

Jeffco Public Shooting Range (JPSR)
Public Meeting Two – June 28, 2016
Ralston Valley High School
Summary - Final

Introduction

This meeting about the Jefferson Public Shooting Range (JPSR) is the second of two public meetings about this topic. The purpose of this meeting is to share the results of the noise study, discuss possible mitigation options, and receive community feedback regarding the JPSR. No decisions will be made at this meeting, and all the information collected will be shared with decision makers such as the Jefferson County Board of County Commissioners and Arvada City Council. The County is currently trying to decide whether or not this site is feasible for the construction of the shooting range.

Staff Presentation

Scot Grossman of Jefferson County Open Space presented background and context of the JPSR conversation and the highlights of the noise study results. Below are the highlights of this presentation.

JPSR Background

- There are not many shooting ranges close to Jefferson County.
- People are shooting on public lands and creating many issues for human safety, wildlife impacts, and forest health.
- Jefferson County put together a working group in 2014 to identify potential sites for a shooting range, define the scope of the facility, develop operating criteria, and determine funding strategies; the members of this working group were diverse and included interested citizens and staff of local, State, and federal agencies.
- The working group submitted their final report in 2014 and defined the scope of the facility, created site evaluation criteria, and identified five possible sites for a future shooting range.
- This process is meant to provide additional detail, along with the high-level analysis of the working group, in identifying a future shooting range site.
- The Arvada Blunn/Pioneer Master plan process began in 2014 and outlines a 1600-acre recreational site; six acres of the 1600 acres would be used for the proposed shooting range.
- The preliminary concept plan includes many types of facilities other than the shooting range, such as a bike park, a reservoir, trails, and a police training facility.
- The master plan indicated that further study was necessary for the public outdoor shooting range; this public process and noise study are part of the additional study.

Noise Study Results

- Preliminary sound data was presented at the last meeting, but the study was not complete at that time.
- The initial data was collected using Type 1 sound level meters that were calibrated before each test.
- Three guns (0.45 caliber handgun, 5.56 mm rifle, and 0.308 caliber rifle) were each shot five times with a minute in between shots; five tests of five shots were performed with each firearm.
- One-second average measurements were collected to show peak decibel levels for each shot.

- Meteorological measurements were collected continuously from various sources, as well as vertical atmospheric structure.
- 5 locations were used to collect sound data at varying distances from the test shot.
- Preliminary results showed maximum decibel levels for shots throughout the day with no mitigation; the maximums ranged from 54 decibels (dBa) to 96 at various locations.
- The ambient noise collected at all sites ranged from 40 dBa to 62 dBa.
- While there are many other factors that would impact the design of the shooting range, the provided rendering shows design concepts and mitigation options used to decrease sound propagation.
- Some of the features of the concept plan include a controlled, single entrance, classrooms for safety classes, fences to restrict wildlife, overhead baffles, firing sheds, and berms.
- Enclosed firing lanes are a mitigation technique that decreases muzzle noise through the use of physical walls with sound insulation.
- Overhead baffles are a safety measure that forces the shooter to aim underneath a beam and decreases the change of a stray bullet leaving the range.
- Earthen berms utilize steep walls to increase safety and act as a barrier to sound.
- It was not within the scope of this study to address environmental mitigation issues, but high-level analysis shows that creating an environmental stewardship plan, maintaining vegetative ground cover, monitoring soil pH, creating ballistic sand bullet impact berms, and implementing lead recovery and recycling will all help mitigate environmental impacts of a shooting range.
- The Colorado revised statutes dictate the thresholds for continuous and impulsive sound.
- Modeling was utilized to create a better picture of the noise impacts of the shooting range.
- The modeling was completed assuming 15 lanes for 0.45 caliber handguns and 15 lanes for 0.308 caliber rifles; each shot 50 bullets per hour.
- Both dBa Leq (average noise) and dBa Lmax (maximum noise) were used to show the modeling results, but the State statutes judge noise based on dBa Leq.
- The modeled maps show dBa Leq with and without noise mitigation; the dBa Leq go down in all areas with mitigation.
- The following map shows peak noise levels, or dBa Lmax, which is the maximum sound throughout the map with and without mitigation.
- AECOM also created one table that shows all the collected data side-by-side for ease of understanding; this table and all maps are available online.
- Mitigation typically drops sounds 14 to 15 dBa.

Clarifying Questions

Attendees asked clarifying questions about the noise study results and other presented information. Questions are indicated in italics, and staff and AECOM answers are immediately beneath.

Why is there a criterion that the shooting range is next to a scenic area?

This criterion is meant to ensure that the shooting range is not in a scenic area.

Who completed the noise study?

AECOM, a large international engineering company, completed the noise study. Their staff is in attendance and able to answer technical questions.

How high will the berms be surrounding the shooting range?

The specific height has not been set, but it will be high enough to stop any stray shots.

What can be heard in Spring Mesa at 30 dBa?

Everyone's ears are different, so it is not possible to say what someone will or will not be able to hear. Modeling can show how the noise relates to the ambient levels in a certain area.

The results were generated using modeling based on one shot; has there ever been a study that is based on multiple shots being fired at the same time?

The modeling results are based on one shot being fired, and that is standard methodology.

Have these results been calibrated or been tested against real-life situations?

This model was validated, but it was not compared to multiple shots being fired at the same time. That was not within the scope of this analysis.

