipping and repair facilities, including cruise ship homeports, container terminals, commodity export terminals and intermodal shipping facilities. Many of these air quality and environmental noise studies included reviews and documentation required by the Washington State Environmental Policy Act and NEPA.

EDUCATION

1981 MS, Environmental Studies, University of Montana (Air Quality/Energy Conservation)

1975 BA, Anthropology, Georgia State University (Ecological Anthropology)

EXPERIENCE

Noise Impact/Compliance/Mitigation Assessments

- Terminal 5 (T-5) Container Equipment-Handling Noise Mitigation Assessment, Port of Seattle, WA. Principal in charge, project manager, and primary investigator in equipment noise reduction study. Efforts focused on backup alarm noise from container-handling equipment at T-5, and included sound level measurements to assess the audibility of these safety devices, and recommendations for using quieter devices to reduce noise levels received at off-site residential locations.
- Train Yard Noise Impact and Mitigation Assessment, Equistar Chemicals, Morris, Illinois. Principal in charge and project manager for a noise compliance, impact, and mitigation assessment of a new rail storage yard at an existing chemical manufacturing plant. The review included multi-day sound level measurements both on site and near noise-sensitive residential receivers in the vicinity, and CadnaA noise modeling to consider the changes in the acoustic environment due to the new rail yard. In addition to projecting off-site rail yard noise levels, the modeling also considered the effectiveness of using noise barriers near portions of the facility property boundary to obstruct noise transmission to off-site receivers. The mitigation analysis additionally used CadnaA to assist in defining the placement, length, and height of two noise barriers, including use of a berm/wall combination to achieve a greater overall height. These noise analyses were documented in a technical report provided to the client.
- Seattle Steam Fuel Change Project, Seattle Steam, Inc., Seattle, WA. Project manager and principal investigator for the air quality and noise impact review of proposed fuel change at existing facility. Noise analysis focused on the design and noise sources associated with the new wood fuel-handling building to assess compliance with applicable noise rules.

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- Southwest Recycling and Transfer Station, Snohomish County Solid Waste, Mountlake Terrace, WA. Project manager and principal investigator for noise compliance and mitigation assessment of operational transfer station to recommend means to reduce noise received on nearby properties. Included source and ambient measurements in the area and noise modeling to assess potential noise reduction treatments.
- Tacoma Narrows Bridge 24th Street Electronic Toll On-Ramp Project, WSDOT, Gig Harbor, WA. Project manager and principal investigator for the analysis to consider the need for supplemental noise mitigation assessment for potential traffic noise impacts at residential receivers affected by the larger Tacoma Narrows Bridge Project. Analysis refuted previous determination of the lack of feasible and reasonable mitigation to shield affected from high levels of traffic noise by proving mitigation could work at a reasonable cost.
- Oso Gravel Pit Noise Studies, Green Crow, Inc., Snohomish County, WA. Principal in charge for ongoing support related to noise issues from operation and expansion of the facility. Project has included numerous sound level measurements to document existing ambient conditions near the gravel pit's initial and relocated access road, and continuing consulting and expert testimony before hearings examiner and monitoring related to the conditional use permit conditions for the facility.
- Float Glass Manufacturing Plant, Cardinal Glass Industries, Napavine, WA. Project manager and principal investigator of environmental noise implications of the development of a float glass manufacturing facility in Lewis County, WA. Analysis included measurements of existing sound levels at representative sensitive receiving locations in areas. Potential impacts from operational noise included on-site truck traffic and idling, on-site train movements, facility noise, on-site material handling, and an on-site electrical substation. Evaluated noise from these sources using the FHWA Traffic Noise Model, the Environmental Noise Model, and specialized calculations. Considered projected future sound levels both in relation to the county noise limits and with regard to the potential for noise impacts due to changes in the existing acoustic environment. Analysis also evaluated potential noise reducing mitigation in the forms of operational changes and noise barriers for several potentially problematic noise sources. Findings summarized in the Final EIS for the project. Also testified in the successful defense of the EIS during an administrative appeal.
- Gravel Truck Noise Assessment, Canyon Resources, Puyallup, WA. Contributor. Developed noise monitoring protocol and participated in initial sound level measurements of compliance of gravel pit haul truck traffic noise levels with applicable county nighttime noise limits. Conducted noise mitigation analysis and oversaw subsequent sound level measurements to verify compliance.
- 145th Place Noise Impact/Mitigation Study, City of Bellevue, Bellevue, WA. Project manager and senior reviewer of noise impact and mitigation study for the widening of 145th Place.
- Manufacturing Facility Noise Compliance Assessment, Confidential Client, Tumwater, WA. Project manager and principal investigator for noise compliance measurements for a microchip manufacturer. Evaluation included frequency-specific source sound measurements during experimental operation of the facility to identify potentially problematic sources and to assess the effectiveness of noise mitigation barriers along the property line.
- 140th Avenue Noise Mitigation Studies, City of Bellevue, Bellevue, WA. Project manager and principal investigator for the noise impact and mitigation study for the widening of 140th Avenue. Assessment included extensive modeling to assess potential traffic noise impacts under Bellevue's noise rule followed by site-specific modeling to evaluate the potential noise reduction benefits of noise barriers along much of the project alignment. Included several meetings with citizen advisory group to explain and discuss findings. Studies led to construction of cost-effective noise barriers along much of this project area.
- Madrona Woods Noise Mitigation Study, Homeowners Association, Gig Harbor, WA. Project manager and principal investigator for review of noise impact and mitigation assessment related to SR-16/36th Street

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interchange. Analysis led to construction of two noise barriers determined in previous analyses to be unnecessary and ineffective.

