P010810902

SOUND STUDY REPORT
HUMBOLDT TRAP AND SKEET CLUB
1021 LYCOMING AVENUE
MCKINLEYVILLE, CALIFORNIA

Coastal Development Permit Case No. CDP-07-37

July 2, 2010

Prepared for:
Humboldt Trap and Skeet Club
P. O. Box 3642
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EXHIBIT NO. 6
APPLICATION NO.
A-1-HUM-12-005
HUMBOLDT TRAP & SKEET CLUB
SOUND STUDY REPORT
(1 of 9)

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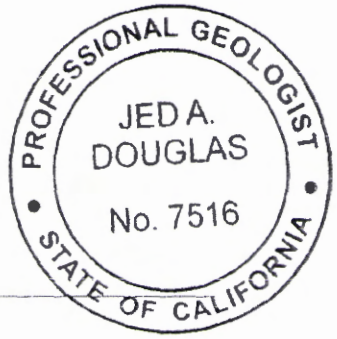

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1.0 INTRODUCTION

Winzler & Kelly has prepared this Sound Study Report on behalf of the Humboldt Trap and Skeet Club (HTSC), for the property located on the Eureka-Arcata Airport, at 1021 Lycoming Avenue, in McKinleyville, California (Figures 1 and 2). This report presents the results of a sound study conducted in March of 2010. This report was prepared in response to a January 13, 2009 letter from the County of Humboldt Planning Division (CHPD) to the HTSC, requiring an adequate sound study. The sound study is related to the November 28, 2007, HTSC Coastal Development Permit application (Case No. CDP-07-37) to the CHPD to develop one additional skeet field at the existing HTSC location.

In order to assess the existing sound emanating from the HTSC, a series of sound measurements were made on March 7, 2010 by the Northern California Safety Consortium (NCSC). The sound measurements were collected by Mr. Russ Brown, Program Director for the NCSC. The NCSC was retained by the HTSC due to their being a local company, and Mr. Brown having over 25 years of experience in the industrial hygiene industry. Copies of the field data are attached in Appendix A.

2.0 BACKGROUND

2.1 Site Description

The subject site is located at 1021 Lycoming Avenue on the Eureka-Arcata Airport, in McKinleyville, California (Figure 1). The site is approximately 13 acres, and is situated in the northwestern portion of the airport (Figure 2). The site is bordered on the west and north by open space, to the northeast and east by runways 32/14, and to the south by the United States Coast Guard and runways 1/19. The site is occupied by one major structure, which is utilized for the clubhouse. Several minor structures are present, including seven small buildings housing the launching apparatus for the clay targets and five wooden stands at the sporting clay field for shooters to stand on. There are currently two active skeet fields, two active trap fields, and one active sporting clay field. There are also two inactive trap fields, located on the east side of the airport security fence, which were abandoned in 1991.

The site and driveway are unpaved, except for small concrete areas on the trap and skeet fields where the shooters stand. There are also historical military ammunition bunkers on the south side of the HTSC clubhouse.

2.2 Site History

The HTSC was started in 1951, and has been in continuous operation at its present location at the airport ever since. At its peak in the 1960's, membership exceeded 350 people. The HTSC is a non-profit corporation and is open to the general public, so the actual number of people using the club in the 1960's was higher than 350. Up until the 1990's, the HTSC operated four trap fields and two skeet fields.

During Operation Desert Storm in 1991, the HTSC was closed for three months during the construction of an airport security fence, which was mandated by the Federal Aviation Administration (FAA). The location of the security fence crossed the eastern portion of the HTSC boundary, forcing the abandonment of the easternmost two trap fields. This reduced the number of active shooting fields to four.

In 1996, a new 5-stand sporting clay field was installed to the west of the skeet fields, to offset the loss of one of the two trap fields located behind the security fence. In 2007, the HTSC submitted an application to install one additional skeet field, in the existing open space between the sporting clay field and the westernmost skeet field. The proposed construction of the new skeet field would bring the number of active shooting fields back to six, which was the existing number before the security fence was installed in 1991.

2.3 Site Operation

The HTSC allows the shooting of sport shotguns only, no military shotguns are allowed at the club. Shooting of rifles (center-fire and rim-fire), handguns, or military small arms are prohibited. Shot size is restricted to number 7 ½ or smaller, and shotgun shells are restricted to 2 ¾-inch. 3-inch and magnum (3 ½ –inch) shot shells are not allowed to be used at the club.