Why was high wind levels not factored into the modeling?

Atmospheric conditions were collected on the testing day, which was typical of benign conditions. It would be possible to test again under severe weather conditions. However, the influence of the changed conditions may not be significant.

How do these results compare to the dBa levels tonight (note: there was a loud hail storm during the meeting)?

AECOM staff checked the dBa during the storm, and it was about 65 dBa.

Could this study be conducted year-round or quarterly to better understand the impacts of various weather conditions?

The modeling was conducted under typical weather conditions. Propagation of noise could be different with a change in temperature, but there would likely not be significant changes throughout the year based on the season.

Were the test shots pointed at the noise receptors?

The test firing was oriented to the north, which is standard for a sport shooting range. The receptors were forward and to the side of the test fire.

Are there available studies that show by putting in a shooting range, dispersed shooting will stop on public lands?

No.

Please explain the relationships of increased decibels; the relationship is actually logarithmic, but the presentation appears to characterize the relationship as linear.

This was not intended to be misleading. The levels listed on the presented chart are backed by internationally-recognized data. It was meant purely as a visual to aid those who are not familiar with the science behind noise propagation by offering comparable, familiar sounds.

The State regulations say that the maximum dBa of impulsive sounds is 50 dBa, but the results say 51 dBa at Leyden Rock. Is this a violation of State statutes?

The maximum levels are judged against Leq levels. These levels are not in violation of State statutes.

Are the rifles allowed at the proposed range larger than what was tested?

A .308 caliber rifle was used for the noise study as is representative of the highest caliber that would be allowed at the shooting range.

How does additional development in the area impact decibel levels?

The model was completed under the assumption of current conditions. Any additional development would need a separate sound study.

How does topography impact sound in neighborhoods?

The colored lines on the map take into account contour lines, and the model did factor in topography.

What are the criteria for how far away the shooting range must be from residential development?

The shooting range must be over half a mile from residential development.

Who funded the noise study?

Jefferson County funded the study.

Does AECOM, any of its sister companies, or subsidiaries build shooting ranges? This could call the results of the noise study into question.

AECOM is a large engineering company that does design public and private shooting ranges.

Is there a chance that AECOM would bid on this project if it is approved?

The company is very large. Jefferson County is a statutory County with a rigorous purchasing policy that requires competitive bids. AECOM could bid as the engineers for the site; the entire hiring process would be open and transparent. The County would be sure to evaluate any conflict of interest that could arise and would have heightened sensitivity to this issue.

Where can the contact information to submit questions and comments about the shooting range be found? This webpage contains information on the shooting range including presentations and materials from the community meetings, and a comment form: <http://jeffco.us/bcc/board-programs/shooting-range> Comments and questions can also be emailed to: jpsr@jeffco.us

How has this process been funded?

The County has used funds from the County conservation trust fund; these funds are from the Colorado Lottery. The Board of County Commissioners has allocated \$1,035,000 for this study and \$1,000,000 for a public-private partnership. The Open Space department has only allocated staff time towards this project. The budget for the noise study is not to exceed \$47,000, and that includes public meetings, staff time, and materials.

Is the police training facility a done deal?

There is only a concept plan for the police training facility; additional study is needed.

Where were the dispersed shooting photos from the presentation taken?

These pictures were taken in Squaw Pass. One of the areas has been closed, but the other is still open. There are no pictures of Jefferson County Open Space, as firearms are restricted.

What will happen to the ambient noise levels when construction is no longer at a high level? Did this study take into account the construction of the new parkway?

This study did not model specific sounds, and there was no study of if the traffic creating ambient noise was typical or not. The model was created based on the assumption of current conditions. The freeway would probably increase ambient levels, but this assumption was not included in the modeling.

There is currently a large hill between Spring Mesa and the proposed shooting range, but there are plans to make it into a lake. How would that change the noise levels?

Anything getting in the way of the line of sight to the shooting range would lessen the noise. The noise might increase, but it is hard to predict how much and if this change would exceed any State thresholds.

Polling

After hearing the results of the noise study and asking clarifying questions, participants were asked to answer some polling questions regarding their opinion of the shooting range. 280 to 286 people participated in this polling exercise; below are the results.

Where do you reside? (This question provides the demographic data for following questions)

- 78% - In a neighborhood near the shooting range
- 14% - Elsewhere in Arvada
- 7% - Elsewhere in Jefferson County
- 1% - Outside of Jefferson County

<i>What is your level of support for the JPSR?</i>	
59% - Strongly opposed	70% of those who reside in a nearby neighborhood
	50% of those who reside outside of Jefferson County
	21% of those who reside elsewhere in Arvada
	14% of those who reside elsewhere in Jefferson County
27% - Strongly support	62% of those who reside elsewhere in Jefferson County
	62% of those who reside elsewhere in Arvada
	17% of those who reside in a nearby neighborhood
	0 % of those who reside outside of Jefferson County
7% - Opposed	7% of those who reside in a nearby neighborhood
	5% of those who reside elsewhere in Jefferson County
	5% of those who reside elsewhere in Arvada
	0% of those who reside outside of Jefferson County
4% - Support	19% of those who reside elsewhere in Jefferson County
	5% of those who reside elsewhere in Arvada
	2% of those who reside in a nearby neighborhood
	0% of those who reside outside of Jefferson County
4% - Neutral	50% of those who reside outside of Jefferson County
	8% of those who reside elsewhere in Arvada
	4% of those who reside in a nearby neighborhood
	0% of those who reside elsewhere in Jefferson County

