



PLANNING COMMISSION MEETING

7:00 PM

March 14, 2019

1. **CALL TO ORDER**
2. **PLEDGE OF ALLEGIANCE**
3. **ROLL CALL**
4. **ADDITIONS TO OR DELETIONS FROM THE AGENDA**
5. **APPROVAL OF MINUTES**
February 28, 2019 Meeting Minutes
6. **PUBLIC HEARINGS**

**MOST TRACT A PARKER HOMESTEAD FILING 1 1ST
AMENDMENT - Use by Special Review (Back 40 Gun Range)**

Applicant:	John Prestwich, PCS Group, Inc.
Location:	Generally located at the Northwest Corner of Chambers and Double Angel Roads
Department:	Community Development, Paul Workman
TRAKiT No.:	Z18-004

7. **PLANNING COMMISSION ITEMS**
8. **STAFF ITEMS**
9. **ADJOURNMENT**



PLANNING COMMISSION MINUTES

February 28, 2019

Chair Gary Poole called the meeting to order at 7:00 p.m.

The Planning Commission and audience joined in saying the Pledge of Allegiance.

Also, present were Commissioners Duane Hopkins, Richard Foerster, Kelly Hickler and Eliana Burke. Alternates Ruth Ann Nelson and Kimberly Rodell were present and seated for the absent Commissioner Erik Frandsen and the vacant position. Alternate Tracie Mankse was present.

ADDITIONS TO OR DELETIONS FROM THE AGENDA

None

APPROVAL OF MINUTES

Commissioner Duane Hopkins moved to approve the January 24, 2019 meeting minutes. Commissioner Eliana Burke seconded; a vote was taken and passed 7:0.

PUBLIC HEARING: OPENED: 7:03 P.M. PARKER POINTE – Minor Development Plat

Applicant: Parker and Stroh, LLC
Location: Southeast Corner of Parker Road and Stroh Road
Department: Community Development, Paul Workman
TRAKiT No.: SUB17-058

Paul Workman, Planner presented the staff report for the Parker Pointe – Minor Development Plat. Mr. Workman concluded with the determinations in the staff report and recommended the Planning Commission recommend Town Council approve the minor development plat.

Commissioners discussed with staff:

- if the Stroh Road full-movement traffic access will be signalized; (*Alex Mestdagh, Town of Parker, Engineering Services Manager said there will be a two-way stop condition for the minor roads at the full-movement traffic access that will not be signalized.*)
- if all lots will be developed by a single-developer or individual developers; (*Mr. Workman said a majority of the lots will be developed individually.*)
- if the drainage area will be improved or remain natural for the Preble's meadow jumping mouse habitat; (*Mr. Mestdagh said the drainage area will remain natural.*)

- if there will be individual traffic studies and landscape requirements for each lot development; (*Mr. Mestdagh and Mr. Workman said yes, there will be traffic conformance letters and landscape requirements for the development of each lot.*)
- if the referral comments are to be addressed as part of this approval or at the time of development; (*Mr. Workman said some of the Public Works requirements need to be met with approval of this request; other comments will be addressed at the time of site plan.*)

APPLICANT PRESENTATION

None; applicant was available for questions.

Planning Commissioners had no questions for the applicant.

PUBLIC COMMENT OPENED

None

PUBLIC COMMENT CLOSED

PUBLIC HEARING: CLOSED: 7:14 P.M. PARKER POINTE – Minor Development Plat

PLANNING COMMISSION DISCUSSION

Commissioner Eliana Burke said the request is cut and dried.

Commissioner Duane Hopkins said the request is straight-forward; the location of this property needs to be commercially developed and this request will set the stage for proper development. He supported recommending Town Council approve the request.

Commissioner Kelly Hickler said the request clearly meets all approval criteria.

Commissioner Ruth Ann Nelson agreed.

Commissioner Kimberly Rodell agreed.

Commissioner Richard Foerster agreed.

Chair Gary Poole agreed.

Commissioner Eliana Burke moved that the Planning Commission recommend Town Council approve the minor development plat. Commissioner Kelly Hickler seconded; a vote was taken and passed 7:0.

PUBLIC HEARING: OPENED: 7:16 P.M. COMPARK VILLAGE FILING NO. 4, AMENDMENT NO. 1 - Minor Development Plat

Applicant: Dave Klebba, Etkin Johnson
Location: South of Compark Boulevard and west of Chambers Road
Department: Community Development, Stacey Nerger
TRAKiT No.: SUB18-047

Stacey Nerger, Planner presented the staff report for the Compark Village Filing No. 4, Amendment No. 1 – Minor Development Plat. Ms. Nerger concluded with the determinations in the staff report and recommended the Planning Commission recommend Town Council approve the minor development plat.

Commissioners discussed with staff:

- the immediate plans for development; (*Ms. Nerger said the request will provide for two-buildable lots, a tract for a detention pond and an unbuildable tract which will allow for future office/warehouse uses; two site plan applications have been submitted to construct office/warehouse buildings on the property.*)
- the definition of exemption plat; (*Ms. Nerger said that an exemption plat is a means to legally plat land prior to having to meet subdivision development requirements.*)
- if a traffic study would be done with the site plan application; (*Ms. Nerger said yes, a traffic study was submitted and reviewed as part of this application and will be submitted and reviewed as part of the site plan process.*)
- the definition of unbuildable lots; (*Ms. Nerger said an unbuildable lot establishes a legal status that a lot cannot be built upon until a development application can be reviewed for compliance to the Town's Land Development Ordinance; it does not mean that the lot has geographic or environmental building limitations.*)

APPLICANT PRESENTATION

Dave Klebba, Vice President of Development, Etkin Johnson Real Estate Partners, 5 Blue Grouse Ridge Road, Littleton, CO said they look forward to a high quality development for the site.

Planning Commissioners had no questions for the applicant.

PUBLIC COMMENT OPENED

None

PUBLIC COMMENT CLOSED

PUBLIC HEARING: CLOSED: 7:23 P.M. COMPARK VILLAGE FILING NO. 4, AMENDMENT NO. 1 - Minor Development Plat

PLANNING COMMISSION DISCUSSION

Commissioner Kimberly Rodell said the request is consistent with the surrounding areas; she appreciated the buildable lots and exemption plat discussion as a learning opportunity. She said this is a straight-forward request and she supported recommending approval to Town Council.

Commissioner Eliana Burke agreed.

Commissioner Ruth Ann Nelson said it will be nice to have additional employment in Parker.

Commissioners Kelly Hickler agreed and that the request complies with all six criteria for approval.

Commissioner Duane Hopkins agreed.

Commissioner Richard Foerster agreed; the request complies with the Parker 2035 Master Plan and the surrounding land development.

Chair Gary Poole agreed.

Commissioner Duane Hopkins moved that the Planning Commission recommend Town Council approve the Compark Village Filing No. 4 Amendment No. 1 Minor Development Plat. Commissioner Richard Foerster seconded; a vote was taken and passed 7:0.

PUBLIC HEARING: OPENED: 7:25 P.M. ORDINANCE NO. 3.25.1 - A Bill for an Ordinance Amending Ordinance No. 3.25 by the Deletion of Certain Property from the Planned Development Zoned Area Known as the Country Meadows Planned Development

Applicant: Town of Parker
Location: Northwest corner of Parker Road and Hess Road
Department: Community Development, Stacey Nerger

Stacey Nerger, Planner presented the staff report for Ordinance No. 3.25.1. Ms. Nerger concluded with the determinations in the staff report and recommended the Planning Commission recommend Town Council approve the ordinance.

Commissioners discussed with staff:

- from where the request was initiated; (*Ms. Nerger said that when the properties were rezoned from Country Meadows Planned Development to Modified C-Commercial a zoning map was created and approved to reflect this change; the Town's internal Geographic Information System mapping brought this to staff's attention.*)
- that this is a clean-up for internal documents; not a problem brought forward by an external entity; (*Ms. Nerger said that is correct.*)
- that the properties will still be commercially developed; (*Ms. Nerger said that is correct.*)

APPLICANT PRESENTATION

None; staff presentation only.

PUBLIC COMMENT OPENED

None

PUBLIC COMMENT CLOSED

PUBLIC HEARING: CLOSED: 7:30 P.M. ORDINANCE NO. 3.25.1

PLANNING COMMISSION DISCUSSION

Commissioner Richard Foerster said the request makes sense as an administrative process.

All Commissioners agreed.

Commissioner Ruth Ann Nelson moved that the Planning Commission recommend Town Council approve Ordinance No. 3.25.1. Commissioner Eliana Burke seconded; a vote was taken and passed 7:0.

PLANNING COMMISSION ITEMS

None

STAFF ITEMS

None

ADJOURNMENT

The meeting was adjourned at 7:30 p.m.

Rosemary Sietsema
Recording Secretary

Gary Poole
Chair



Planning Commission Staff Report

Planning Commission Date: 3/14/2019

Town Council Date: 4/1/2019

Hearing Type: Public Hearing
MOST OF TRACT A PARKER HOMESTEAD
FILING 1 1ST AMENDMENT Use by Special Review –
(Back 40 Gun Range)
TRAKiT No(s): Z18-004

Location: Generally located at the northwest corner of Chambers Road and Double Angel Road

Project Planner: Paul Workman, Senior Planner

Applicant: John Prestwich, PCS Group, Inc. on behalf of the property owner and the operator

Executive Summary: The applicant is requesting the approval of a Use by Special Review in order to operate an indoor archery and gun range with ancillary retail sales.

Staff Recommendation: Approval with Conditions

RECOMMENDED MOTION

"I move the Planning Commission recommend Town Council approve the Use by Special Review, subject to the following conditions:"

- 1) The applicant shall submit an updated noise study at the time of the site plan that includes further detail based on the final site layout, building construction type and noise attenuation systems. This noise study evaluation will ensure that construction of the facility restricts noise levels to no more than 45 decibels related to fire arm activities when measured at a 25-foot setback from the shared property line with the drainage pond to the west.
- 2) At the time of site plan submittal, the applicant and the Town shall enter into an agreement to fund the Town's hiring of a consultant to review and evaluate the applicant's noise study described in Condition #1.
- 3) The applicant shall evaluate the noise levels between the first three months of operations and the first 12 months of operations. Locations for measurement, duration of evaluation and the time of year of this evaluation will be established during the site plan application. If the results of this evaluation are determined to exceed the noise levels in Condition #1, the applicant shall cease operations until such time the building is modified to bring the noise levels into compliance.