- Noise Compliance Assessment, City of Kent, Kent, WA. Project manager and principal investigator for noise compliance assessment of a food distribution facility where large trucks idle across the street from numerous residential receivers. Assessment led to further studies (by others) to assess and then construct noise barriers for this facility.
- Terminal 90/91 Noise Compliance Assessment, Port of Seattle, Seattle, WA. Project manager and principal investigator for compliance assessment of noise from refrigerated shipping trucks at the loading dock of a fish-processing facility. Study led to operational changes at the facility to relocate idling reefer containers.

Marine/Freight Facility Projects (Including General Air Quality Conformity where Applicable)

- Gateway Pacific Terminal, SSA Marine, Cherry Point, WA. Principal in charge, project manager, and senior reviewer for the air quality and environmental noise impact and mitigation assessments for a proposed 54 million ton/year commodity export/import terminal on the Strait of Georgia, northwest of Bellingham, WA. The environmental noise assessment included measurements of existing conditions in the project vicinity and noise modeling using CadnaA to consider off-site sound levels related to facility operations. The noise assessment also considered train operations noise along the route between the railroad mainline and the facility, and included a mitigation assessment for projected train-horn noise impacts. The air quality review included extensive emission inventory development to characterize future operations of transiting and on-site trains, coal and other commodity-handling systems, vessels in transit and hoteling, and vessel-loading systems. These emissions were considered in an AERMOD dispersion modeling analysis that evaluated compliance with ambient air quality standards. Results of these analyses were documented in technical reports review by permitting agencies and the EIS contractors for this project. This project is ongoing.
- Puyallup Tribal Terminal, SSA Marine, Port of Tacoma, WA. Principal in charge, project manager, and senior reviewer for the air quality and environmental noise impact and mitigation assessments for the modification and expansion to develop a 4-berth container terminal in the Port of Tacoma, WA. The environmental noise assessment included measurements of existing conditions in the project vicinity, source noise measurements of expected terminal operations equipment, and noise modeling using CadnaA to consider off-site sound levels related to facility operations. The air quality review included extensive emission inventory development to characterize future terminal operations and AERMOD dispersion modeling to evaluate compliance with ambient air quality standards. Due to the designation of the Tacoma area as nonattainment for fine particulate matter (PM_{2.5}), the review also included extensive review by and interactions with the Puget Sound Clean Air Agency regarding emission reduction components included in the project.
- Weyerhaeuser Port of Olympia Log-Export Facility, Weyerhaeuser Company, Olympia, WA. Project manager and principal investigator for the air quality and environmental noise impact and mitigation studies for a proposed log export facility. The air quality analysis included compilation of worst-case peak-day and annual vessel and log-handling equipment emission inventories, and AERMOD dispersion modeling. The analysis assessed potential off-site concentrations of fine particulate matter (PM_{2.5}), which were also used as a surrogate for diesel particulate matter. The noise study included measurements of ambient levels in the project vicinity, equipment source noise measurements in and around an operational log-handling facility, and calculations to assess both compliance with local noise limits and the potential for impacts due to changes in noise levels.
- Terminal 30 (T-30) Container Terminal Reactivation and T-91 Cruise Terminal Relocation, Port of Seattle, Seattle, WA. Project manager and principal investigator for the air quality impact and mitigation assessment and environmental noise impact review for this two-part project. Air quality analysis included compilation of detailed peak-day and annual emission inventories for hotelling vessels and container-handling equipment and haul

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vehicles. Emissions data considered in AERMOD dispersion modeling to assess potential off-site concentrations of both criteria air pollutants and selected toxic air pollutants. Analysis considered uncontrolled emissions and then more realistic and controlled emissions based on implementation of particulate control technologies and cleaner diesel fuels.