<i>How well informed do you feel about the JPSR?</i>	
40% - Informed	50% of those who reside elsewhere in Jefferson County
	41% of those who reside elsewhere in Arvada
	39% of those who reside in a nearby neighborhood
	0% of those who reside outside of Jefferson County
30% - Very informed	46% of those who reside elsewhere in Arvada
	28% of those who reside in a nearby neighborhood
	25% of those who reside elsewhere in Jefferson County
	0% of those who reside outside of Jefferson County

17% - Ill-informed	50% of those who reside outside of Jefferson County
	20% of those who reside in a nearby neighborhood
	10% of those who reside elsewhere in Arvada
	0% of those who reside elsewhere in Jefferson County
10% - Neutral	50% of those who reside outside of Jefferson County
	15% of those who reside elsewhere in Jefferson County
	10% of those who reside in a nearby neighborhood
	3% of those who reside elsewhere in Arvada
3% - Very ill-informed	10% of those who reside elsewhere in Jefferson County
	3% of those who reside in a nearby neighborhood
	0% of those who reside elsewhere in Arvada
	0% of those who reside outside of Jefferson County

<i>How well do you understand the noise study and its results?</i>	
38% - Well	50% of those who reside outside of Jefferson County
	42% of those who reside elsewhere in Arvada
	37% of those who reside in a nearby neighborhood
	35% of those who reside elsewhere in Jefferson County
26% - Very well	50% of those who reside elsewhere in Arvada
	30% of those who reside elsewhere in Jefferson County
	21% of those who reside in a nearby neighborhood
	0% of those who reside outside of Jefferson County
19% - Not well	50% of those who reside outside of Jefferson County
	21% of those who reside in a nearby neighborhood
	20% of those who reside elsewhere in Jefferson County
	8% of those who reside elsewhere in Arvada
13% - Neutral	15% of those who reside in a nearby neighborhood
	15% of those who reside elsewhere in Jefferson County
	0% of those who reside outside of Jefferson County
	0% of those who reside elsewhere in Arvada
4% - Not at all	5% of those who reside in a nearby neighborhood
	0% of those who reside elsewhere in Jefferson County
	0% of those who reside elsewhere in Arvada
	0% of those who reside outside of Jefferson County

<i>How confident are you in the noise study and its results?</i>	
50% - Very uncomfortable	100% of those who reside outside of Jefferson County
	58% of those who reside in a nearby neighborhood
	20% of those who reside elsewhere in Jefferson County
	16% of those who reside elsewhere in Arvada
17% - Uncomfortable	19% of those who reside in a nearby neighborhood
	16% of those who reside elsewhere in Arvada
	0% of those who reside elsewhere in Jefferson County
	0% of those who reside outside of Jefferson County
14% - Very comfortable	35% of those who reside elsewhere in Arvada
	15% of those who reside elsewhere in Jefferson County

	10% of those who reside in a nearby neighborhood
	0% of those who reside outside of Jefferson County
14% - Comfortable	40% of those who reside elsewhere in Jefferson County
	27% of those who reside elsewhere in Arvada
	10% of those who reside in a nearby neighborhood
	0% of those who reside outside of Jefferson County
5% - Neutral	25% of those who reside elsewhere in Jefferson County
	5% of those who reside elsewhere in Arvada
	3% of those who reside in a nearby neighborhood
	0% of those who reside outside of Jefferson County

<i>How well do you understand the information on mitigation?</i>	
42% - Well	51% of those who reside elsewhere in Arvada
	41% of those who reside in a nearby neighborhood
	40% of those who reside elsewhere in Jefferson County
	0% of those who reside outside of Jefferson County
26% - Very well	49% of those who reside elsewhere in Arvada
	45% of those who reside elsewhere in Jefferson County
	21% of those who reside in a nearby neighborhood
	0% of those who reside outside of Jefferson County
16% - Not well	21% of those who reside in a nearby neighborhood
	5% of those who reside elsewhere in Jefferson County
	0% of those who reside elsewhere in Arvada
	0% of those who reside outside of Jefferson County
14% - Neutral	50% of those who reside outside of Jefferson County
	15% of those who reside in a nearby neighborhood
	10% of those who reside elsewhere in Jefferson County
	0% of those who reside elsewhere in Arvada
3% - Not at all	50% of those who reside outside of Jefferson County
	3% of those who reside in a nearby neighborhood
	0% of those who reside elsewhere in Arvada
	0% of those who reside elsewhere in Jefferson County

<i>How confident are you that the potential impacts of the JPSR can be mitigated?</i>	
55% - Very unsure	100% of those who reside outside of Jefferson County
	66% of those who reside in a nearby neighborhood
	14% of those who reside elsewhere in Jefferson County
	14% of those who reside elsewhere in Arvada
21% - Very confident	51% of those who reside elsewhere in Arvada
	48% of those who reside elsewhere in Jefferson County
	14% of those who reside in a nearby neighborhood
	0% of those who reside outside of Jefferson County
13% - Unsure	16% of those who reside elsewhere in Arvada
	14% of those who reside in a nearby neighborhood
	5% of those who reside elsewhere in Jefferson County
	0% of those who reside outside of Jefferson County