- 4) The applicant shall meet all requirements outlined in the Occupational Safety and Health Administration (OSHA) Standards – 29 Code of Federal Regulations (CFR) contained in 1910.1025 and 1926.62. Information showing compliance with these standards shall be provided with the site plan application
- 5) The applicant shall meet all Environmental Protection Agency (EPA) standards for primary and secondary ambient air quality. Information showing compliance with these standards shall be provided with the site plan application.
- 6) The operator shall hold an open house at least once a month for anyone wishing to attend for the first 12 months of operations. The operator shall provide a sign-in sheet and notes of the meeting to the Community Development Department.
- 7) The applicant shall coordinate with the Town of Parker Police Department in order to ensure that development of the property, interior layout of the building and operating procedures are designed to ensure safety and deter criminal activity.
- 8) All business operations and activities associated with the use are required to be done within the building.
- 9) The applicant shall work with Town staff during the site plan application review process to ensure that buffering along the shared property line with the drainage pond to the west is above the minimum requirements, within the Town of Parker Land Development Ordinance.

ALTERNATIVE MOTIONS

“I move the Planning Commission recommend Town Council approve the Use by Special Review.”

“I move the Planning Commission recommend Town Council deny the Use by Special Review as the request does not meet the following approval criteria:”

-List criteria not met (either by staff or Planning Commission)

“I move the Planning Commission vote to continue the Use by Special Review to a future date.”

I. BACKGROUND/DISCUSSION

The applicant is requesting the approval of a Use by Special Review per the Parker Homestead Planned Development for an indoor archery and gun range with accessory retail sales on undeveloped property generally located at the northwest corner of Chambers Road and Double Angel Road. The subject property is roughly 8.5 acres in size and is zoned Mixed-Use Neighborhood Center within the Parker Homestead Planned Development.

Uses by Special Review are established in zone districts when a proposed use may present external impacts that require additional review beyond those uses that are considered uses-by-right within a zone district. The request for a Use by Special Review is a discretionary request made by a private property owner or applicant. The Use by Special Review is to determine whether or not the requested use meets or can meet, subject to conditions, the nine approval criteria set forth in the Land Development Ordinance and outlined in Section VII of this staff report.

A Use by Special Review does not include the review of specific development standards or construction standards. The review of those items occurs during the site plan and building permit processes.

Vicinity Map



II. PRIOR ACTIONS

Date	Action
2010	Town Council approved the annexation of the subject property.
2011	The current Parker Homestead Development Plan was approved by Town Council.
2012	The Second Amendment to the Parker Homestead Development Guide was approved by Town Council.
2013	The Parker Homestead Filing #1 1 st Amendment plat was recorded.

III. CURRENT SITE DATA

Existing Zoning		PD - Planned Development	
Overlay District		N/A	
PD & Plan Area		Parker Homestead – Planning Area 1 (Mixed-Use Neighborhood Center)	
Master Plan Area		Neighborhood Center	
Site Acreage		8.5	
Subdivision		Parker Homestead Filing #1 1 st Amendment	
Existing Use		Undeveloped	
Surrounding Uses			
	Master Plan Land Use	Zoning	Existing Use
North	Neighborhood Center	PD - Planned Development	Open Space/Drainage
South	Neighborhood Center	PD - Planned Development	Echo Park Stadium and Single-Family Detached Homes
East	Low Density Residential	PD - Planned Development	Chambers Road and Single-Family Detached Homes
West	Low Density Residential	PD - Planned Development	Drainage and Single-Family Detached Homes

IV. PARKER 2035 MASTER PLAN

[Parker 2035 Master Plan | Town of Parker - Official Website](#)

MASTER PLAN CONSISTENCY	
Master Plan Designation	Neighborhood Center ☒ Consistent ☐ Inconsistent
Master Plan Character Discussion	Neighborhood Centers: Serve the basic needs of the surrounding residents. Typical uses include convenient retail and personal/business services usually anchored by a grocery store. Other compatible uses such as small offices, recreational uses and restaurants are also permitted. The total Gross Leasable Area for the commercial/office components within an entire

	Neighborhood Center should range from a combined 50,000 to 250,000-square feet. Higher density residential is appropriate as a transition between less intense residential areas and non-residential areas when developed as part of a mixed-use development and when the design encourages residents to walk or bicycle. Typical garden style apartment designs are not appropriate.
Consistent Goals/Strategies	Land Use 1.C Land Use 1.E Jobs and Economic Vitality 2.A Jobs and Economic Vitality 2.B Jobs and Economic Vitality 2.C Transportation 2.B
Inconsistent Goals/Strategies	None
Staff Analysis	The subject property falls within a Neighborhood Center as identified in the Town's General Land Use Plan. Within the description of this designation, commercial uses are specifically identified as appropriate uses. Land Use 1.C: The request would expand the Town's economic base in an area that is designated for commercial uses and zoned for commercial uses. Land Use 1.E: There would be an adequate transition from the proposed use to different land uses through drainage facilities, open space, rights-of-way and increased buffering techniques. Jobs and Economic Vitality 2.A: The request would provide for expanded commercial activities in an area designated as a Neighborhood Center. Jobs and Economic Vitality 2.B: The request would provide for additional variety and diversity of the business types on the Town. Jobs and Economic Vitality 2.C: The request would provide for a local business that would be the only one in Parker. Transportation 2.B: The transportation systems that would serve this proposal are either in place or can be constructed to adequately serve the proposal.

V. LAND DEVELOPMENT ORDINANCE

ZONING CONSISTENCY (Site Plan/UBSR/Sketch/Prelim Plan/MDP)			
Provisions	Existing/Required	Proposed	Analysis
Setbacks	Chambers Road – 75’ Double Angel Road – 20’ Newlin Gulch Flooplain – 20’ South property line – 20’ Internal public streets – 15’ Internal private drives – 10’ Adjacent to residential – 25’	Setbacks will be reviewed at the time of a site plan application.	☐ Consistent ☐ Inconsistent ☒ N/A
Density	N/A	The request is for commercial development.	☐ Consistent ☐ Inconsistent ☒ N/A
Height/Stories	35’	Building height will be reviewed at the time of a site plan application.	☐ Consistent ☐ Inconsistent ☒ N/A
Lot Size	None.	Compliance for lot size is reviewed with the subdivision application.	☐ Consistent ☐ Inconsistent ☒ N/A
Lot Coverage	None.	Compliance for lot coverage is reviewed at the time of site plan application.	☐ Consistent ☐ Inconsistent ☒ N/A
Landscaping	Title 13.06.070	Compliance for landscape requirements is reviewed at the time of site plan application.	☐ Consistent ☐ Inconsistent ☒ N/A
Off-Street Parking	Title 13.06.050	Compliance for parking is reviewed at the time of site plan application.	☐ Consistent ☐ Inconsistent ☒ N/A
Staff Analysis	The specific details related to the development of the property are not a part of the Use by Special Review, but will be reviewed during the site plan and subdivision applications if the Use by Special Review is approved.		

VI. ACCESS, CIRCULATION & TRAFFIC ANALYSIS

The commercial property in the Parker Homestead development will be served by the existing Pelican Street on the south side of the site. This roadway and associated access was intended for, and constructed to serve, both the residential and the commercial components of this Planning Area when the residential uses were constructed. Any future commercial development on the property, including this request, will likely construct a right-in and right-out access along Chambers Road as a part of the commercial development on the subject property. Detailed design for this improvement would be provided at the time of a future site plan for the commercial development.

VII. APPROVAL CRITERIA

Title 13.04.200.b. Criteria for approval for Uses Permitted by Special Review:

1. Will be in harmony and compatible with the character of the surrounding areas and neighborhoods.

Applicant's Response:

The Applicant feels strongly that the Back 40 Range is in harmony with the adjacent uses surrounding Heirloom/Parker Homestead and strives to be an amicable neighbor who integrates with the surrounding area and neighborhoods. We believe that the Back 40 Range will indeed complement the existing sporting facilities adjacent to the proposed site. We recognize that the premise of the Back 40 Range may be initially concerning to some residents, but the applicant will strive to be a family-friendly destination that enhances the sporting destination that the Rueter-Hess Reservoir corridor has become for the Town of Parker.

We are excited to play a part of the neighborhood and surrounding area by offering services that are currently not available in Parker. First, an additional sporting option at Chambers/Double Angel will help solidify the area as a destination for Parker residents and metro Denver area residents alike. By nature, sports tend to engage entire families, which is important to a neighborhood feel. Back 40 Range intends to be an inviting facility to further promote time spent together. Also, the socializing area of Back 40 Range lobby and classroom space provides an opportunity for personal interactions with neighbors. Additionally, our heavy landscaping is designed to include an inviting rest spot for trail users. While this inclusion might not benefit Back 40 Range directly, we feel that it can be an important part of proving that we intend to be an upstanding and approachable piece of the neighborhood. To this end, we would like to note specifically how the Back 40 Range is compatible:

- a) Back 40 Range sits immediately adjacent to the 5,500 seat Echo Park Stadium, which is operated by the Douglas County School District. Stadium events occur both during daytime and at night and include the lights, amplified sound, noise, and traffic associated with seating thousands of spectators. Further, Douglas County School District has submitted a response to the Town's solicitation for input regarding this development that did not raise any objections to the development of Back 40 Range. Back 40 hours of operation will be similar to normal retail hours found in other Parker establishments, typically 9am to 9pm.

- b) Only a few hundred feet away are the Double Angel ball fields, which include lights, amplified sounds, noise, and traffic associated with the two lit ball fields. Parking includes over 300 identifiable spaces. Our facility will not have this same outside environmental impact but will create another venue for these sports-minded individuals to patronize in the Town of Parker.
- c) Rueter-Hess Reservoir is being billed not only as a critical source of water for Parker's growing population, but also as an outdoor recreation hotspot that features boating, fishing, picnicking, outdoor archery range, biking, and hiking. Back 40 Range offers an additional alternative for off-season sports enthusiasts to explore in the area.

As the above statements are facts of the neighborhood, Back 40 will provide yet another sporting facility in the area. There are currently over 50.3 million shooting sports participants in the United States, as stated by National Shoot Sports Foundation (N.S.S.F.) Industry Intelligence Report: 2016 Edition. The industry has continued to grow at least 8% year over year, according to NSSF. Additionally, the USA Shooting Sports website states:

"There are many programs available through the USA Shooting and partner organizations. Where a youth may not have excelled in other sports, shooting sports do not require a participant to be the fastest, tallest, or strongest. It does require—or will teach—patience, determination, organization skills, mental and physical control, safety awareness, goal setting, problem-solving, and good citizenship/sportsmanship."

The archery component continues to show growth through programs similar to the firearm shooting sports such as Junior Olympic Archery Development (J.O.A.D).

Parker has worked hard for the past 20 plus years to become a premier recreation town. This is clearly evidenced by the extensive and well thought out trails and open space systems which allow citizens to traverse the entirety of the Town. Heirloom/Parker Homestead is at the confluence of a number of these amenities, including the East/West regional trail system that runs eastward to Canterbury, the Newlin Gulch trail system installed by the developer of Heirloom, the Chambers Road/Double Angel sidewalk connections, and the extensive trail system associated with Rueter-Hess Reservoir. We look forward to being an integral piece of this vision for the Town. Back 40 can become an additional stop along these paths for trail users to refill water bottles or sit and recuperate on the outdoor patio.