- Rail/Barge Satellite Transfer Facility, Port of Everett, Everett/Mukilteo, WA. Project manager and principal investigator for the air and noise studies for the EIS considering establishment of a barge-to-rail transfer facility for oversized containers. Studies considered three candidate sites. Air quality analysis included an assessment in relation to general conformity during construction of the facility and review of the implications of related traffic. Noise analysis included ambient measurements in the vicinity, special consideration of rail travel and horn noise, impact and mitigation modeling, and subsequent testimony during the shoreline permitting process for the facility. Subsequent work included development of air quality and noise management plans for implementation during construction of the facility, and sound level measurements to assess pile-driving noise levels at nearby eagle nest and perch locations.
- Homeport Cruise Ship Terminal, Port of Seattle, Seattle, WA. Project manager and principal investigator for the air quality and noise impact and mitigation analyses for the proposed development of a temporary cruise ship homeport terminal at the Port's Terminal 90/91 and Terminal 30 on Elliott Bay. Assessments included dispersion modeling of the cruise ship sources and consideration of off-site traffic-related air quality. Provided support in later supplemental air quality analyses for the now operational T-30 cruise ship port facility.
- Pier 1 Redevelopment Project, Port of Anacortes, Anacortes, WA. Project manager and principal investigator for the air quality and noise impact and mitigation evaluations for the EIS for the proposed redevelopment and expansion of an existing shipyard on the industrial waterfront. Air quality analysis included consideration of compiled monitoring data and review of projected future traffic related to the facility. Noise analysis included ambient and compliance measurements in neighborhoods near the facility, source measurements of shipyard noise sources (e.g., cranes, welding, etc.), and impact and mitigation modeling to assess the noise implications of the proposed facility expansion.
- Terminal 90/91 Neighborhood Noise Compliance Studies, Port of Seattle, Seattle, WA. Project manager and senior reviewer for the nighttime noise monitoring compliance evaluation for the Terminal 90/91 facility under terms of the short-fill agreement between the Port and nearby neighborhoods. Project included periodic measurements of nighttime (10 p.m. to 7 a.m.) noise levels at locations overlooking the facility, and analysis of the collected second-by-second data to ascertain contributions from terminal sources to neighborhood sound levels. Also conducted measurements and calculations to assess compliance with Seattle noise regulation and consulted with the Port and with terminal tenants in efforts to reduce off site noise levels. Work began in 1990 and extends to the present day, and has involved numerous meetings with the advisory group representing affected citizens, including revamping the protocols used in these evaluations.
- Southwest Harbor Cleanup and Redevelopment, Port of Seattle, Seattle, WA. Project manager for later phases of project and primary air quality analyst. Performed transportation and general conformity air quality analyses for a major port redevelopment of Terminal 5 (T-5) in the south Seattle PM10 nonattainment area. Effort included compiling emission inventories for both the federally controlled phases of construction and the operational phase of the entire facility. Compared emission tabulations with allowed *de minimis* levels and/or used in modeling to assess compliance with ambient air quality standards. Results reported in a NEPA EIS and related documentation.
- Southwest Harbor Redevelopment Supplemental Noise Study, Port of Seattle, Seattle, WA. Project manager and principal investigator for extended baseline noise measurements near Southwest Harbor (T-5) site as it was being redeveloped an intermodal container shipping terminal. Measurements used in later assessments of compliance with noise conditions. Project also included an equipment noise reduction study and construction noise and vibration monitoring.

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- Shilshole Bay Marina Redevelopment, Port of Seattle, Seattle, WA. Project manager and principal investigator for the air quality and noise impact assessments for the redevelopment and expansion of the Shilshole Bay Marina.
- California Street Overpass Project, Port of Everett, Everett, WA. Project manager and principal investigator for the air quality and noise impact and mitigation analyses of the proposed new access route to the Port. Air quality analysis included hot-spot modeling and consideration of transportation conformity. Noise analysis included measurements and impact and mitigation modeling, including special studies related to a daycare center near the proposed facility.
- Intermodal Facility Study, Burlington Northern Santa Fe Railway, Auburn, WA. Project manager and principal investigator for the air quality and noise analyses for a potential intermodal rail facility. Air quality concerns focused on off-site traffic sources, while noise study examined a wide range of on-site sources and mitigation opportunities.

Noise Policy Studies

- Off-Road Vehicle (ORV) Noise Mitigation Policy Study, Washington Interagency Committee (IAC) for Outdoor Recreation, WA. Managed and provided senior review of research for and development of a proposed model ordinance to reduce impacts from ORV noise received in residential properties around the state. Research effort included literature reviews, interviews of potentially affected stakeholders, and public meetings to seek input on preliminary proposals. Model ordinance development included proposed amendments to the existing state noise rules (WAC 173-60 and others) to provide a tool with which local jurisdictions can control ORV noise. Study and proposed model ordinance reported in a document submitted to the IAC.
- Petrovitsky Road Noise Mitigation Studies, King County Roads Dept. King County, WA. Project manager and principal investigator for three phases of the Petrovitsky Road noise barrier effectiveness study. First phase determined existing sound levels near a road scheduled for widening based on expanded baseline sound level measurements. Second phase included more sound level measurements to assess traffic noise levels after the road had been widened but before the noise barrier was fully constructed. Final phase used additional measurements to document the noise reduction provided by the noise barrier. Reports of all three assessments provided to King County.
- Road Noise Impact and Mitigation Policy Study, King County Roads Dept., King County, WA. Project manager and principal investigator for study examining alternative traffic noise impact definitions and mitigation policies in King County, WA. Included extensive literature review of noise effects on people, consideration of regulations and policies in a wide range of jurisdictions, a measurement study of possible mitigation using alternative paving materials, and development of a noise impact matrix for county roads to assist decision makers in their considerations of alternative policy goals. Study also involved presentations of findings and sound level demonstrations to county staff and members of the County Council.