9% - Confident	29% of those who reside elsewhere in Jefferson County
	19% of those who reside elsewhere in Arvada
	6% of those who reside in a nearby neighborhood
	0% of those who reside outside of Jefferson County
1% - Neutral	5% of those who reside elsewhere in Jefferson County
	1% of those who reside in a nearby neighborhood
	0% of those who reside elsewhere in Arvada
	0% of those who reside outside of Jefferson County

<i>Do you intend to remain engaged on this issue in the future?</i>	
96% - Yes	100% of those who reside outside of Jefferson County
	97% of those who reside in a nearby neighborhood
	97% of those who reside elsewhere in Arvada
	90% of those who reside elsewhere in Jefferson County
4% - Unsure	10% of those who reside elsewhere in Jefferson County
	3% of those who reside elsewhere in Arvada
	3% of those who reside in a nearby neighborhood
	0% of those who reside outside of Jefferson County
0% - No	0% of those who reside elsewhere in Arvada
	0% of those who reside in a nearby neighborhood
	0% of those who reside elsewhere in Jefferson County
	0% of those who reside outside of Jefferson County

Public Comment

Members of the public were given the opportunity to sign up in advance to speak for two minutes. Those who did not want to speak publicly were encouraged to write their thoughts and ideas on a comment card and leave it with Jefferson County staff. Below are the themes of these comments.

Noise

- The gun shots at the shooting range will be audible and disturbing to nearby residents.
- Many residents moved out to this area for the peace and tranquility, and do not want this to be disturbed by constant noise.
- The sound of gunfire can be a trigger for veterans with post-traumatic stress disorder.
- The sound of gunfire is stressful, especially continuous gunfire.
- Wildlife never becomes accustomed to the sound of gunshots.
- There is already too much noise in the area with children’s sports, the associated modeler’s organization, and the Jeffco stadium.
- Shooting will extend into the night and weekend hours with the construction of a police training facility.
- The noise of the shooting range will not be as disruptive as some people think.
- The shooting range would be detrimental to wildlife, which will impact the health of the environment.
- The sound of gunshots is terrifying to children.

Noise Study

- The noise study did not test to see if the sounds of gunshots can be heard in nearby neighborhoods.
- There continue to be vague answers from staff and consultants when asked if gun shots would be audible in nearby neighborhoods.
- There was no study about the impact of noise on veterans with post-traumatic stress disorder.
- The noise study did not take into account general atmospheric conditions of the area, except on the one day of the study.
- The study should be repeated and have the results tested by a neutral third party.
- AECOM has an incentive to skew the results of the study, since they could bid on the project to design and build the gun range.
- There needs to be additional studies of the impacts on wildlife.
- The noise from one gun is not comparable to the noise of 30 guns being shot at the same time.
- The noise levels of the shooting range seem to be less distracting than that from traffic.
- The information from the noise study was over many people's heads.
- The shots fired during the test were audible to nearby residents.
- The modeled decibel levels are not acceptable for the area.
- The noise study should be expanded to model the worst-case scenarios for noise levels based on weather conditions.

Mitigation

- The sounds of the gun range will not be able to be effectively mitigated to not disturb neighbors.
- The proposed freeway should not be relied upon as a mitigation factor, since it will likely not be built for a long time, if ever.
- While the mitigation may bring down the noise levels as they related to State statutes, the noise will still be bothersome to nearby residents.
- There may be additional mitigation efforts to be explored that would satisfy nearby residents.
- The proposed mitigation efforts are adequate.

Safety

- There is a chance the proposed elementary school will not be built due to safety concerns associated with the gun range.
- Misfired shots are not uncommon.
- It can be reasonably expected that the berms will not be able to stop all misfired ammunition.
- A gun range will increase community safety since gun owners will have an opportunity to be better trained in gun safety.
- The National Rifle Association (NRA) recommends a longer shooting distance than is included in the current design.
- The more controlled a shooting environment is, the safer it will be for the public.
- The safety of horses and their riders will be compromised.
- There are not many safety issues with shooting ranges, as they are highly controlled environments; this one would be especially safe due to its high-tech design.

Recreation

- Shooting is a sport just like basketball or baseball.
- Hunting license fees are a significant portion of public funding for wildlife protection and other ecological efforts.
- The current shooting ranges are very crowded, especially leading into hunting season.
- An open, public shooting range is necessary for the area.
- There are less and less hunters, as the new generation does not have the opportunity to practice shooting due to lack of shooting ranges.
- The public demands for recreational shooting will ever be met by private shooting ranges.
- There are no other comparable ranges in the area.
- Many different types of people like to shoot and would benefit from this shooting range.
- The current shooting ranges are not close to Jeffco citizens.

Property Values

- Residents would not have bought homes in this area if they had known a shooting range would be built and it would impact their home values.
- The gun range will decrease home values in the area.
- A gun range in the neighborhood could increase property values, as it is a desired community amenity.
- The County will not be able to reimburse all homeowners for a decrease in property value.
- This area is one of the fastest growing in the country, and it would not be a good decision to curb growth by constructing a shooting range.
- Not only will the gun range impact property values, but also the amount of property taxes to be collected.