Back 40 Range will strive to be a family-friendly destination, which is compatible with the demographics of the surrounding neighborhoods. While we recognize that being a good neighbor is imperative to the success of Back 40 Range itself, this view also extends from our personal philosophies about the type of community that we would all be proud to live in. The following strategies will be used to ensure that we meet the goal of being compatible with the surrounding community:

- a) The aesthetics of the building are designed to blend with other retail buildings commonly found in Parker. We have proposed an attractive 'modern mountain-

style lodge' theme. We are proud of the building design, which does not have a strip-mall feel, but rather is unique and inviting.

- b) We will work with local civil service groups to promote community engagement through discounted services at the range. Additionally, the lounge is available for civil servants to complete paperwork or other aspects of their employment, if they choose. We also plan on supporting Scouts, 4H, J.O.A.D., USA Shooting, and other similar youth groups in their efforts toward responsible teachings. This is compatible with the teaching of football, baseball, and soccer.
- c) The Back 40 Range anticipates employing local community members. This is another benefit that will allow residents to live, work and play in their local community.
- d) We will host a monthly open-house/coffee hour with food to facilitate conversation. This will allow Back 40 to hear different views from around the neighborhood about local and national topics pertaining to the industry, and will help Back 40 develop classes to address the issues raised during these discussions. We will invite people to use Back 40 as a gathering space, rather than the normal retail space that has a come and go type atmosphere.

Staff Analysis:

The subject property is located at the intersection of Chambers Road and Double Angel Road. Existing land uses in the vicinity of this intersection include single-family homes, drainage and open space amenities, a church, Echo Park stadium and Double Angel ballpark. The existing character of the area is a mix of uses, including sporting related uses that accommodate hundreds of people at a time. The addition of an indoor archery and gun range would add to the mix of uses in the area and would provide an additional sporting opportunity.

Retail sales at this location are uses-by-right. It is the firing of guns inside this facility that has the potential to have off-site impacts and that are being reviewed as a part of this application.

The applicant has submitted a noise study indicating:

- 1. Existing noise levels in this area;
- 2. Noise levels that are generally acceptable in traditional suburban neighborhoods; and
- 3. Strategies and construction methods to mitigate noise levels to a less than significant or to have no impact from this facility on surrounding uses.

The requested use will function like a traditional commercial use for traffic related impacts. This use will have less traffic impacts than the existing stadium or ballpark uses. Future development on the subject property will attract more people to the site regardless of uses. In the review of the request, the Parker Police department did not identify the potential for increased criminal activity attributable to the proposal more than other traditional commercial uses allowed by the existing zoning. All proposed operations will be conducted inside of the facility which will result in the site functioning like a traditional commercial user. See staff analysis for criteria six, seven and nine for additional staff analysis on noise, traffic and crime.

The applicant has stated that they are willing to host an open house with the residents and other operators in the area to ensure issues are pro-actively addressed and the facility is compatible with the character of the area and surrounding neighborhoods. Staff has recommended this as a condition of approval.

Therefore, staff has determined that, subject to conditions, this criterion can be satisfied.

2. Will be consistent with the Town Master Plan.

Applicant's Response:

Both the approved PD Guide for the property and the Town's Plan call for a mixed-use project that is adjacent to residential, has excellent traffic circulation, and has walkability if desired. We have designed all elements of Back 40 Range with the Guiding Principles of the Town of Parker Master Plan in mind, including the Neighborhood Center Designation, and address them individually here:

Back 40 will be consistent with the Town's Master Plan by providing community members with unique retail conveniently located on their way home from work. In addition to the retail we will provide personal services in the form of safety and training for archery and firearms with hands-on classes. This further goes toward adding a value of yet another recreational venue in the area. During peak hours of operation, a local food truck will be invited to utilize the area for the walk-up convenience of dining with the added value of menu rotation provided by different trucks in rotation.

"As we grow, we will strive to preserve the attributes of our unique, hometown character and community identity, the beauty of our natural environment, and the strengths of our neighborhoods while lessening the adverse effects of growth."
(Town Master Plan)

For the owner, the name 'Back 40' was chosen because it conjures up memories of childhood and growing up in a small town where a lot of time was spent playing in the Back 40. We fully embrace this Guiding Principle and intend to exemplify this hometown character in both our building and our interactions with our clients and neighbors. We feel that our landscaping design and overall business approach will improve the current natural environment and mitigate as much as possible any detrimental effect of the development.

Furthermore, applicant has made extensive efforts to assure that the surrounding neighborhood will not be impacted by noise or air quality issues. These topics were fully addressed in the following documents:

- Wave Engineering *"Baseline Ambient Sound Level Measurement Report"*
- Carey's HVAC Lead Letter
- Carey's HVAC *"Range Ventilation Standards"*

“Architectural and land use design is fundamental to our identity. As our community grows, special attention will be given to promoting high quality residential and commercial development that reflects aesthetic excellence.” (Town Master Plan)

We take great pride in the building design, which will resemble a modern and inviting mountain lodge, and will immediately be recognizable not only as Back 40 Range but as an iconic structure in Parker. We will work with the Town to ensure that all building guidelines are met and surpassed to uphold these high standards.

“The long-term economic well-being of the Town is fundamental to its future. Therefore, we will encourage a variety of employment opportunities, and promote unique, local businesses.” (Town Master Plan)

We are excited to be a locally owned business by a Parker resident! In addition, we plan to hire local employees including military Veterans, women, and minorities. Back 40 Range holds the same views as the Town as to the importance of local businesses and plans to use other local businesses in the development and building of the Range. Back 40 Range is a unique opportunity for the Town of Parker to expand its recreational offerings and we appreciate the Town’s promotion of such local businesses.

Retail tax generation is also critical to the Town of Parker, as retail tax helps fund the quality of life that all Parker residents have become accustomed to. Back 40 will contribute a projected 5-year sales tax revenue of \$1.1M and a projected 10-year sales tax revenue of \$2.8M. Back 40 will grow jobs close to home, keeping tax dollars and employment within the Town limits.

Staff Analysis:

The details of this analysis can be found in Section IV of this staff report. The subject property is located within a Neighborhood Center in the Town’s General Land Use Plan and the request is for a commercial use. The application has also demonstrated consistency with six goals identified in the Master Plan.

Therefore, staff has determined that this criterion has been satisfied.

3. Will not result in an over-intensive use of land.

Applicant’s Response:

Back 40 is a low-intensity user. As mentioned above, a significant portion of the building is uninhabitable because it falls within shooting lanes. We also anticipate that, because of the amount of unoccupied space, Back 40 will also have a much lower parking ratio. Required parking spaces will be finally determined with the more detailed future Site Plan submittal. Of the approximately 25,000 square foot building, approximately 10,000 square feet will be unoccupied. Back 40 estimates that approximately 65 to 75 parking spots will be needed, based on the maximum number of employees working plus one spot per customer using the location. We are prepared to adjust parking spots as needed during the Site Plan approval process.

We understand that the Back 40 building will need to fit on the property and comply with the bulk standards contained in the Parker Homestead PD Guide. We also understand that a detailed analysis will be performed when the more detailed Site Plan is formally submitted for the project. We have evaluated the conceptual site plan and have confirmed that the proposed use will conform to Sec. 1-50 of the Parker Homestead Development Guide. The maximum building height is less than 35 feet and will meet or exceed the following Building Setbacks:

- 1) From Chambers Road: 75 feet min, avg. 100 feet
- 2) From Double Angel Road: 20 feet
- 3) From Newlin Gulch 100 Year Floodplain: 20 feet
- 4) From South Property line: 20 feet
- 5) From Internal public streets: 15 feet
- 6) From Internal private drives and parking: 10 feet
- 7) Between structures: Per Building and Fire Code

Staff Analysis:

The subject property is relatively flat, it does not have a floodplain encumbrance and is large enough to accommodate multiple commercial users. Due to these conditions, there are not major obstacles to the development of the site. A detailed site plan has not been submitted for the application in order to evaluate the development requirements for the subject property. However, the applicant has indicated an ability to meet the necessary development requirements should the requested Use by Special Review be approved.

Therefore, staff has determined that this criterion has been satisfied.

4. Will not have a material adverse effect on community capital improvement programs.

Applicant's Response:

We do not anticipate any unusual impact on the capital improvement program as a result of this use.

Staff Analysis:

The applicant's request will have no material adverse effect on the community capital improvement programs.

Therefore, staff has determined that this criterion has been satisfied.

5. Will not require a level of community facilities and services greater than that which is available.

Applicant's Response:

The site will require a curb cut on Chambers Road. That curb cut will be installed and paid for by the master developer. Back 40 will be outfitted with a sprinkler system and it will not require any unusual fire or police protection. Utilities serving the site are in place and easily accessible. Sanitary sewer service is provided via an existing sewer stub located at the west side of the property. Water service is provided by two stubs, one on the west side of the property and the other on the east side coming out

of Double Angel Road. Site detention is provided by the existing pond south and adjacent to the site and the existing pond north of Chambers Road. These two ponds provide 100% of the required capacity. Dry utilities such as gas, electric and fiber optic are located around the site on Chambers Road and Double Angel Road. The roadway network surrounding the site provides service and no offsite improvements are necessary.

Staff Analysis:

The applicant's request will not require a level of community facilities and services greater than that which is available.

Therefore, staff has determined that this criterion has been satisfied.

6. Will not result in undue traffic congestion or traffic hazards.

Applicant's Response:

The Developer has been intimately involved with the development of the Traffic Plan for more than a decade. We have provided an update to the Traffic Study which David Evans and Associates completed a number of years ago at the Annexation and PUD stage. Please see attached Traffic Memorandum entitled "Parker Homestead Commercial Traffic Analysis", dated October 24, 2018.

Staff will also review our Annexation Agreements and multiple Subdivision Improvements Agreements to confirm that we have fulfilled our previous obligations, have constructed the agreed upon street improvements, and have generally fulfilled all of our Annexation and SIA obligations related to traffic, streets, sidewalks, and trails. We recognize that the Town may ask for an additional SIA to cover any items that have arisen in the interim.

The proposed use is a low traffic generator, and as such, we do not anticipate traffic congestion or traffic hazards related to this proposal.

Staff Analysis:

The applicant has provided a traffic analysis that shows consistency with the assumptions of the Master Traffic Analysis that was approved with the original zoning and platting entitlement process. The associated anticipated trips generated by the proposal are within the limits contemplated with the Master Traffic Analysis.

Therefore, staff has determined that this criterion has been satisfied.