Transportation Projects (with Air Quality Transportation Conformity)

- NE 8th Street Widening Project, City of Bellevue, Bellevue, WA. Senior reviewer for the air quality and noise impact and mitigation assessments for the NE 8th Street widening project in Bellevue. The air quality review was based on qualitative comparisons of project-related traffic effects at intersections with traffic conditions encountered in previous air quality modeling analyses. The noise study included ambient sound level measurements in the project vicinity and traffic noise modeling (using TNM) to assess potential impacts and possible mitigation measures. Both analyses were documented in WSDOT format discipline reports.
- Granite Falls Alternative Route, Snohomish County Public Works, Granite Falls, WA. Principal in charge, project manager, and senior reviewer for air quality and environmental noise reviews of a proposed new roadway to reroute heavy-duty gravel truck traffic away from the central business district. Air quality analysis included a

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conformity review based on consideration of the traffic impact assessment, with a focus on roundabout intersections along the proposed new roadway. Environmental noise study included sound level measurements throughout the project area and impact and mitigation modeling using the FHWA Traffic Noise Model (TNM). Analyses conducted in accordance with WSDOT policies, and documented in technical reports approved by WSDOT. Subsequently assisted with refined noise barrier analysis to provide decision makers and public with additional, specific information regarding barrier locations and heights.

- Federal Way Transit Center, Sound Transit (regional transit authority), Federal Way, WA. Project manager and senior reviewer to reexamine the need for mitigation for air quality impacts projected in a previous analysis (by others). Analysis included consideration of latest available Mobile6.2 emission factors and revised CAL3QHC modeling to examine the need for structural mitigation. Analysis determined mitigation would not be necessary.
- Tacoma Narrows Bridge 24th Street Electronic Toll On-Ramp Project, WSDOT, Gig Harbor, WA. Project manager and principal investigator for air quality analysis of potential impacts related to modification of the larger Tacoma Narrows Bridge Project. Analysis included hot-spot air quality modeling and a conformity determination related to the ramp project and the toll plaza of the facility based on specialized project-level air quality dispersion modeling of these facilities.
- West Lake Sammamish Parkway, City of Redmond, Redmond, WA. Project manager and primary investigator for air and noise reviews for a proposed widening of West Lake Sammamish Parkway, near SR 520 in Redmond. Air quality review included hot-spot modeling, and the noise analysis included sound level measurements and a thorough examination of potential noise impacts using TNM. Noise mitigation was proposed and examined at several locations along the project corridor.
- Russell Street Expansion Project, City of Missoula, Missoula, MT. Project manager and senior reviewer for the air quality and environmental noise reviews for the proposed widening of Russell Street and 3rd Street in the Missoula, MT. The air quality review included hot-spot modeling of project-created roundabouts. The noise analysis included numerous noise measurements and TNM modeling to examine potential noise impacts at numerous receiving locations along both roadways. The Montana DOT noise rules were used to determine the degree of impact and the potential effectiveness of noise mitigation.
- I-5/196th Street Interchange Project, City of Lynnwood, Lynnwood, WA. Project manager and primary investigator for the air quality and environmental noise impact and mitigation studies related to the proposed creation of a new freeway interchange. The air quality analysis included project-level hot-spot modeling. The environmental noise analysis included ambient noise measurements at potentially affected sensitive receivers, and extensive modeling and calculations to assess the likelihood of noise impacts and evaluate potential mitigation measures in accord with WSDOT policies. The methods and findings of these analyses were documented in technical reports that were summarized in the project EIS.
- Transportation Projects, Various Clients, WA. Completed a wide range of transportation projects for a variety of clients, including the Peace Arch International Border Crossing redevelopment project in Blaine, WA; the S. 228th Street Extension Project in Kent, WA, to establish a new east-west corridor between I-5 and north Kent; the Lundeen Parkway Extension project and the 196th Street Extension project in Snohomish County, WA; the Issaquah-Fall City Road and Woodinville-Duvall Road projects in King County, WA; the 142nd Street improvement project in Sumner, WA; the SR-18/C Street ramp relocation project in Auburn, WA; the Allen Street Bridge Replacement Project in Kelso, WA; the Bremerton to Gorst, WA, highway project; the South 196th/200th Street corridor project in Kent, WA; and the S. 312th widening project in Federal Way.