Site Location

- Other sites should be considered.
- No one wants anything built close to them; this is the typical case of “not in my backyard.”
- If this site is not developed, the County should continue to look for suitable sites in the area.
- It has always been public knowledge that this site was going to be turned into a gun range, and some residents bought property close by for this very reason.
- This site does not meet all the criteria.
- Other sites can be engineered to be more physically appropriate if they are farther away from residences.
- The nearby residents, who would be most affected by the shooting range, are not in favor of the shooting range; it is people outside of the area who are pushing for it in this location.
- The criteria used to assess a site’s feasibility may not be appropriate if neighbors are this upset.
- The range should be built indoors instead in order to address safety and noise concerns.
- The gun range should not be built in a high-density, residential neighborhood.
- Many people have to drive significant distances to be able to participate in their chosen hobby; gun enthusiasts are no different.
- The area should be searched for Native American burial sites to avoid disruption or make provisions for moving the remains; tribes should be consulted before construction.
- The selection of this site did not consider the proximity to future low-density residential areas shown in the Arvada Comprehensive Plan.
- Undeveloped land in its natural state is more desirable than a shooting range.

Guns

- Opposition to the gun range does not always correlate with dislike of guns in general; many people in nearby neighborhoods own guns.
- Having guns in cars driving to this site could increase the danger of violent road rage.
- The shooting range will bring more guns into the neighborhood.
- It will be hard for neighbors to tell if a gun shot was from a domestic violence confrontation or the shooting range.
- The increase of guns in the area will increase the likelihood of a violent crime.

Process

- This amenity is for all the citizens of Jefferson County, not just those in Arvada.
- Almost all feedback at this point has shown that people are not in favor of this location; staff needs to reevaluate.
- This issue is dividing the community.
- It does not make sense that this was the first project to be green-lighted from an entire list of priorities.
- Jefferson County Open Space is pursuing this project, even though it is in direct contract to the department's mission.
- The process is moving too quickly.
- This project seems to be the only project fast tracked from the Arvada-Blunn Master Plan.
- The public is frustrated because elected officials and staff ask for feedback but do not actually listen to it.
- This issue should be decided through a referendum.
- There needs to be a significant amount of transparency throughout this process, as the idea of a public-private partnership could be concerning.
- All screening criteria and full, detailed analyses should be provided to the public.
- Some citizens will fight against this measure until it is defeated.
- Having many meetings that are stretched out gives the appearance of trying to wear down the public.

Miscellaneous

- The most expensive part of this shooting range is the long-term operation; taxpayer money should be spent on more necessary and timely projects.
- Citizens should unite against this project and the elected officials who are supporting it.
- There is no information that states constructing a shooting range in this area will have any impact on dispersed shooting.
- The shooting range should offer special discounts and specific hours for suppressor-only shooting.
- It is necessary to provide the contact information of the people who are influential in getting this shooting range approved at this location.

Questions

Meeting attendees were asked to submit any lingering questions about the JPSR on comment cards after the meeting to receive answers in the meeting summary. Jefferson County staff's answers to these questions are provided below.

Would you live by a shooting range?

Jefferson County is gathering public input for this proposed project and will provide the data collected to the City of Arvada. One's choice of where to live and what to live nearby is a personal decision.

Is there a better location where all can be happy?

The Blunn/Pioneer site was identified as potentially the most feasible during the 2014 working group. We are now looking deeper into specific variables for this site, beginning with noise impacts. However, if the concerns on this site cannot be mitigated, the next most feasible site will be researched.

Will the proposal for the gun range be on a ballot? Was it ever on a ballot?

No, the proposed project did not appear on a ballot and there are currently no plans for it to become a ballot measure.

The proposed elementary school is close to the shooting range. What about the noise impacts on a school premise?

The proposed shooting range would employ best practices for noise mitigation to reduce the noise to nearby schools and neighborhoods.

What will the noise decibel level be in the Apple Meadows neighborhood?

The decibel ranges were modeled out for surrounding areas. See the noise study results [here](#).

Please publish calibration and sample rate information for the noise meter used in the study. All sound level meters used for the noise measurements were calibration certificated within their manufacturers' recommended laboratory calibration period, with support information as included in the Noise Study Report. All sound level meters were set to "fast" response with a time constant of 1/8 second (125 ms).

Please address the validity of reporting the maximum sound, L(max), versus the instantaneous peak, L(peak), for a sharp report, like a gunshot. The human ear hears the single sharp report. Is this data available from the sound study?

Maximum Sound Level (Lmax) and Peak Sound Level (Lpeak) are different values as described below from a third party source (www.noisemeters.com/help/faq/min-max-peak.asp)

The Peak is not the same as the Maximum Sound Level. The Peak, referred to as the Lpeak or sometimes Lpk, is the maximum value reached by the sound pressure. However, there is no time-constant applied and the signal has not passed through an RMS circuit or calculator. This is the true Peak of the sound pressure wave. For a pure tone, the Peak will be 3 dB above the Maximum Sound Level. For varying signals there can be a huge difference and there is no way to calculate the Peak from the Max or any other measurement. Unlike the Sound Level and the Leq, the Peak measurement is usually C-weighted rather than A-weighted in most modern sound level meters. The C-weighted Peak measurement is usually expressed as LCpeak in dB(C). The LCpeak is used for occupational noise measurement where loud bangs are present. The Peak is not usually used for environmental

noise measurement and is useless when any wind is present. A gust of wind will easily give very high LCPeak readings.