7. Will not cause significant air, water, or noise pollution.

Applicant's Response:

To address the concerns of neighbors, and in compliance with the Town UbSR criteria, the applicant is committed to two sound abatement conditions/stipulations to the UbSR approval obligating us to engage Wave Engineering and implement its recommendations to improve the building and its systems so that:

- a) Sound from firearm activity is below 45 dB measured 25' from the Back 40 property line onto the adjoining detention pond serving the commercial

development as stated below. As a comparison to this sound level, the average conversation is 60 dB, as referenced in <https://www.noisehelp.com/noise-level-chart.html>

- b) In conjunction with item a) above, ensure residents' continued peaceful enjoyment and use of their property by committing to improvements to its facility so that no gunfire is heard at an adjacent residential property line.

The above commitments shall be enforced by first measuring the existing ambient sound on site with a sound level meter of standard design and quality and characteristics established by the American National Standards Institute. The sound study produced by Wave Engineering has established that the ambient daytime noise level at Location #1 is 52 dBA and at Location #2 is 56 dBA. Back 40 shall then design the building to ensure that firearm sound levels measured with the sound meter set on the "A" weighted scale and on Fast or Impulse response are not heard at the adjacent residential property lines. The resulting building improvements (additional information below) shall ensure that gunshots do not cause the measured sound level to rise in the presence of the ambient sound level during normal operating hours at the residential property line.

The end result is that residential property owners will continue the quiet enjoyment of their property.

Wave Engineering's input will allow us to model a number of items, including but not limited to the following, to ensure our use is compatible with commercial Uses by Right that are currently permitted for the commercial corner. The planned sound mitigation program includes:

- Wall design
- Roof deck design
- The design configuration of the wall and roof deck connection
- The use of rubber bullet traps, rather than steel traps
- Use of acoustical enclosures and sound barriers
- Prohibiting external building wall penetrations (doors, windows, vents, etc.) directly to a range bay (which are a necessity with a steel trap)
- Prohibiting the use of ground-mounted mechanical HVAC units
- A four-sided parapet wall to screen rooftop equipment
- The use of sound abatement material inside the range bays, as provided in this submittal and titled "Sound Abatement Materials."
- A sound dampening system within the dedicated range HVAC mechanical system

After the UbSR is approved, and prior to engaging Back 40's project architect, the Wave Engineering baseline field report will be used as a guide in the design process to address these sound abatement commitments.

Examples of shooting ranges that have negatively impacted adjacent residential property in other communities around the country, as well as articles about the impacts of sound, have been presented to our team by neighbors adverse to our project. In each of the example nuisance instances, those facilities either failed to incorporate the majority, and possibly all the items bulleted above, or the articles were, in fact, referring to outdoor shooting ranges, which obviously are not comparable nor applicable.

Staff has asked for clarification as to whether or not ground-born vibrations will occur as a result of the Back 40 range. There will be no ground born vibration created by this facility over and above that associated with a typical retail establishment.

Applicant has agreed to test gunfire noise from the range concurrent with opening the range. Applicant is open to continuing discussions with Staff regarding an additional one-time monitoring of noise at the Back 40 Range at a mutually agreed upon time after opening - within the first 12 months of operations being completed. This monitoring will be used to confirm that the noise mitigation efforts of the design and architectural teams have met the goals of the Wave Engineering study. This additional noise study is meant to assess the impacts of indoor noise (gunshots) exiting the building, not the sound of traffic, HVAC units, doors, etc. Applicant is open to taking corrective measures if the target noise levels are not being met.

Staff Analysis:

The Parker Water and Sanitation District has not identified any concerns for this request related to water services.

The applicant has provided detailed information from Carey's Small Arms Range Ventilation that states; *"Carey's has designed and installed over 800 small arms range ventilation systems. All systems that our team has designed and/or installed use both 30% pre-filters and 99.97% HEPA filters. The dual set of filters are installed to maintain an exhaust air that is cleaner than the outside air. The small arms range will exhaust an average of 93.3% less than the allowable limit per EPA Lead emission rates."* The same information from Carey's Small Arms Range Ventilation identifies three main purposes for properly ventilating a small arms range. First, it is important to remove harmful contaminants created during the firing of a weapon from the respiratory zone of the occupants. Second, it is important to keep the range at a negative pressure to the surrounding base building space. This prevents the ingestion of contaminants as well as keeps the surfaces free of contaminants. Third, it is important to remove the smoke from the range in order to properly see targets. Additionally, this information provides industry standards that are established by the Environmental Protection Agency (EPA) for primary and secondary ambient air quality standards as well as Occupational Safety and Health Administration (OSHA) standards for these facilities. Staff has recommended a condition of approval that the applicant provide documentation demonstrating the ability to comply with these standards as a part of the future Site Plan application once detailed building design has been done.

The applicant hired Wave Engineering to produce a noise study that:

1. Provides information on what different noise levels equate to;
2. Documents existing noise levels in the vicinity of the property; and
3. Makes recommendations as to construction techniques and materials that could be used to ensure there isn't an impact related to noise pollution.

The noise study states; *"The exact building construction for this facility will not be determined until the detailed design is underway with the architect, mechanical engineer and design team. However, the following are examples of the types of special construction that will be considered for the building and implemented as necessary:*

- *Install concrete slab over the range roof (as opposed to a typical light weight roof)*
- *Install gypsum board or plywood ceiling above the baffles in the range themselves.*
- *Provide rockwool or fiberglass insulation in the cavity between the roof and the range cleanings.*
- *Design walls to have multiple wythes (a continuous vertical section of masonry one unit in thickness) or layers. For example walls could include dual concrete or CMU panels with rockwool or fiberglass insulation in a center cavity.*
- *Range ventilation systems will be designed to mitigate gunshot sound that can transmit through the exhaust and ventilation ductwork, through the fans, and then outdoors. Mitigation measures will include internally lined ductwork, additional elbows, and/or inline duct silencers as needed.*
- *Range ventilation equipment will be placed in locations that are selected to reduce the potential for sound transmission to residences.*
- *The range floor plan may make use of non-sensitive "buff" spaces to further isolate the shooting ranges from the exterior walls or roof.*
- *Rubber bullet traps may be used in lieu of steel traps to reduce sound from bullets impacting the trap.*
- *The range bays themselves will likely include sound absorbing treatments to significantly reduce sound levels inside the ranges."*

The applicant has committed to evaluating these techniques and/or materials, and others, in order to ensure that sound from fire arm activity is below 45 decibels (dB) measured at a 25' setback from the shared property line with the detention pond to the west. In order to provide context, a typical suburban neighborhood is generally around 50 dB. As stated in the applicant's response, the current noise level at Location 1 (the west side of the detention pond and east of the residential fence line) was measured at an average of 52 dBA during the daytime and Location 2 (east of Chambers Road) was measured at an average of 56 dBA. Therefore, the 45dB measured at a 25' setback from the share property line with the detention pond to the west would ensure there would be no increase in noise pollution as a result of fire arm activity. Staff is recommending a condition of approval for the applicant to

ensure that sound from fire arm activity is below 45 dB when measured at a 25' setback from the shared property line with the detention pond to the west.

Therefore, staff has determined that, subject to conditions, this criterion can be satisfied.

8. Will be adequately landscaped, buffered and screened.

Applicant's Response:

The building will be designed by a professional architect, and landscaping will be designed by a professional landscape architect. All will be per Town of Parker Code.

Back 40 Range is willing to employ multiple methods to mitigate sound, view, and lighting concerns that adjacent neighbors have brought to the Town's attention. Please see the detailed responses above, but additional strategies may include the construction of berms and planting on the side of the building adjacent to the southern neighbors. While this is a Site Plan level detail, we will commit at the UbSR stage to exceeding landscaping requirements to ease neighborhood concerns. We have prepared a conceptual cross section with this revised submittal depicting how berms and landscaping can be used to screen the project from the southern neighbors.

Staff Analysis:

A detailed site plan has not been submitted for the application in order to evaluate the development requirements for the subject property. However, the applicant has indicated an ability to meet the necessary development requirements should the requested Use by Special Review be approved. Additionally, staff is recommending a condition of approval for the applicant to provide additional buffering along the shared property line with the drainage pond. The final buffering along the shared property line will be determined at the time of the site plan application.

Therefore, staff has determined that, subject to conditions, this criterion can be satisfied.

9. Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the Town.

Applicant's Response:

In addition to the information within this analysis, Back 40 Range, at its core, has safety as its priority. Currently, no facility like Back 40 exists in Parker, forcing residents to travel greater distances to reach Denver area range facilities. Tax revenue (from property and sales) and jobs (approx. 10 full time and +30 part-time) will be added for the benefit and welfare of Parker residents.

Knowing how to safely operate a firearm, shoot a gun for sport, hunting or personal defense, carrying concealed, possessing a firearm at home, transporting one in your vehicle or on your person, and understanding legalities and liabilities is a big responsibility. Area residents' welfare will improve from the availability of shooting sports training/education at Back 40 as they become more proficient, knowledgeable and confident in their ability to safely own and handle firearms and bows.

The instructors of this facility will receive unifying training prior to the grand opening that provide it with a unique training and educational baseline and offering to residents. Instructors and Range Safety Officers will be knowledgeable and experienced in industry standardized training components as directed by the nationally accredited NRA Instructors Certification requirements. The result is that Back 40 will contribute to the welfare of Parker inhabitants by offering and reinforcing safety at all levels of skill to all comers.

As mentioned previously, standard operating procedures will be used to address how firearms are handled while shooting, training, cleaning, and maintaining, transporting to and from the range, on your person, and safe storage at home.

Studies have shown that similar businesses to Back 40 do not have a negative impact on the neighborhood, such as an increase in robbery, burglary or violent crime. Peer-reviewed studies have shown that, in stable socioeconomic areas such as Parker, crime does not increase. In fact, the addition of more Federal Firearm License (FFL) holders has actually decreased crime in that area (Wiebe et. o/., Homicide and geographic access to gun dealers in the United States, BMC Public Health, 9:199, 2009; Plerhoples Stacy et o/., Neighborhood-level economic activity and crime, Journal of Urban Affairs, 39: 225-240, 2017).

The building design will not be completed until after the UbSR is complete, and as such, we have not yet drafted the operating standards for Back 40 Range. That said, the following is a high-level summary of the key items that will be addressed:

- 1) Once we are under construction, as a deterrent, and to ensure safety, for security reasons there will be certain security features of the facility we intend to make public through a series of press releases. Other measures will remain undisclosed to avoid aiding would-be criminal intentions.
- 2) Facility maintenance, cleaning, and recycling will follow all applicable industry standards. The Five- Star rating system recently revamped by the National Shooting Sports Foundation is THE standard for indoor shooting ranges, and we will be following its recommendations. EPA and OSHA compliance will be maintained with scheduled testing, cleaning, and maintenance, with all reports maintained and preserved in writing. Each employee, as per their job responsibilities, will be trained to deploy these procedures and fulfill these tasks.
- 3) OSHA requires a safe work environment for employees which we will test for upon opening to establish a baseline of data on the Range prior to usage. Each employee will be required to produce written reports documenting their maintenance, cleaning and recycling activities.
- 4) The EPA regulates environmental matters. Please see the documentation from our specialized range HVAC contractor, who has been involved in over 800 ranges around the world, outlining how the air exiting this facility will, in fact, be cleaner than the air going into it (see attached). Also, note that only 25% of the air in the

range will be exhausted from the building, while 75% will be reused inside the range. The filtration systems do such an effective job of providing clean air that range users will breathe it with no ill effects. See attached letter from our Range HVAC subcontractor for more information about the cleanliness of the air that enters and exits the facility.