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Transportation Planning Projects (Some with Air Quality Conformity)

- Redmond Overlake Plan Update, City of Redmond, WA. Project manager and principal investigator for the air quality impact assessment of alternative transportation system plans using hot-spot modeling. Results of analysis reported in the environmental impact statement (EIS) for the project.
- Bellevue 2006-2017 Transportation Facilities Plan Noise Analysis, City of Bellevue, Bellevue, WA. Project manager and senior reviewer for the air quality and noise analyses for the 2006-2017 Transportation Facilities Plan (TFP), a city-wide programmatic plan to improve transportation. Examined the potential for traffic noise impacts due to proposed improvements at nearly 30 intersections. Analysis included sound level measurements and using the FHWA NOISE model, completed an assessment of the potential for noise impacts at each project area. The air quality analysis included the use of EPA-approved models to estimate CO concentrations near congested intersections. Findings of both noise and air quality analyses were documented as separate technical reports included in the project's SEPA review.
- Bellevue Downtown Implementation Plan, City of Bellevue Transportation Department, Bellevue, WA. Project manager and senior reviewer for the air quality and environmental noise review of alternative redevelopment options for downtown Bellevue. Alternatives ranged from transportation-system to transit options. The air review included hot-spot modeling and the noise assessment included measurements and use of the FHWA NOISE model to consider potential impacts.
- Transportation Planning Projects, Various Clients, WA. Completed a variety of transportation planning projects including the Bel-Red Overlake Transportation Plan and several City of Bellevue Transportation Facilities Plans and alternative downtown development plans. Efforts included technical support in the development of computerized procedures to calculate peak-hour pollutant emissions from traffic on all major roads in the city, based on output from the EMME/2 transportation system model. Some projects also included CAL3QHC modeling of affected intersections throughout the city. Conducted subarea air quality conformity reviews for proposed subarea plans in Everett and Shoreline, WA. Results typically included in the SEPA EIS examining the transportation plan alternatives.

Transit/Transit-Oriented Projects

- First Hill Streetcar, Seattle DOT, Seattle, WA. Principal in charge, project manager, and senior reviewer for the environmental noise impact and mitigation analyses for the establishment of a new 2.5 mile streetcar system from Pioneer Square onto First Hill. The noise review included measurements of existing sound levels in several locations within the study area, a detailed review of noise-sensitive receivers within the FTA-defined screening distance for such facilities, and screening-level impact assessment based on equipment noise specifications and comparisons of projected construction and operational noise. A subsequent detailed analysis included additional source-specific measurements of an active Seattle streetcar system and CadnaA noise modeling to consider the potential for impacts. The methods and findings of these analyses were reported in several technical memos submitted to project stakeholders.
- Sounder Commuter Rail Expansion and Realignment, Sound Transit, Tacoma, WA. Principal in charge, project manager, and senior reviewer for the air quality and environmental noise impact and mitigation analyses for the supplemental SEPA and NEPA studies considering the extension and realignment of the Sound Commuter Rail. The air quality study included a project-level conformity review based on dispersion modeling. The environmental noise analysis included locomotive source noise measurements, ambient noise measurements, and extensive modeling and calculations to assess the likelihood of noise impacts and evaluate potential mitigation measures in accord with FTA policies. The methods and findings of these analyses of the multiple alternative routes and options considered were reported in a number of technical memos that were summarized in the supplemental EIS for the project.

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- Portland Streetcar Loop Project, City of Portland/TriMet, Portland, OR. Project manager and principal investigator for environmental noise assessment for proposed Portland Streetcar Loop project, to extend streetcar tracks, stations and service. The noise analysis identified and focused on potential sensitive uses along the project routes and assessed the potential for the new streetcar and other considered alternatives to cause noise impacts during either construction or operation of the new system. Project related operational noise was calculated using the Federal Transit Administration (FTA) spreadsheet model, and impact assessment was based on noise impact policies and guidance of the FTA. In addition, construction-related mitigation measures were identified and evaluated.
- South Kirkland Park & Ride Facility, King County Metro, Kirkland, WA. Project manager and principal reviewer for the air quality transportation conformity review for the proposed expansion of an existing Park & Ride facility. The analysis included screening of project-affected intersections based on the traffic review and detailed hot-spot modeling of the two intersections that would be most affected by project-related traffic. The results of this analysis were documented in a memo report that was submitted to the Federal Transit Administration for review as part of the grant-funding process for this project.
- Woodinville Park & Ride, Sound Transit, Woodinville, WA. Project manager and principal investigator for the air quality and environmental noise impact and mitigation studies for a proposed Park & Ride expansion and transit-oriented development. Air quality analysis included hot-spot modeling. Noise assessment included on-site and source noise measurements, modeling, and a mitigation analysis. Results reported in a SEPA EIS.
- Redmond Transit Center Expansion, King County Metro, Redmond, WA. Project manager and senior reviewer for the noise impact assessment for proposed changes and expansion to an existing transit center. Analysis included ambient and source sound measurements, as well as calculations to evaluate potential impacts related to expanded use of the facility and relocation of the transit center circulation roadways through the facility. Results reported in the SEPA review for the project.
- Redmond Park & Ride Garage, King County Metro, Redmond, WA. Project manager and senior reviewer for the air quality and noise impact assessment for the construction and operation of a multilevel garage to replace an existing surface parking lot. Analysis included ambient sound measurements and noise modeling to assess potential impacts. Results reported in the SEPA documentation for the project. Developed a construction noise minimization plan to reduce impacts to nearby homes.
- South Sounder Train Storage Yard, Sound Transit, Lakewood, WA. Project manager and senior reviewer for the air quality conformity-level analysis examining the implications of relocating the south Sounder train storage yard to a site in Lakewood, WA. Conducted the environment noise impact and mitigation assessment including sound level measurements and noise modeling to consider compliance, potential impacts, and mitigation for the relocation of this facility. Included wayside horn analysis as potential mitigation.
- Everett to Seattle Sounder, Sound Transit, WA. Project manager and principal investigator for the air quality impact assessment for the north Sounder commuter rail extending from Everett to Seattle. Analysis included hot-spot modeling and regional emissions comparisons for the EIS for the project.
- Seattle Monorail Project (SMP) Programmatic Review, Seattle Monorail Authority, Seattle, WA. Project manager and senior reviewer for the air quality and noise impact studies for the programmatic EIS that evaluated potential impacts associated with alternative routes for the Seattle Monorail Project.
- Seattle Monorail Project Project-Level Review, Seattle Monorail Authority, Seattle, WA. Project manager and principal investigator for the analysis of potential noise impacts and mitigation measures for the SMP project-level EIS. Analyses included source noise measurements of an operational monorail, noise impact and mitigation modeling, and indoor/outdoor measurements to assess potential impacts on performance venues at Seattle