It is also important to understand that neither the Lmax nor the Lpeak is used to calculate or describe the one-hour Leq values used in comparing predicted project noise levels against the State Statute (which were adjusted downward to account for impulsive sounds), but rather to provide some additional information that might be used to estimate audibility in nearby residential areas (which may depend on several factors, including existing ambient noise level, listener's hearing ability, etc.) that is not a required part of the State Statute)

Can there be a guarantee that there is a zero-percent probability of an errant bullet reaching residences? Has a risk assessment been done for this? Where can we see the results?

Safety features would be designed into the range to ensure bullets could not leave the range. The maximum safety measures would be put into place.

How accurately will the noise modeling predict reality?

The model predicts approximately 15dba noise reduction with mitigation; however, the measured data at site 2b shows 81 dBA. Using 6 dBA per distance doubling approximation, the site appears to require 25 dBA attenuation or noise mitigation to meet State noise pollution levels. Any kind of engineering model represents an estimate based upon calculations and input data. The prediction model used for this study, CadnaA®, is an industry recognized proprietary 3-dimensional noise model that implements several international acoustical technical standards, including ISO 9613-2:1996 "Acoustics -- Attenuation of sound during propagation outdoors -- General Method of Calculation." In addition, we did validate the model in a few locations by comparing measured levels to predicted levels to check agreement. Regarding estimates on noise reduction, these values are dependent upon the proximity of the receiver location to the noise barrier, such as the proposed 25-foot tall berm. Locations close to the berm, such as the five predicted fence-line locations just beyond the berm, receive between about 10 to 17 dBA of predicted noise reduction. More distant residential property line locations (ranging from 900 to 7,000 feet from the center of the range) receive from 2 to 10 dBA of predicted reduction, while a trail location located about 9,000 feet away receives only about 2 to 3 dBA predicted reduction from currently proposed mitigation. The 6-dBA per distance reduction is an estimate based upon the spherical spreading of sound energy in a flat area and is generally realized in addition to the noise reduction from the berms. So noise propagation from the source is really reduced by both phenomena: spherical spreading with distance, and additional reduction from some type of barrier (berm, wall or building) or other type of occlusion (such as from topography).

How will additional noise mitigation be installed should the range as designed fail State noise standards?

Additional noise mitigation features can be installed to further alleviate noise levels.

Why were only 1500 shots per hour chose for the L(eq) modeling?

Shot density will follow a statistical distribution, and more shooting will increase the L(eq). The 1,500 shots per hour assumes 50 shots per hour at each firing lane and was chosen to represent typical use of similar-sized rifle and pistol ranges. Typically, these types of outdoor shooting ranges are used for target accuracy training, not rapid-fire shooting. Time spent at each firing lane includes non-firing activities, such as set up, ammunition loading, range cease-fires, and clean up. With regard to statistical distribution and shot density, when within the hour the shots are fired (more near the beginning, middle or end of the hour, all at once or evenly spaced out) should have no influence on the predicted Leq value which sums all the acoustical energy for all the shots fired

in a single hour and distributes the acoustical energy over the entire one hour period.

The study says residential areas will have 40 to 50 dBA peak noise. Can that be demonstrated before the noise studies are accepted?

The noise study predicts the L(eq) and L(max) levels anticipated for this proposed location. The L(eq) demonstrates all of the acoustical energy over a one hour period and the L(max) shows the maximum one-time acoustical event over one hour. See the [maps](#) in the presentation from June 28 community meeting for full details.

What is the decibel level of 30 shots going off at one time; that seems to be what should be used to model as it is more likely that multiple guns will be shot at the same time.

If multiple rounds were fired at precisely the same instant (that is, within same few hundreds of a second) there would be an additive effect in the Lmax level. The increase from two shots at precisely the same time, would result in a 3 dBA increase in Lmax, which may be just noticeable to most listeners, three or more fired at precisely the same instant (hundredth of a second) would be more noticeable, but less likely to occur. However, the predicted one-hour Leq level which is compared to the State Statute is not dependent upon, nor effected by, this simultaneous firing effect as the Leq accounts for all the acoustical energy of all the rounds fired for the entire hour period regardless if they are all fired at once or are evenly spread out over the entire hour. For the record, 30 identical gunshots being fired at precisely the same instant would have an Lmax value of about 15 dBA higher than a single gunshot from the same firearm (but no change in the one-hour Leq), but is also extremely unlikely to occur in reality.

Why was a one-second sample interval used for the noise study? I imagine the noise of a gunshot can vary significantly in one second.

The one-second Leq was used because, in general, smaller Leq values can be combined and averaged to estimate Leq values for larger time periods given the number of corresponding sound events during that period (where as Lmax values cannot). In this fashion we can take the 1 second Leq value which contains the entire acoustical energy for a single gunshot, sum up all the acoustical energy for the total number of similar gun shots in an hour, and estimate the one-hour Leq for the total number of individual gunshots. The one-second Leq was used so that we could reasonably expect to contain the entire energy for a single gunshot event in a single Leq value, leading to an accurate one-hour Leq calculation given the total number of rounds per hour.

Why was an indoor range not considered?

Due to the desired distance of the range (200yds) an indoor facility becomes cost prohibitive.

If a majority of ranges within the metro area are indoors, why wouldn't the cost of an indoor range be estimated?

Due to the desired distance of the range (200yds) an indoor facility becomes cost prohibitive. The majority of the ranges in the metro area only accommodate short distance target shooting.