- 5) Back 40 will be designed using the standards necessary to achieve the NSSF's Five-Star designation mentioned above. Those standards are attached for your reference. There are less than 30 Five-Star range facilities in the U.S. because of the overhaul of the Five-Star requirements which the NSSF completed in 2016. Achieving this designation is costly, but we are excited and committed to completing the facility in a manner that allows us to earn this coveted designation.

Below is a list of items that will be addressed through Standard Operating Procedures (SOP's) that focus on the specific physical layout and building conditions, the sales process, and services processes provided by Back 40 as well as the protocol for the various tasks employees will be charged with carrying out daily, weekly, and monthly. The SOP documents will be compiled by management during construction of Back 40 Range. They will be tailored to the Back 40 facility specifically and will contain proprietary information/strategies. They include but are not limited to:

- Firearms safety
- Employee training and communications plans
- Firearms (customer) — sale process and policies, 4437's, bound book, background checks,
- etc.
- Gunsmith procedures - check-in / out (implications on FFL and bound book)
- Security
- Inventory management
- Range check in / check out
- Food and drink policy
- Range (and retail) maintenance and monitoring for the highest level of service (LOS)
- Marketing plan / strategy
- HR matters / employee handbook
- HVAC maintenance requirements
- Monitoring employee Blood Lead Levels (BLL)
- Prohibited, limited, modified or accommodated users of the range
- Lead standards training - what does it affect, symptoms of exposure
- Hazardous communications — SDS's
- ATF, OSHA, compliance, training and risk management
- Procedures and incident report for injuries/slip and falls, etc.
- Natural disaster procedures — tornado/flood, etc.
- Safety rules / range waiver and criteria for range usage
- Range operations - opening the facility, closing the facility, range commands

- Scheduling and reservations
- Training classes
- Accounts receivable and payable
- Audit procedures
- Record retention and file management
- Employee responsibilities
- Planning
- Maintenance and inspections
- Customer firearm procedure for entering an existing facility
- Brand / brand equity
- Sales and rentals
- Employee benefits
- First aid and Emergency Procedures
- Recycling and waste management
- Employee health and safety practices
- Storing of materials and supplies
- Information systems management

Staff Analysis:

The request will not be detrimental to the health, safety or welfare of current or future Parker residents. The subject property is zoned for commercial uses and will be developed with commercial uses. In the review of the request, the Parker Police department did not identify the potential for increased criminal activity attributable to the proposal more than other traditional commercial uses allowed by the existing zoning. The proposed facility will be equipped with specific security measures to help discourage criminal activity and staff is recommending a condition of approval that the applicant work with the Parker Police Department to ensure the site is developed in a manner that deters criminal activity. This could include, but not be limited to, specific site lighting, site layout to ensure visibility, interior layout to ensure safe and easy access, locking retail items in cabinets, security cameras and construction and design elements that prevent vehicles from colliding with the building. Based on the recommended condition, the development of the site and the building itself can be developed in a way that would likely mitigate criminal activity. Additionally, this facility would provide education people on how to safely operate, clean and keep fire arms.

Therefore, staff has determined that, subject to conditions, this criterion can be satisfied.

VIII. SUMMARY REFERRAL AGENCY COMMENTS AND CONDITIONS

Agency	Comments
Parker Engineering	No comments.
Newlin Meadows HOA	No response received.
Horse Creek HOA	No response received.
Parker Homestead HOA	No response received.
Parker Police	Advisory comments.
Fire and Life Safety	Advisory comments.
Xcel	Advisory comments.
IREA	Advisory comments.
Parker Water and Sanitation District	No comments.
Tri-County Health	Advisory comments.
Douglas County School District	Advisory comments.
Douglas County	Advisory comments.

IX. CONCLUSION

The applicant is requesting the approval of a Use by Special Review per the Parker Homestead Planned Development for an indoor archery and gun range with accessory retail sales on undeveloped property generally located at the northwest corner of Chambers Road and Double Angel Road. The subject property is roughly 8.5 acres in size and is zoned Mixed-Use Neighborhood Center within the Parker Homestead Planned Development.

Uses by Special Review are established in zone districts when a proposed use may present external impacts that require additional review beyond those uses that are considered uses-by-right within a zone district. The request for a Use by Special Review is a discretionary request made by a private property owner or applicant. The Use by Special Review is to determine whether or not the requested use meets or can meet, subject to conditions, the nine approval criteria set forth in the Land Development Ordinance and outlined in Section VII of this staff report.

A Use by Special Review does not include the review of specific development standards or construction standards. The review of those items occurs during the site plan and building permit processes.

X. RECOMMENDED CONDITIONS

1. The applicant shall submit an updated noise study at the time of the site plan that includes further detail based on the final site layout, building construction type and noise attenuation systems. This noise study evaluation will ensure that construction of the facility restricts noise levels to no more than 45 decibels related to fire arm

- activities when measured at a 25-foot setback from the shared property line with the drainage pond to the west.
2. At the time of site plan submittal, the applicant and the Town shall enter into an agreement to fund the Town's hiring of a consultant to review and evaluate the applicant's detailed noise study described in Condition #1.
 3. The applicant shall evaluate the noise levels between the first three months of operations and the first 12 months of operations. Locations for measurement, duration of evaluation and the time of year this evaluation will be established during the site plan application. If the results of this evaluation are determined to exceed the noise levels in Condition #1, the applicant shall cease operations until such time the building is modified to bring the noise levels into compliance.
 4. The applicant shall meet all requirements outlined in the Occupational Safety and Health Administration (OSHA) Standards – 29 Code of Federal Regulations (CFR) contained in 1910.1025 and 1926.62. Information showing compliance with these standards shall be provided with the site plan application
 5. The applicant shall meet all Environmental Protection Agency (EPA) standards for primary and secondary ambient air quality. Information showing compliance with these standards shall be provided with the site plan application.
 6. The operator shall hold an open house at least once a month for anyone wishing to attend for the first 12 months of operations. The operator shall provide a sign-in sheet and notes of the meeting to the Community Development Department.
 7. The applicant shall coordinate with the Town of Parker Police Department in order to ensure that development of the property, interior layout of the building and operating procedures are designed to ensure safety and deter criminal activity.
 8. All business operations and activities associated with the use are required to be done within the building.
 9. The applicant shall work with Town staff during the site plan application review process to ensure that buffering along the shared property line with the drainage pond to the west, above the minimum requirements, within the Town of Parker Land Development Ordinance shall be provided.

XI. ATTACHMENTS

1. Referral Agency Comments
2. Applicant Narrative and Approval Criteria Analysis
3. Noise Study
4. Carey's Small Arms and Range Ventilation information
5. Journal of Urban Affairs – Neighborhood –Level Economic Activity and Crime
6. Bio-Med Central – Homicide and geographic access to gun dealers in the United States
7. Resident Emails
8. Cross-Section Graphic
9. Shooting Range Rules
10. Federal Fire Arm Safety and Security Recommendations

Report Approved By: Bryce Matthews, Planning Manager

Through: Jason Rogers, Deputy Community Development Director



Parker Police Department



January 10, 2019

The Parker Police Department would recommend the following measures should this application be approved:

- Secured gun and ammo lockers
- On-site lighting remain unobstructed to ensure visibility onto the site
- Clear lines of site into the location
- The Parker Police Department be an emergency contact for the facility to ensure a quicker response time in case of an emergency

Also, within the metro area within the last few years, there has been an increase in criminal activity with vehicles ramming into store fronts. During the development stage, the Police Department advises the installation of large boulders, flower pots, or similar to prevent this type of activity at this location.

Z18-004

REVIEWS

Randy Capra

FIRE
LIFE
SAFETY
10

The applicant has not introduced additional concepts for this site; Fire Life Safety has no issues with the zoning request for this facility. This approval does not imply approval for site layout, access, location of utilities, or the fire sprinkler control valve room. Please note - two points of access are required for this site.

11/14/2018 8:41:33 AM

Z18-004

REVIEWS

Brooks Kaufman

IREA
15

The Association will address utility easements at site development and platting.

8/9/2018 7:39:09 AM

From: Workman, Paul
Sent: Thursday, December 20, 2018 4:36 PM
To: rramsey@pwsd.org
Subject: Z18-004 comments

Robert,

I wanted to say thank you for your voicemail related to the case referenced above (the Back 40 indoor archery and gun range) and your indication that PWSD has no comments on the request, but will need additional information at the time of site plan.

Merry Christmas.



Paul Workman, Senior Planner
20120 E. Mainstreet Parker, CO 80138-7335
303.805.3327 www.parkeronline.org





Right of Way & Permits

1123 West 3rd Avenue
Denver, Colorado 80223
Telephone: **303.571.3306**
Facsimile: 303. 571. 3284
donna.l.george@xcelenergy.com

November 21, 2018

Town of Parker Community Development Department
20120 E. Mainstreet
Parker, CO 80138

Attn: Paul Workman

**Re: Parker Homestead A1 - Indoor Archery and Gun Range - 3rd referral
Case # Z18-004**

Public Service Company of Colorado's (PSCo) Right of Way & Permits Referral Desk acknowledges the comment responses for **Parker Homestead A1 - Indoor Archery and Gun Range** and reminds the property owner/developer/contractor to complete the **application process** for any new natural gas service, or modification to existing facilities via FastApp-Fax-Email-USPS (go to: <https://www.xcelenergy.com/start, stop, transfer/new construction service activation for builders>).

Should there be any questions with this referral response, please contact me at 303-571-3306 or donna.l.george@xcelenergy.com.

Donna George
Right of Way and Permits
Public Service Company of Colorado



August 7, 2018

Paul Workman
Town of Parker Community Development Department
20120 E. Mainstreet
Parker, CO 80138

RE: Parker Homestead AMD1, Z18-004
TCHD Case No. 5087

Dear Mr. Workman,

Thank you for the opportunity to review and comment on the Use by Special Review for an indoor archery and gun range located at the southwest corner of Chambers Road and Double Angel Road. Tri-County Health Department (TCHD) staff has reviewed the application for compliance with applicable environmental and public health regulations and principles of healthy community design. After reviewing the application, TCHD has the following comments.