The HTSC is open to the public year round on Sundays between 9:00 AM and 3:00 PM, and during the summer (mid-May through mid-September) on Wednesday evenings from 6:00 PM until dark (approximately 9:00 PM). Automatic clay target launching machines are utilized at each of the fields. Each of the two operational trap fields has five shooting stations, although only one shooter is allowed to discharge a shotgun at a time. Each of the two existing skeet fields has eight shooting stations, but again only one shooter is allowed to discharge a shotgun at a time. The sporting clays field has five stations, also with only one shooter allowed to discharge a shotgun at a time. Therefore, the maximum number of shooters which could discharge a shotgun at any given moment is five (one at each of the five operational fields).

According to a December 21, 2007 letter prepared by the HTSC president (Appendix B), there are typically about 100 shooters present on any given Sunday, and up to 30 shooters on Wednesday evenings. As of the date of the letter, the club had not reported a single accident from shooting operations. Besides operating for shooters enjoyment of the sport, firearms training also occurs at the club. Hunter safety training is offered by several members as a community service. Various other organizations have also used the club, including the Bureau of Land Management, College of the Redwoods Police Academy, Federal Bureau of Investigation, Boy Scouts of America, Humboldt State Wildlife Women's Club, and various local church groups.

3.0 FIELD ACTIVITIES

The objectives of the field measurements for sound levels were to:

- Measure the sound pressure generated by shooting activities;
- Measure the sound pressure levels at various distances from the club while shooting was occurring; and,
- Measure sound pressure levels from various selected locations during shooting activities for appropriate evaluation of sound impacts.

3.1 Sound Reading Methodology

On March 7, 2010, a series of sound measurements were collected by Mr. Rus Brown, of the NCSC. The sound level readings were collected using a Bruel & Kjaer sound level meter (Model 2230), set to the *Fast* response time with *"A"* frequency weighting, as required for impulse sounds. Sound pressure levels are recorded in decibel (dB) units on the *"A"* scale (dBA). Mr. Brown operated the meter and collected measurements according to the manufacturer's directions, and in conformance with the methods appropriate for the type of sound sources being evaluated. Literature from the manufacturer is presented in Appendix C. Prior to use, the sound meter was calibrated with a Bruel & Kjaer calibrator (Model 4231), which is shielded from wind interference.

Nine different locations were selected to collect the sound measurements, at distances from the shooting locations ranging from 25 feet to the trap and skeet fields to approximately 3.75 miles to Westhaven. The locations of the sound measurement collection points are presented on Figures 2 and 3.

The weather on the day sound measurements were collected was cloudy with wind blowing at approximately 10 miles per hour, based on a report from the Airport Weather Observation System. The sound pressure level measurements in dBA were collected each time at approximately 5 feet above the ground surface, while facing in a southerly direction. The results of the readings are presented in Table 1.

4.0 LITERATURE REVIEW

An extensive review of the effects of sound from firearms was performed in 1999 by the Royal Canadian Mounted Police (RCMP, Appendix D). The RCMP report discusses the types of sound meters which should be used in measuring firearms sound, as well as the attenuation factors based on atmospheric conditions and the type of ground surface between the source and receptor. The RCMP report specifies that downrange residential receptors as far as 3 kilometers (1.86 miles) should be considered. The nearest downrange (Northerly) residences are located approximately 0.6 miles from the HTSC, while the most southerly properties in Westhaven are located approximately 3.5 miles from the HTSC. Although the RCMP report was prepared in Canada, the physics of sound and the findings discussed are applicable to the HTSC.

Winzler & Kelly also reviewed the Humboldt County General Plan Draft Update, dated November 20, 2008, concerning what sound levels are acceptable for varying situations. Table 13-D in the General Plan Section 13 (Appendix E) shows that sound levels for a public right of

way, such as the public street sample location in Westhaven, are clearly acceptable up to 71 dBA, and normally acceptable up to 81 dBA.

A noise study was conducted in 2002 for the proposed Brentwood Rod and Gun Club, located in a residential area of Brentwood, California (Appendix F). Sound measurements collected by Illingworth & Rodkin, along with Parsons, indicated that at distances of 1,200 feet, 2,700 feet and 4,000 feet from the boundary of the proposed club, sound levels from shotgun firing were reported as "not audible or below ambient noise levels".

Sample location numbers 4, 5 and 6 for the HTSC study were collected at distances similar to the Brentwood study (1,200, 2,700, and 2,550 feet, respectively). Locations 5 and 6 are adjacent to the nearest residential areas to the HTSC.

5.0 RESULTS AND DISCUSSION

The following presents the findings of the sound readings collected at and in the vicinity of the HTSC. Sound meter readings are presented in Table 1. Locations of the sound readings are presented on Figures 2 and 3. A discussion of the physics of sound and mechanisms for generation of shooting sound is discussed in the RCMP report in Appendix D.

5.1 Sound Reading Results

The results presented in Table 1 indicate that the sound readings varied from a high of approximately 95 dBA when positioned adjacent to the south of the trap and skeet fields, to a low of approximately 50 dBA in Westhaven. Background ambient sound levels when shooting was not occurring ranged from approximately 59 to 76 dBA.