How did this site meet all the criteria to be the top consideration with five green checkmarks to begin? It seems that regarding distance from residences, trails, wildlife, and a body of water, it should have three or more red x's.

During the evaluation of sites, the working group considered the entire area for each listed site. For the Blunn/Pioneer site this was the entire 126 acre parcel. No specific site within the area was identified as "the" spot. Rather, the question being assessed was: could a site be located somewhere on that property that met the minimum criteria. The Arvada Blunn/Pioneer Master Plan identified

the specific site being proposed.

The working group was meant to be a broad-based assessment of potential locations. During the this high-level analysis, no significant impacts to wildlife were found, including known threatened and endangered species, known critical habitat, potential conservation areas and others. This is not to say that if/when more detailed wildlife analyses are performed that nothing will be found.

Why does the target area face north toward housing instead of west, away from houses? A western-facing range would have been able to decrease noise for residences and would be safer.

The preferred direction for a shooting range is north because of solar direction (not firing into the sun).

The artist's depiction shows only a few parking space; why the deception?

The concept plan for the shooting range has 70 parking spaces and three accessible ADA parking spaces.

Why is the question of who came up with this ignored? Who thought this up?

In 2013, the Jeffco Board of County Commissioners were receiving a number of inquiries and requests for the County to explore and build a public shooting range. As a result, the Board asked staff to study this matter and bring recommendations on possible locations, criteria etc.

The poll showed the strongest support from those who live elsewhere; why not move the site? Residents who live down south might want it, but those of us who live nearby do not.

The Blunn/Pioneer site was identified as potentially the most feasible during the 2014 working group. If the concerns on this site cannot be mitigated, the next most feasible site will be researched. Public comments and polling are being taken into consideration for this proposal.

Are the taxpayers expected to pay for guns for use by those who do not have guns?

Visitors of the proposed shooting range would need to bring their own firearms to the range.

Which of the County Commissioners attended the public comment section of tonight's meeting?

Commissioner Casey Tighe attended the meeting.

If trap shooting allowed, what mitigation can be made for his shooting activity?

Trap shooting is not included at this proposed range.

Has the decline in property value (three percent to four percent) change been accounted for in property taxes? It can be expected that the City will lose \$400,000 per year in property taxes; has this cost been factored into the facility?

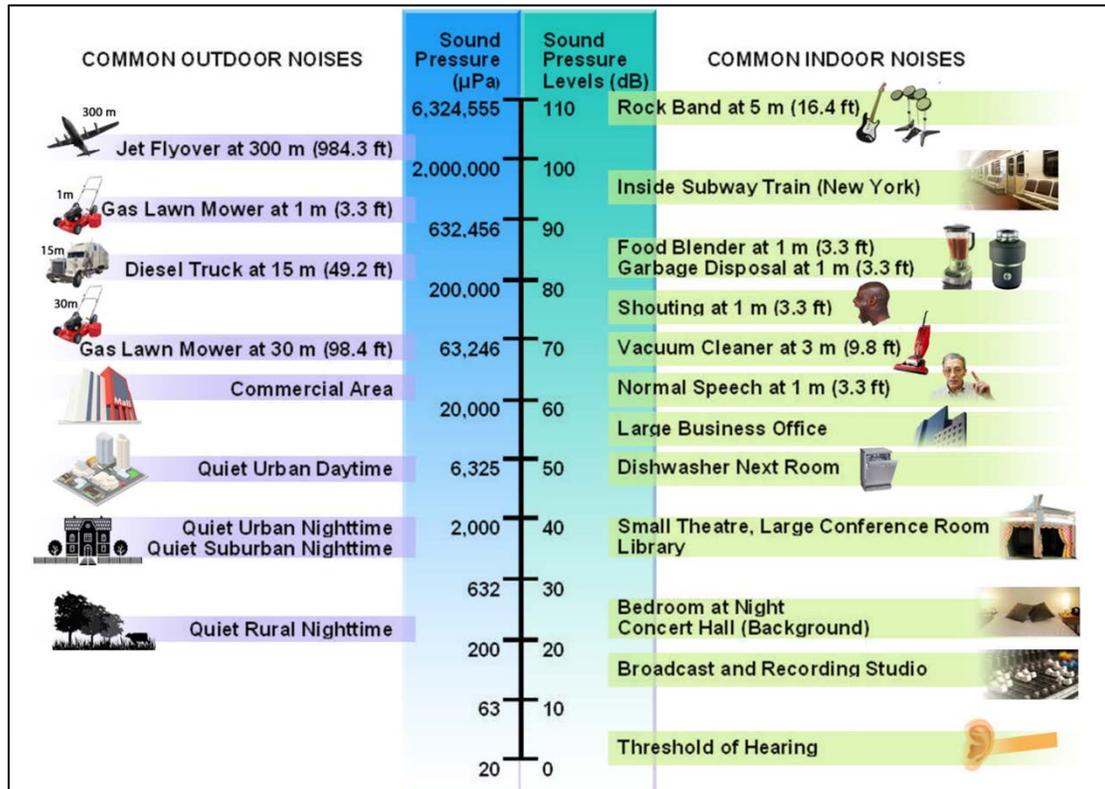
At this point there is no written evidence that property values or corresponding taxes will decline.

Why was only modeling done?