Lead Ammunition

Lead can be a hazard to humans if ingested or inhaled. To mitigate exposure to lead, TCHD recommends the applicant develop procedures for people who may touch bullets or who may be exposed to lead dust including encouraging staff to wear protective coverings over their hands when handling lead bullets and encouraging handwashing after exposure to lead and before eating or drinking. More information can be found here: <https://www.osha.gov/Publications/OSHA3772.pdf>.

Noise

Regular exposure to elevated sound levels can have a negative impact on both physical and mental health by increasing the risk of stress, hearing impairment, hypertension, ischemic heart disease, and sleep disturbance. Due to the nature of indoor gun ranges, employees and customers will be subjected to elevated noise levels. TCHD recommends that the applicant consider how noise mitigation measures and personal protective equipment could aid in the mitigation of noise. More information can be found here: <https://www.cdc.gov/niosh/docs/2009-136/pdfs/2009-136.pdf?id=10.26616/NIOSH PUB2009136>

Please feel free to contact me at 720-200-1585 or aheinrich@tchd.org if you have any questions on TCHD's comments.

Sincerely,

A handwritten signature in blue ink, appearing to read "Annemarie Heinrich".

Annemarie Heinrich, MPH/MURP
Land Use and Built Environment Specialist

cc: Sheila Lynch, Keith Homersham, TCHD



February 1, 2018

Paul Workman
Town of Parker
Community Development Department
Town Hall
20120 East Mainstreet
Parker, CO 80138

RE: Proposed Indoor Gun and Archery Range and Training Facility Site Plan at Parker Homestead (Heirloom) Commercial

Dear Mr. Workman;

On behalf of Douglas County School District (DCSD), we have a couple comments regarding this application that we would like to resolve prior to approval.

The applicant proposes an indoor gun and archery range and training facility adjacent to Echo Park Stadium in the Town of Parker. The property is located within Parker Homestead (Heirloom) Commercial at Chambers and Double Angel and is owned by Jim Marshall and Tom Brinkman. The project is proposed to be constructed by Back 40 Range, LLC and owned and operated by Rion Buswell.

It is our understanding that you have suggested a meeting between DCSD and the applicant early in the process to discuss this application to make sure any questions DCSD has can be answered in advance of the referral period. On January 19, 2018, DCSD met with the applicant to review and understand the scope of this project, and provided comments.

Be advised that DCSD has no objection to this project provided the following provisions are satisfied: "Pursuant to Section 13.04.200 of the Parker Development Code Land Development Ordinance Uses Permitted By Special Review proposed uses:

- "(1) Will be in harmony and compatible with the character of the surrounding areas and neighborhood,
- (7) Will not cause significant air, water or noise pollution, and
- (9) Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the Town."

Sincerely,

SCO Consulting, LLC

A handwritten signature in black ink that reads "Steve Ormiston". The signature is written in a cursive, flowing style.

Steve Ormiston
Consultant to DCSD

Project Name: Parker Homestead AMD1 - USR Indoor Archery & Gun Range

Project Number: USR for "Amusement & Recreation Facility"

Jurisdiction: Town of Parker

Date Received: 01/31/2018

Due Date: 02/28/2018

Addressing Comments:

Based on the full movement access and emergency service provider requirements, proposed addresses for this site will use Pelican Street.

The proposed address for the primary building is 15185 Pelican Street. This address is not to be used for any purpose other than for plan review with the building and fire departments until after this project is approved. This address is subject to change and the Town of Parker and Douglas County will not reimburse any funds spent using this proposed address should the address require a change.

Future proposed buildings will either be issued unique street addresses or they will use the same street address as the primary building with building designators (A, B, etc.) based on E911 provider requirements.

Engineering Comments:

No comments

Planner Comments:

Thank you for providing the opportunity for Douglas County Community Development to provide comment. Douglas County Planning Services has reviewed the project for consistency with the Town of Parker and Douglas County Intergovernmental Agreement (IGA) and Comprehensive Development Plan, 4th Amendment. The proposal is within Region 3 of the Town Urban Growth Area and is required to comply with Section 5.3.1 through 5.3.15 of the IGA. Following review of the development requirements within this section, the proposal appears compliant with the applicable IGA requirements for development within this portion of the Urban Growth Area.

February 15, 2019

Mr. Paul Workman
Town of Parker Planning
20120 East Mainstreet
Parker, CO 80138

Re: Back 40 Range Project Narrative

Dear Paul,

Thanks so much for taking the time to meet with us regarding the proposed Back 40 Range, LLC education and training center, archery and gun range at the commercial corner on Chambers and Double Angel Road.

We have reviewed the Parker Homestead PD Guide and PD Development Plan. The PD Development Guide (1st Amendment) was recorded on 9/9/2011 and classifies the approximately 8.5-acre corner (PA-1) as a Mixed-Use Neighborhood Center. Section 6 of the Development Guide is entitled "Include Mixed-use Development and Provide Choices." This section states that the purpose of a Mixed-Use Development is to:

"Integrate different land uses and varied building types to create vibrant pedestrian friendly activity zones and to establish development patterns (and options) for future phase development."

"Provide variety in housing, shopping, recreation, and transportation to appeal to residents and visitors in different stages of their lives and at different socio-economic levels."

Back 40 Range, LLC proposes to construct an education and training center that consists of an archery and gun range on approximately 2.5 acres adjacent to Newlin Gulch, on the south side of the commercial parcel. The project will be serviced by a right in/right out from southbound Chambers Road, with a flow-through traffic pattern that ultimately exits onto Double Angel in a shared access with the Lennar residential community to the south.

The building will be approximately 25,000 square feet and will be approximately 70' x 350' dimensionally, with shape/undulations necessary for aesthetic quality. The interior will be composed of a retail component, an archery range, (10) 25-yard pistol range bays, and (4) 100-yard rifle bays. The facility will also have two rooms that allow shooter training for club members and members of the law enforcement community.

The retail component of the facility will include archery products and accessories, firearm products and accessories, targets, clothing items such as t-shirts and sport-related clothing, and snack food. The facility will not include liquor, nor will it have a full kitchen.

The facility will be owned and operated by local Parker resident Rion Buswell, who is working with consultant Stuart Mullen, owner of Range Development Services, LLC on the concept, building, site layout, retail component, construction, and startup phase.

Back 40 will operate primarily as a training and education center for its club members, members of the law enforcement community, and the general public. While both the retail and shooting components of the facility are open to the public, Back 40 functions with the primary goal of elevating new prospects to the full club membership level. Back 40 is also very different than many "heavy" retail and service uses in that a significant portion of the approximately 25,000 square foot building is in range areas, in other words, the bays and lanes where club members are not permitted. Customers will be permitted in the retail area, classrooms, restrooms, and the "Get Ready" areas of the shooting lanes, but much of the building is uninhabitable space because that is where range activity is occurring.

The significant amount of uninhabitable space is important to the parking ratio discussion. Back 40 Range has been submitted as a Use by Special Review, and parking requirements are typically not determined by the Town until the Site Plan submission. In an attempt to comply with the Town's request for 30%-level Site Plans, we addressed some of the general concepts, with the realization that any details will be agreed upon with the Town in future more detailed submittals. We would like to point out that a strict interpretation of the parking ratio as related solely to building square footage would be inappropriate for this use, as only a portion of the floor area of the building is habitable space, with a large percentage of the building being shooting lanes. We fully understand that this is a topic of discussion for Site Plan.

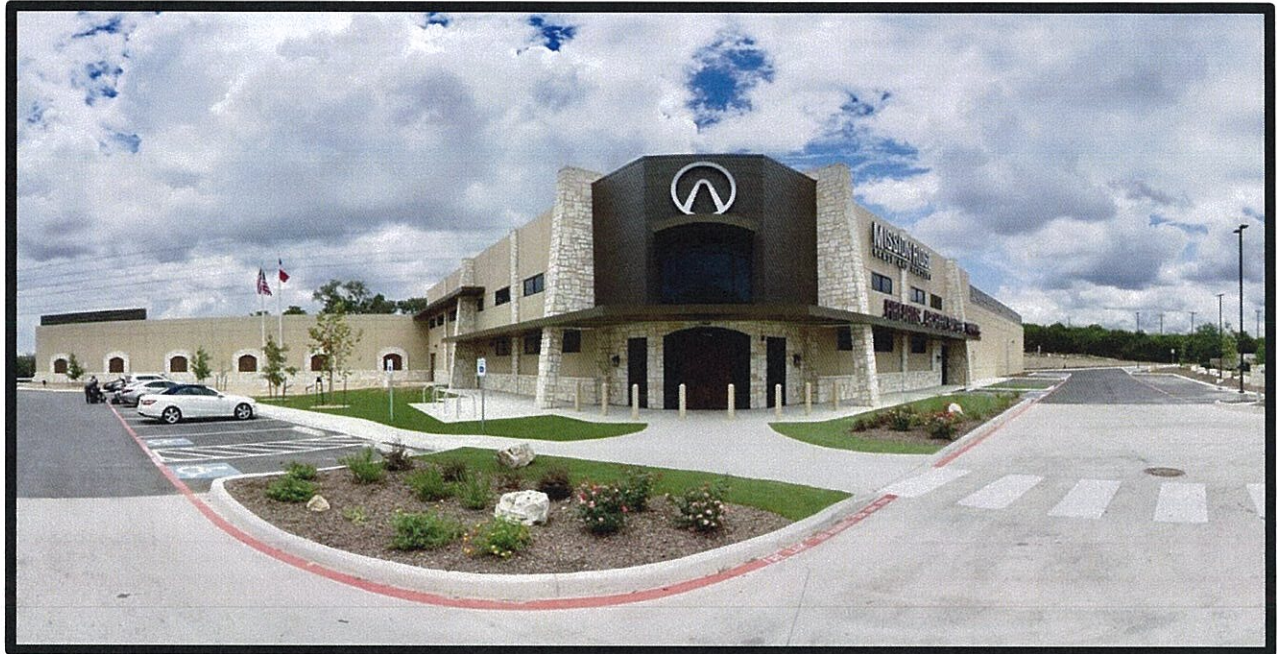
The project is also unique in that it is located on a site that is truly buffered on all sides from residential users. The site is buffered to the south by a regional detention pond and approximately 200 feet of open land. To the west the site is buffered by the Newlin Gulch open space and nearly 400 feet of open land. To the north, the site is buffered by Chambers Road, and then a regional detention pond and tract, or approximately 540 feet of open land. Finally, to the east, there are additional retail sites, Double Angel Road, and the Douglas County stadium. While the building will be designed to limit sound, it is nice to know that we have large buffers from residential uses on all sides as an additional measure of noise protection.