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Center. Provided expert testimony regarding noise issues in the successful defense of an appeal of the adequacy of the EIS.

- Transit Projects, Various Clients, WA. Managed and participated in the air quality and/or noise analyses for environmental impact studies for the Sound Transit (ST) Lynnwood Park & Ride Expansion and direct high-occupancy vehicle (HOV) ramp project, the ST Auburn Park & Ride, the King County Metro (KC Metro) Eastgate Park & Ride expansion, the KC Metro Northgate Park and Pool lot expansion, the KC Metro Kenmore Park & Ride expansion, the Pierce Transit Lakewood Park & Ride and transit base expansion and relocation, and the Whatcom Transit Authority's Lynden, WA, Transfer Center project. Provided senior review of the qualitative air quality and noise assessments of several King County transit-oriented design projects. Provided expert testimony regarding noise issues related to an appeal of a proposed Sound Transit parking garage in Federal Way.

Mixed Use/Institutional Development Projects/Public Housing

- Virginia Mason Medical Campus Master Plan, Virginia Mason, Seattle, WA. Principal in charge, project manager, and senior reviewer for the air quality and environmental noise assessments of potential impacts and possible mitigation measures for a major phased expansion of this existing medical campus. The air quality review was based on qualitative comparisons with previous analyses. The noise assessment included baseline sound level measurements and qualitative consideration of both the construction and the operational phases of this facility. Subsequently took second round of baseline noise measurements to assess the influence of emergency vehicle siren noise in the project vicinity.
- Yesler Terrace Redevelopment, Seattle Housing Authority, Seattle, WA. Principal in charge, project manager, and senior reviewer for the air quality and environmental noise assessments of potential impacts and possible mitigation measures for the complete phased redevelopment of an existing low income housing facility adjacent to Interstate 5 in Seattle. The air quality review included AERMOD dispersion modeling to evaluate potential traffic-related air pollutant emission levels across the project site. The noise assessment considered the suitability of the project site under HUD criteria based on extensive CadnaA noise modeling of freeway and other major roadway traffic noise across the site. The noise evaluation included consideration of potential noise mitigation measures including noise wall and sit layout changes to shield noise-sensitive areas of the facility.
- North and East Cities Justice Center, NEC Coalition, Metro Seattle, WA. Principal in charge, project manager, and senior reviewer for the air quality and environmental noise assessments of potential impacts and possible mitigation measures for studies that considered numerous candidate sites for a new jail and justice center to serve northern King County. The air quality review was based primarily on qualitative comparisons derived from assessment of the traffic impact studies of the proposed facility. The noise assessment included baseline sound level measurements at numerous locations and noise modeling to consider both construction and operational noise from the facility.
- Thurston Highlands Development, Thurston Highlands LLC, Yelm, WA. Project manager and senior reviewer for air quality analysis for a proposed 1,251-acre master planned mixed-use development that would include approximately 5,000 homes in a mix of housing types and densities. The analysis included air quality dispersion modeling of several signalized intersections that would be affected by project traffic. The analysis also included a greenhouse gas emissions estimate for construction and operation of the first phase of the development.
- Accountability and Restitution Center, Shockey/Brent, Inc., Tumwater, WA. Senior technical reviewer for air quality and environmental noise evaluations for the environmental impact analysis for the proposed Thurston County Accountability and Restitution Center (ARC) and Courts Facility.
- King County Regional Justice Center Site-Selection Analyses, King County, Kent, WA. Project manager and senior reviewer for the air quality and traffic noise impact assessments for the SEPA EIS for the proposed King County Regional Justice Center. Assessments used the CAL3QHC dispersion model and EPA NOISE model to evaluate

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potential effects of locating the facility at four different candidate sites in three separate municipal jurisdictions in the county. Noise analyses considered county noise rules in conjunction with the rules in Kent, Auburn, and SeaTac, and included measurements and modeling of future impacts.