Noise measurements for existing ambient conditions and sample gunshots were conducted and reported, but the primary concern was for noise levels from the future gun range. Measurements of events that take place in the future can only be modeled, so models of future conditions were done (based, in part, on the data collected from the measurements).

Why was the presentation so full of deception? For example:

- *The shots of damage by shooting at Squaw Pass.*
The photos shown of dispersed shooting damage at Squaw Pass were taken in May 2016 and accurately show what is happening on that site.
- *The linear decibel scale.*
Decibel values displayed on the “typical noise levels slide” are the result of a logarithmic expression of the linear sound pressure, specifically, $\text{Sound Pressure Level (in dB)} = 20 \times \log(\text{sound pressure in micropascal}/20)$. This does indeed have the result of compressing the overall range of sound pressures. This can be seen in the chart below which displays both actual sound pressures (in microPascal) and sound pressure levels (in dB) side by side along with some typical corresponding indoor and outdoor sound levels. One can see that the range of sound pressures that are perceptible by the human ear tend to range between about 20 to over 6,000,000 micropascals (linear pressure), but the corresponding range in decibel levels for the same linear pressures is a more manageable 0 to 110 dB. It would also be *possible* to display the pressures on a linear scale rather than dB level but that would essentially push all the useful information about typical sound levels into about the bottom one-third of the figure (since the upper limit is over 6 million micropascal and nearly all the examples are below 2 million). But the suggestion that this arrangement represents a deception, or is meant to be misleading in any way, is inaccurate. Indeed, illustrating typical sound levels by displaying sound pressure level in dB (or dBA) on an apparent linear scale and in a manner often nicknamed an “acoustic thermometer” is by far the most common way to present this type of information, and virtually any government agency that regulates noise levels and provides a graphic figure to illustrate typical noise levels does so in this fashion, as shown below (which is borrowed directly from an FHWA highway noise training course manual).



- *The engineering firm ignoring studies of existing ranges even though they design and build them.*

Detailed sound studies are not frequently conducted for existing ranges (presumably because these studies are expensive and the decision to build a range or not has already been made). Additionally, all shooting ranges coupled with their specific surrounding environments are quite unique; so finding a detailed noise study for a completed range with a similar design and projected usage in a surrounding environment that is significantly similar to this one (in terms of topography, nearby development and land use, ambient noise levels, prevailing meteorological conditions, etc.) is not very likely. Certainly, any empirical data from a different range someplace else would have been viewed with skepticism, and rightfully so.

Please explain how the model was done to account for the actual simultaneous nature of 30 lanes? I need the specific details, formulas, and assumptions for the model.

In calculating the one-hour Leq level, which is the value used in comparing predicted noise levels to the State Statute noise limits, the model took into consideration the acoustical energy for one gunshot, the one-second Leq containing the sample gunshot, and also how many times over the course of one hour that event would occur. In this fashion all the acoustical energy for the total number of rounds per hour are accounted for in calculating the one-hour level.

The basic equation for this relationship would be as follows:

$$Leq(1-hour) = Leq(1-second) + 10 \times \log(events\ per\ hour/3600)$$

where the events per hour is per lane or for the entire range, depending on context (we modeled each lane individually with separate source levels for pistols and rifles depending on the lane type). We could have also assumed that all (30) guns would be fired simultaneously (increasing the one-second Leq), but for purposes of analyzing the hourly Leq it would not change the above expression. Whether or not the shots in all 30 lanes are simultaneous, the total amount of acoustical energy is the same, and the one-hour Leq would be the same (since the Leq spreads the acoustical energy out over the specified time interval). The modeled Lmax levels, however, could be higher if we were to assume that more than one weapon would be fired at precisely the same moment (within a few hundredths of a second), and which could conceivably happen from time to time, but this seems more the exception than the rule, and the Lmax value is provided as additional information (with some possible relevance to audibility in the community) but is not used in calculating the one-hour level used to determine whether the proposed project is in compliance with the applicable State Statute.

Is the gun range considered a "park?" Is this the definition?

This type of sport shooting range is generally considered a park and recreation use by most public land management agencies.

Can we see the study that shows a gun range would increase property value that one speaker referenced during the public comment?

We are not aware of the study that the speaker referred to during public comment. A full recording of the public comments from the June 28 meeting is available [here](#).

What is the recourse if the noise levels in the neighborhood exceed the projections and are a disturbance?

Jefferson County wants to be a good neighbor and does not want to be in a position of receiving ongoing noise complaints. If noise levels exceed state requirements, additional mitigation features or other management practices will need to be implemented to address their issues.

Why was only one shot fired when you know how many guns will be fired?

The measurement method collected gunshot sounds for one round at a time. In the model we accounted for the acoustical energy of the total number of rounds per hour expected to be fired.

Will the homeowners be able to judge the noise levels?

We are not sure how to interpret the question. Please resubmit the question through the [online form](#) so it can be properly answered.

Will the impacts on surrounding homeowners' property values be evaluated?

At this point there is no written evidence that property values or corresponding taxes will decline.

What is the plan to mitigated lost tax revenue if property values do decrease?

At this point there is no written evidence that property values or corresponding taxes will decline.

Have residents been informed about special protections for noise from shooting ranges, such that there will be minimal enforcement issues in regards to noise complaints?

We are not sure how to interpret the question. Please resubmit the question through the [online form](#) so it can be properly answered.