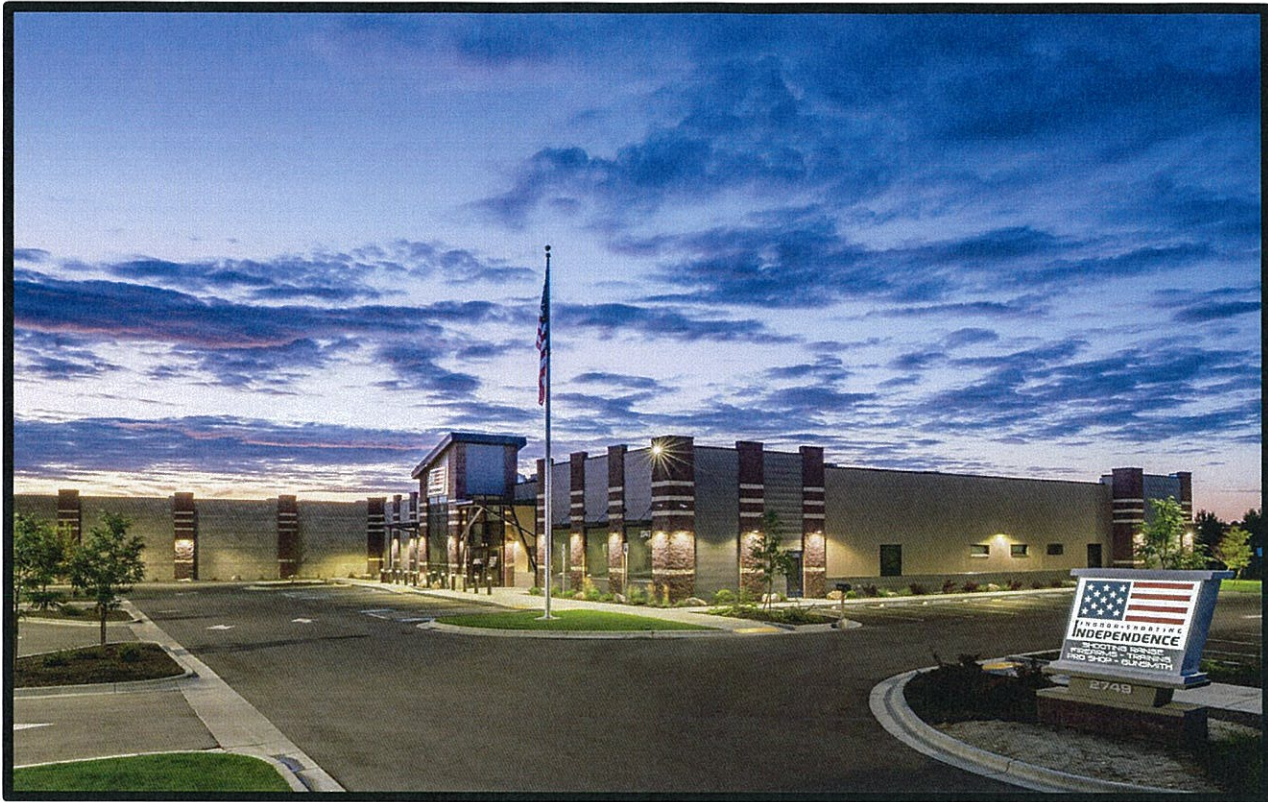
This facility will be constructed with solid masonry walls to increase sound abatement. Furthermore, Back 40 will outfit key areas of the range closest to the firing line with additional sound abatement materials, such as padding, sheetrock, and sound dampening by way of example. This will further ensure shooters are comfortable on the firing line and will eliminate disruption to both patrons receiving classroom training and to those in the retail areas of Back 40. We are taking a comprehensive approach to sound mitigation throughout all areas of the building. Additional details can be found in the sound abatement information attached.

Our full sound abatement standards ensure that sound is minimized at the building's exterior, where it can disturb neighbors and adjacent users, and further calls for sound to be managed within the building so that other shooters, clients in the retail area, and learners in the classrooms can conduct their conversations in a normal voice and that their hearing is protected. In order to accomplish this, each building component will be carefully selected by the architect, the development team, and Wave Engineering. As mentioned previously, these items can include, but are not limited to: sound damping

insulation, sheetrock, cinder blocks, and rubber padding to name some examples. Additional information can be found in the supplemental information provided. Certain areas within the building, such as the shooting bays, receive special attention for sound mitigation, as supplemental information details.

The following pages show photos of similar facilities that have been developed across the country





Town Council may approve a Use by Special Review subject to reasonable conditions which include, but are not limited to, the requirements that the proposed use:

- (1) Will be in harmony and compatible with the character of the surrounding areas and neighborhood;
- (2) Will be consistent with the Town Master Plan;
- (3) Will not result in an over-intensive use of land;
- (4) Will not have a material adverse effect on community capital improvement programs;
- (5) Will not require a level of community facilities and services greater than that which is available;
- (6) Will not result in undue traffic congestion or traffic hazards;
- (7) Will not cause significant air, water or noise pollution;
- (8) Will be adequately landscaped, buffered and screened; and
- (9) Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the Town.

Criteria 1: Will be in harmony and compatible with the character of the surrounding areas and neighborhood.

The Applicant feels strongly that the Back 40 Range is in harmony with the adjacent uses surrounding Heirloom/Parker Homestead and strives to be an amicable neighbor who integrates with the surrounding area and neighborhoods. We believe that the Back 40 Range will indeed complement the existing sporting facilities adjacent to the proposed site. We recognize that the premise of the Back 40 Range may be initially concerning to some residents, but the applicant will strive to be a family-friendly destination that enhances the sporting destination that the Rueter-Hess Reservoir corridor has become for the Town of Parker.

We are excited to play a part of the neighborhood and surrounding area by offering services that are currently not available in Parker. First, an additional sporting option at Chambers/Double Angel will help solidify the area as a destination for Parker residents and metro Denver area residents alike. By nature, sports tend to engage entire families, which is important to a neighborhood feel. Back 40 Range intends to be an inviting facility to further promote time spent together. Also, the socializing area of Back 40 Range lobby and classroom space provides an opportunity for personal interactions with neighbors. Additionally, our heavy landscaping is designed to include an inviting rest spot for trail users. While this inclusion might not benefit Back 40 Range directly, we feel that it can be an important part of proving that we intend to be an upstanding and approachable piece of the neighborhood. To this end, we would like to note specifically how the Back 40 Range is compatible:

- a) Back 40 Range sits immediately adjacent to the 5,500 seat Echo Park Stadium, which is operated by the Douglas County School District. Stadium events occur both during daytime and at night and include the lights, amplified sound, noise, and traffic associated with seating thousands of spectators. Further, Douglas County School District has submitted a response to the Town's solicitation for input regarding this development that did not raise any objections to the development of Back 40 Range. Back 40 hours of operation will be similar to normal retail hours found in other Parker establishments, typically 9am to 9pm.
- b) Only a few hundred feet away are the Double Angel ball fields, which include lights, amplified sounds, noise, and traffic associated with the two lit ball fields. Parking includes over 300 identifiable spaces. Our facility will not have this same outside environmental impact but will create another venue for these sports-minded individuals to patronize in the Town of Parker.
- c) Rueter-Hess Reservoir is being billed not only as a critical source of water for Parker's growing population, but also as an outdoor recreation hotspot that features boating, fishing, picnicking, outdoor archery range, biking, and hiking. Back 40 Range offers an additional alternative for off-season sports enthusiasts to explore in the area.

As the above statements are facts of the neighborhood, Back 40 will provide yet another sporting facility in the area. There are currently over 50.3 million shooting sports participants in the United States, as stated by National Shoot Sports Foundation (N.S.S.F.) Industry Intelligence Report: 2016 Edition. The industry has continued to grow at least 8% year over year, according to NSSF. Additionally, the USA Shooting Sports website states:

"There are many programs available through the USA Shooting and partner organizations. Where a youth may not have excelled in other sports, shooting sports do not require a participant to be the fastest, tallest, or strongest. It does require—or will teach—patience, determination, organization skills, mental and physical control, safety awareness, goal setting, problem-solving, and good citizenship/sportsmanship."

The archery component continues to show growth through programs similar to the firearm shooting sports such as Junior Olympic Archery Development (J.O.A.D).

Parker has worked hard for the past 20 plus years to become a premier recreation town. This is clearly evidenced by the extensive and well thought out trails and open space systems which allow citizens to traverse the entirety of the Town. Heirloom/Parker Homestead is at the confluence of a number of these amenities, including the East/West regional trail system that runs eastward to Canterbury, the Newlin Gulch trail system installed by the developer of Heirloom, the Chambers Road/Double Angel sidewalk connections, and the extensive trail system associated with Rueter-Hess Reservoir. We look forward to being an integral piece of this vision for the Town. Back 40 can become an additional stop along these paths for trail user to refill water bottles or sit and recuperate on the outdoor patio.

Back 40 Range will strive to be a family-friendly destination, which is compatible with the demographics of the surrounding neighborhoods. While we recognize that being a good neighbor is imperative to the success of Back 40 Range itself, this view also extends from our personal philosophies about the type of community that we would all be proud to live in. The following strategies will be used to ensure that we meet the goal of being compatible with the surrounding community:

- a) The aesthetics of the building are designed to blend with other retail buildings commonly found in Parker. We have proposed an attractive 'modern mountain-style lodge' theme. We are proud of the building design, which does not have a strip-mall feel, but rather is unique and inviting.
- b) We will work with local civil services groups to promote community engagement through discounted services at the range. Additionally, the lounge is available for civil servants to complete paperwork or other aspects of their employment, if they choose. We also plan on supporting Scouts, 4H, J.O.A.D., USA Shooting, and other similar youth groups in their efforts toward responsible teachings. This is compatible with the teaching of football, baseball, and soccer.
- c) The Back 40 Range anticipates employing local community members. This is another benefit that will allow residents to live, work and play in their local community.
- d) We will host a monthly open-house/coffee hour with food to facilitate conversation. This will allow Back 40 to hear different views from around the neighborhood about local and national topics pertaining to the industry, and will help Back 40 develop classes to address the issues raised during these discussions. We will invite people to use Back 40 as a gathering space, rather than the normal retail space that has a come and go type atmosphere.

Criteria 2: Will be consistent with the Town Master Plan – Community/Neighborhood Center.

Both the approved PD Guide for the property and the Town's Plan call for a mixed-use project that is adjacent to residential, has excellent traffic circulation, and has walkability if desired. We have designed all elements of Back 40 Range with the Guiding Principles of the Town of Parker Master Plan in mind, including the Neighborhood Center Designation, and address them individually here:

Back 40 will be consistent with the Town's Master Plan by providing community members with unique retail conveniently located on their way home from work. In addition to the retail we will provide personal services in the form of safety and training for archery and firearms with hands-on classes. This further goes toward adding a value of yet another recreational venue in the area. During peak hours of

operation, a local food truck will be invited to utilize the area for the walk-up convenience of dining with the added value of menu rotation provided by different trucks in rotation.