- Kent Events Arena, City of Kent, WA. Project manager and senior reviewer for air quality and environmental noise impact assessments for development of a proposed major events arena. The air quality evaluation consisted of a primarily qualitative review based on consideration of the traffic impact assessment for the facility. Environmental noise review included multi-day sound level measurements in the vicinity of the preferred project site, traffic noise modeling, and facility noise calculations to consider both compliance with local noise limits and the potential for noise impacts at nearby sensitive receivers.
- Yakima Valley Memorial Hospital Plan Update, Yakima Regional Hospital, Yakima, WA. Project manager and principal investigator for air quality and environmental noise impact assessment for 30-year plan update for this major regional hospital. Air quality analysis included consideration of traffic-related air quality issues, including tabulation of fine particulate matter emissions. Noise analysis included measurements in the vicinity of the facility and calculations to consider future changes in the facility layout and on-site sources. Results reported in the EIS for the project.
- North Bay Master Plan, Port of Seattle, Seattle, WA. Project manager and principal investigator for the air quality and environmental noise impact and mitigation analyses for proposed redevelopment of an industrial portion of the Port's Terminal 90/91 into a mixed use research and development/office/residential facility. The air quality analysis included hot-spot modeling near project-affected intersections. The noise assessment included long-term on- and near-site sound level measurements along with traffic noise modeling and calculations to evaluate the potential for impacts as well as compliance with applicable noise limits. Analyses published in the draft EIS for the project.
- Port Gardner Wharf/North Marina Redevelopment, Port of Everett, Everett, WA. Project manager and principal investigator for the air quality and environmental noise impact and mitigation analyses for the proposed redevelopment of an existing industrial and recreational boating maintenance and repair facility into a mixed use office/residential facility. Analyses were published in the draft and final EIS for the project.
- Westpark Redevelopment Project, Bremerton Housing Authority, Bremerton, WA. Project manager and senior reviewer for the air quality and environmental noise impact and mitigation analyses to assess the potential impacts from and the site suitability of a new low and market rate housing development to replace an existing facility in Bremerton as required by the U.S. Department of Housing and Urban Development (HUD). Air quality review included dispersion modeling to assess potential impacts near signalized intersections. Noise analysis included measurements on the existing development site and traffic noise modeling (using TNM) of roadways affecting the proposed development. Analyses reported in the SEPA review documentation for the project. Subsequent analyses based on refined noise barrier modeling provided information that will be used in noise barrier design and construction.
- Greenbridge Redevelopment Project, King County Housing Authority, King County, WA. Manager and senior reviewer of the air quality and environmental noise impact and mitigation analyses to assess the potential impacts from and the site suitability of a new low and market rate housing development to replace an existing facility south of West Seattle, as required by HUD. Air quality review included dispersion modeling to assess potential impacts near signalized inter-sections. Noise analysis included measurements on the existing development site and TNM of roadways affecting the proposed development, including re-graded terrain and new residential buildings. Analyses were reported in the SEPA review documentation for the project, and a final report included a determination of suitability of the site for residential use, as well as recommendations of effective noise mitigation options.

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- High Point Redevelopment Project, Seattle County Housing Authority, Seattle, WA. Manager and senior reviewer of the air quality and environmental noise impact and mitigation analyses to assess the potential impacts from and the site suitability of a new low and market rate housing development to replace an existing facility in West Seattle, as required by HUD. Air quality review included dispersion modeling to assess potential impacts near signalized intersections. Noise analysis included measurements on the existing development site and traffic noise modeling of roadways affecting the proposed development, including re-graded terrain and new residential buildings. Analyses reported in the SEPA review documentation for the project.
- Salishan Redevelopment Project, Tacoma Housing Authority, Tacoma, WA. Manager and senior reviewer of the air quality and environmental noise impact and mitigation analyses to assess the potential impacts from and the site suitability of a new low and market rate housing development to replace an existing facility, as required by HUD. Air quality review included dispersion modeling to assess potential impacts near signalized intersections. Analysis included noise measurements of traffic and other ambient noise sources affecting the existing development site, and TNM of the roadways affecting the proposed development. Analyses reported in the SEPA review documentation for the project, and findings included a determination of site suitability for residential use and potential noise mitigation options.
- Woodland Park Zoo Master Plan, Woodland Park Zoo, Seattle, WA. Project manager and senior reviewer for the air quality impact study for master plan alternatives EIS that considered expanded parking facilities at the zoo. Analysis included carbon monoxide (CO) hot-spot modeling of affected off-site intersections in the project vicinity.
- Children's Hospital Parking Garage, Children's Hospital, Seattle, WA. Project manager for the air quality analysis of potential CO impacts of a proposed parking garage at the Children's Hospital and Regional Medical Center, including the development of emission factors.
- Good Samaritan Hospital, Good Samaritan Hospital, Puyallup, WA. Project manager and principal investigator for the qualitative air quality impact review for the master plan update for this facility.
- Arrowleaf Development, Arrowleaf Development Co., Methow Valley, WA. Air/noise analyst for the impact and mitigation assessments for a proposed resort development in Okanogan County, WA. Project included research and development of a program designed to restrict residential wood burning during periods of impaired air quality based on real-time PM10 monitoring and meteorological measurements.
- Miscellaneous Mixed Use Developments, Various Cities, WA. Managed and participated in the air quality and noise analyses for environmental impact studies for the Issaquah East Village mixed use development; the Kenmore Lake Pointe mixed use development; the Cascadia mixed use development in Pierce County, WA; and the Grand Ridge urban planned development in King County, WA.