5.2 Discussion of Sound Readings

At 10 meters from the muzzle of a typical 12 gauge shotgun, the sound pressure level has been reported as 127 dBA (RCMP, 1999). Based on the industry accepted attenuation factor of 6 dBA per doubling of distance, without factoring in weather and wind, Winzler & Kelly calculated the maximum theoretical sound at three downrange locations compared to actual readings, shown in the table below. These calculations are based on the discharge of one shotgun at a time.

Measurement Location	Distance from Source	Theoretical Maximum dBA	Actual Reading Average dBA
Convair Road	1,500 feet	88	62.2
Kjer Road	2,550 feet	82	58.3
Driver Road	19,800 feet	64	50.6

Using industry accepted and well known calculations[1] for adding source sounds together,

[1] http://www.sengpielaudio.com/calculator-spl.htm
http://www.menlh.go.id/apec_vc/osaka/eastjava/noise_en/1/page3.html

Winzler & Kelly also calculated the theoretical maximum sound pressure levels if six shotguns were discharged simultaneously (the maximum number of shooters which could occur at one time, including the proposed new skeet field). The table below presents the results of calculations based on the discharge of six shoguns at a time.

Measurement Location	Distance from Source	Theoretical Maximum dBA	Actual Reading Average dBA
Convair Road	1,500 feet	94-96	62.2
Kjer Road	2,550 feet	88-90	58.3
Driver Road	19,800 feet	70-72	50.6

According to a reference in the RCMP report, the "threshold for annoyance" due to impulsive noise is from 60 to 65 dBA. Therefore, under optimal weather conditions, it is possible that residents of Westhaven could be exposed to a maximum theoretical impulsive noise (shooting noise) of 72 dBA, which falls within the threshold for annoyance. However, noise levels of 64 to 72 dBA are well within the allowable noise limits according to the Humboldt County General Plan (Appendix E). The general plan states that "clearly acceptable" sound levels along a public right of way range from 50 to 70 dBA, while "normally acceptable" levels range from 71 to 81 dBA. It should be noted that the actual sound pressure levels measured during the HTSC study were significantly lower than the calculated theoretical maximums.

6.0 CONCLUSIONS

The following conclusions are based upon the results of the field data collected in and around the HTSC, and on the literature reviewed which we deemed relevant to the existing HTSC facility conditions and proposed changes.

- Sound level measurements collected on March 7, 2010 show an inverse relationship with distance, that is, as distance increases from the source of the sound, the sound levels measured decrease. A decrease in sound pressure level was measured as distance increased from the HTSC property boundaries, as expected due to the inverse square law as applied to distance from the source and the environmental attenuation of sound.

- Although shooting sound was not detectable by the human ear in Westhaven on the day of sound measurements, calculations of theoretical maximum sound levels indicate that under certain atmospheric conditions, shooting sounds could be occasionally audible to Westhaven residents;

- During the period of 1951 through 1991, there were six active shooting fields at the HTSC. From 1991 through 1996, there were four active shooting fields, and from 1996 through the date of this report, there were five active shooting fields at the HTSC. The construction of one additional skeet field would yield a total of six active shooting fields at the club, equal to the historical maximum number of shooting fields in use prior to 1991.

- The addition of one skeet field is not expected to significantly increase the sound pressure levels emanating from the HTSC, as the addition of one additional shooter (raising the maximum possible instantaneous shooters from five to six) would simply add 1 dBA to the existing sound levels emanating from the HTSC (see Section 5.2). As noted above, the sound levels emanating from the HTSC then significantly decrease with distance and environmental attenuation before reaching populated receptor locations.

7.0 DISCUSSION AND RECOMMENDATIONS

Based on Winzler & Kelly's evaluation of the data presented herein, the construction of one additional skeet field is not considered a significant enough change to the HTSC general operations to cause a noticeable increase in sound levels. One shooter at a time is currently allowed on each of the five existing shooting fields (trap, skeet and sporting clays). This requirement will not change with the construction of a new skeet field. The addition of one extra shooter would match the club's historical number of shooters at any given time, and would be expected to increase existing sound levels by a maximum of 1 dBA. Furthermore, the location of the proposed new skeet field would be in between the existing skeet fields and the sporting clay field, and therefore would not be anticipated to exacerbate the sound levels at the HTSC or result in a noticeable increase in sound at offsite receptor locations.

This Report is planned to be submitted to the County of Humboldt Planning Division for review, comment and/or consideration of the following recommendations. Based on the data presented in this report, Winzler & Kelly recommends the following:

- Approve the construction of one additional skeet field at the HTSC facility; and,
- No additional sound mitigation measures are warranted at this time.

8.0 DISTRIBUTION

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