School Siting Projects

- Site-Selection Analyses for Public Schools, Various Clients, WA. Managed and participated in the air quality and/or environmental noise impact and mitigation studies for new high schools in Auburn, Bonney Lake, and Tacoma, WA. Noise investigations for these projects included documenting source sound levels from several high school bands and developing noise mitigation measures for band and on-site traffic noise using noise barriers and relocation of sound sources. Conducted several school feasibility ambient sound measurements and reports required under Washington Administrative Code school site requirements.

Solid Waste Facilities

- Central Recycling and Transfer Station, Snohomish County Solid Waste, Everett, WA. Project manager and principal investigator for the air quality and noise impact evaluations for the siting of a new transfer station, now in operation. Air quality review included considerations of off-site traffic and facility-related odors. Noise assessment included baseline sound level measurements and noise impact modeling and calculations to evaluate compliance

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with applicable noise regulations. Review process included detailed analyses for two candidate sites, including one within the flight path of a small regional airport. Findings of the air and noise studies documented in the SEPA EIS for the project. This facility considered in this project is now operational as the Airport Road Recycling & Transfer Station.

- Solid Waste Transfer Station Siting Study, King County Solid Waste, Eastern King County, WA. Project manager and principal investigator for noise measurements, traffic noise modeling, and noise calculations for a site-selection study for a proposed solid waste transfer station in eastern King County. Evaluated potential noise impacts due to traffic and operational noise associated with the proposed transfer station at three candidate sites. Measured sound levels near each candidate site, as well as a similarly designed facility in Vancouver, BC. Measurements used in the calculations of off-site noise levels. Also qualitatively assessed both air quality and odor impacts from the facility and related traffic. Results of these analyses included in a SEPA EIS.
- Southwest Recycling and Transfer Station, Snohomish County Solid Waste, Mountlake Terrace, WA. Project manager and principal investigator for noise compliance and mitigation assessment of operational transfer station to recommend means to reduce noise received on nearby properties. Included source and ambient measurements in the area and noise modeling to assess potential noise reduction treatments for the facility. Recommended treatments were implemented and included extending the primary transfer station wall downward to enclose more of the transfer building and installing masonry noise barriers in several locations on the site to obstruct noise transmission to off-site receivers. Subsequent sound level measurements documented substantial noise decreases.
- Solid Waste Transfer and Disposal Facilities, Various Clients, WA. Project manager and principal investigator for the air quality and noise impact and mitigation evaluations during the siting studies for the Everett Central Transfer Station; the Lynnwood Disposal recycling center; the Pacific Disposal Tumwater transfer station and recycling center; the King County Cedar Hills landfill expansion; the Hobart Transfer Station siting studies; and the Enumclaw Transfer Station.
- Snohomish County Regional Landfill Noise Studies, Snohomish County Public Works, Solid Waste, et al., Snohomish County, WA. Project manager and principal investigator for several evaluations of compliance with Conditional Use Permit conditions related to temporary interim uses of lands in the vicinity of the Snohomish County Regional Landfill. Studies included background and active source sound measurements both on-site near active transfer station activities and at property line locations near off-site sensitive uses.
- Southwest Recycling and Transfer Station, Snohomish County Solid Waste, Mountlake Terrace, WA. Project manager and principal investigator for noise compliance assessment of proposed transfer station operational and equipment changes based on source-specific sound measurements and ambient measurements at potentially affected locations.

Prior to joining ENVIRON, Mr. Steffel's experience includes:

- 2004-2008 Geomatrix Consultants, Inc., Principal Environmental Scientist
- 1993-2004 MFG, Inc., Senior Environmental Scientist
- 1989-1993 TRC Environmental Corp, Senior Environmental Scientist
- 1981-1988 Eco-Resource Systems, Owner

CREDENTIALS

Professional Affiliations and Activities

Air & Waste Management Association
Institute for Noise Control Engineering, Member

EXHIBIT 2

1 References Cited in Declaration of Richard Steffel

2 ENVIRON International Corporation (ENVIRON). 2011. *Comments on Drakes Bay Oyster*
3 *Company Special Use Permit Environmental Impact Statement: Point Reyes National*
4 *Seashore*. Prepared for Draft EIS DBOC SUP c/o Superintendent, Point Reyes Station, CA
5 on behalf of Drakes Bay Oyster Company. December 9, 2011

6 National Academy of Sciences (NAS). 2012. *Scientific Review of the Draft Environmental Impact*
7 *Statement Drakes Bay Oyster Company Special Use Permit*. Committee on the Evaluation of
8 the Drakes Bay Oyster Company Special Use Permit DEIS and Peer Review, Ocean Studies
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