“As we grow, we will strive to preserve the attributes of our unique, hometown character and community identity, the beauty of our natural environment, and the strengths of our neighborhoods while lessening the adverse effects of growth.” (Town Master Plan)

For the owner, the name ‘Back 40’ was chosen because it conjures up memories of childhood and growing up in a small town where a lot of time was spent playing in the Back 40. We fully embrace this Guiding Principle and intend to exemplify this hometown character in both our building and our interactions with our clients and neighbors. We feel that our landscaping design and overall business approach will improve the current natural environment and mitigate as much as possible any detrimental effect of the development.

Furthermore, applicant has made extensive efforts to assure that the surrounding neighborhood will not be impacted by noise or air quality issues. These topics were fully addressed in the following documents:

- Wave Engineering *“Baseline Ambient Sound Level Measurement Report”*
- Carey’s HVAC Lead Letter
- Carey’s HVAC *“Range Ventilation Standards”*

“Architectural and land use design is fundamental to our identity. As our community grows, special attention will be given to promoting high quality residential and commercial development that reflects aesthetic excellence.” (Town Master Plan)

We take great pride in the building design, which will resemble a modern and inviting mountain lodge, and will immediately be recognizable not only as Back 40 Range but as an iconic structure in Parker. We will work with the Town to ensure that all building guidelines are met and surpassed to uphold these high standards.

“The long-term economic well-being of the Town is fundamental to its future. Therefore, we will encourage a variety of employment opportunities, and promote unique, local businesses.” (Town Master Plan)

We are excited to be a locally owned business by a Parker resident! In addition, we plan to hire local employees including military Veterans, women, and minorities. Back 40 Range holds the same views as the Town as to the importance of local businesses and plans to use other local businesses in the development and building of the Range. Back 40 Range is a unique opportunity for the Town of Parker to expand its recreational offerings and we appreciate the Town's promotion of such local businesses.

Retail tax generation is also critical to the Town of Parker, as retail tax helps fund the quality of life that all Parker residents have become accustomed to. Back 40 will contribute a projected 5-year sales tax revenue of \$1.1M and a projected 10-year sales tax revenue of \$2.8M. Back 40 will grow jobs close to home, keeping tax dollars and employment within the Town limits.

Criteria 3: Will not result in an over-intensive use of land.

Back 40 is a low-intensity user. As mentioned above, a significant portion of the building is uninhabitable because it falls within shooting lanes. We also anticipate that, because of the amount of unoccupied space, Back 40 will also have a much lower parking ratio. Required parking spaces will be finally

determined with the more detailed future Site Plan submittal. Of the approximately 25,000 square foot building, approximately 10,000 square feet will be unoccupied. Back 40 estimates that approximately 65 to 75 parking spots will be needed, based on the maximum number of employees working plus one spot per customer using the location. We are prepared to adjust parking spots as needed during the Site Plan approval process.

We understand that the Back 40 building will need to fit on the property and comply with the bulk standards contained in the Parker Homestead PD Guide. We also understand that a detailed analysis will be performed when the more detailed Site Plan is formally submitted for the project. We have evaluated the conceptual site plan and have confirmed that the proposed use will conform to Sec. 1-50 of the Development Standards. The maximum building height is less than 35 feet and will meet or exceed the following Building Setbacks:

- 1) From Chambers Road: 75 feet min, avg. 100 feet
- 2) From Double Angel Road: 20 feet
- 3) From Newlin Gulch 100 Year Floodplain: 20 feet
- 4) From South Property line: 20 feet
- 5) From Internal public streets: 15 feet
- 6) From Internal private drives and parking: 10 feet
- 7) Between structures: Per Building and Fire Code

Criteria 4: Will not have a material adverse effect on community capital improvement programs.

We do not anticipate any unusual impact on the capital improvement program as a result of this use.

Criteria 5: Will not require a level of community facilities and services greater than that which is available.

The site will require a curb cut on Chambers Road. That curb cut will be installed and paid for by the master developer. Back 40 will be outfitted with a sprinkler system and it will not require any unusual fire or police protection. Utilities serving the site are in place and easily accessible. Sanitary sewer service is provided via an existing sewer stub located at the west side of the property. Water service is provided by two stubs, one on the west side of the property and the other on the east side coming out of Double Angel Road. Site detention is provided by the existing pond south and adjacent to the site and the existing pond north of Chambers Road. These two ponds provide 100% of the required capacity. Dry utilities such as gas, electric and fiber optic are located around the site on Chambers Road and Double Angel Road. The roadway network surrounding the site provides service and no offsite improvements are necessary.

Criteria 6: Will not result in undue traffic congestion or traffic hazards.

The Developer has been intimately involved with the development of the Traffic Plan for more than a decade. We have provided an update to the Traffic Study which David Evans and Associates completed a number of years ago at the Annexation and PUD stage. Please see attached Traffic Memorandum entitled "*Parker Homestead Commercial Traffic Analysis*", dated October 24, 2018.

Staff will also review our Annexation Agreements and multiple Subdivision Improvements Agreements to confirm that we have fulfilled our previous obligations, have constructed the agreed upon street improvements, and have generally fulfilled all of our Annexation and SIA obligations related to traffic,

streets, sidewalks, and trails. We recognize that the Town may ask for an additional SIA to cover any items that have arisen in the interim.

The proposed use is a low traffic generator, and as such, we do not anticipate traffic congestion or traffic hazards related to this proposal.

Criteria 7: Will not cause significant air, water or noise pollution.

To address the concerns of neighbors, and in compliance with the Town UbSR criteria, the applicant is committed to two sound abatement conditions/stipulations to the UbSR approval obligating us to engage Wave Engineering and implement its recommendations to improve the building and its systems so that:

- a) Sound from firearm activity is below 45 dB measured 25' from the Back 40 property line onto the adjoining detention pond serving the commercial development as stated below. As a comparison to this sound level, the average conversation is 60 dB, as referenced in <https://www.noisehelp.com/noise-level-chart.html>, and
- b) In conjunction with item a) above, ensure residents' continued peaceful enjoyment and use of their property by committing to improvements to its facility so that no gunfire is heard at an adjacent residential property line.

The above commitments shall be enforced by first measuring the existing ambient sound on site with a sound level meter of standard design and quality and characteristics established by the American National Standards Institute. The sound study produced by Wave Engineering has established that the ambient daytime noise level at Location #1 is 52 dBA and at Location #2 is 56 dBA. Back 40 shall then design the building to ensure that firearm sound levels measured with the sound meter set on the "A" weighted scale and on Fast or Impulse response are not heard at the adjacent residential property lines. The resulting building improvements (additional information below) shall ensure that gunshots do not cause the measured sound level to rise in the presence of the ambient sound level during normal operating hours at the residential property line.

The end result is that residential property owners will continue the quiet enjoyment of their property.

Wave Engineering's input will allow us to model a number of items, including but not limited to the following, to ensure our use is compatible with commercial Uses by Right that are currently permitted for the commercial corner. The planned sound mitigation program includes:

- Wall design
- Roof deck design
- The design configuration of the wall and roof deck connection
- The use of rubber bullet traps, rather than steel traps
- Use of acoustical enclosures and sound barriers
- Prohibiting external building wall penetrations (doors, windows, vents, etc.) directly to a range bay (which are a necessity with a steel trap)
- Prohibiting the use of ground-mounted mechanical HVAC units

- A four-sided parapet wall to screen rooftop equipment
- The use of sound abatement material inside the range bays, as provided in this submittal and titled "Sound Abatement Materials."
- A sound dampening system within the dedicated range HVAC mechanical system

After the UbSR is approved, and prior to engaging Back 40's project architect, the Wave Engineering baseline field report will be used as a guide in the design process to address these sound abatement commitments.

Examples of shooting ranges that have negatively impacted adjacent residential property in other communities around the country, as well as articles about the impacts of sound, have been presented to our team by neighbors adverse to our project. **In each of the example nuisance instances, those facilities either failed to incorporate the majority, and possibly all the items bulleted above, or the articles were, in fact, referring to outdoor shooting ranges, which obviously are not comparable nor applicable.**

Staff has asked for clarification as to whether or not ground-born vibrations will occur as a result of the Back 40 range. There will be no ground born vibration created by this facility over and above that associated with a typical retail establishment.

Applicant has agreed to test gunfire noise from the range concurrent with opening the range. Applicant is open to continuing discussions with Staff regarding an additional one-time monitoring of noise at the Back 40 Range at a mutually agreed upon time after opening - within the first 12 months of operations being completed. This monitoring will be used to confirm that the noise mitigation efforts of the design and architectural teams have met the goals of the Wave Engineering study. This additional noise study is meant to assess the impacts of indoor noise (gunshots) exiting the building, not the sound of traffic, HVAC units, doors, etc. Applicant is open to taking corrective measures if the target noise levels are not being met.

Criteria 8: Will be adequately landscaped, buffered and screened.

The building will be designed by a professional architect, and landscaping will be designed by a professional landscape architect. All will be per Town of Parker Code.

Back 40 Range is willing to employ multiple methods to mitigate sound, view, and lighting concerns that adjacent neighbors have brought to the Town's attention. Please see the detailed responses above, but additional strategies may include the construction of berms and planting on the side of the building adjacent to the southern neighbors. While this is a Site Plan level detail, we will commit at the UbSR stage to exceeding landscaping requirements to ease neighborhood concerns. We have prepared a conceptual cross section with this revised submittal depicting how berms and landscaping can be used to screen the project from the southern neighbors.

Criteria 9: Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the Town.

In addition to the information within this analysis, Back 40 Range, at its core, has safety as its priority.

Currently, no facility like Back 40 exists in Parker, forcing residents to travel greater distances to reach Denver area range facilities. Tax revenue (from property and sales) and jobs (approx. 10 full time and +30 part-time) will be added for the benefit and welfare of Parker residents.

Knowing how to safely operate a firearm, shoot a gun for sport, hunting or personal defense, carrying concealed, possessing a firearm at home, transporting one in your vehicle or on your person, and understanding legalities and liabilities is a big responsibility. Area residents' welfare will improve from the availability of shooting sports training/education at Back 40 as they become more proficient, knowledgeable and confident in their ability to safely own and handle firearms and bows.

The instructors of this facility will receive unifying training prior to the grand opening that provide it with a unique training and educational baseline and offering to residents. Instructors and Range Safety Officers will be knowledgeable and experienced in industry standardized training components as directed by the nationally accredited NRA Instructors Certification requirements. The result is that Back 40 will contribute to the welfare of Parker inhabitants by offering and reinforcing safety at all levels of skill to all comers.

As mentioned previously, standard operating procedures will be used to address how firearms are handled while shooting, training, cleaning, and maintaining, transporting to and from the range, on your person, and safe storage at home.

Studies have shown that similar businesses to Back 40 do not have a negative impact on the neighborhood, such as an increase in robbery, burglary or violent crime. Peer-reviewed studies have shown that, in stable socioeconomic areas such as Parker, crime does not increase. In fact, the addition of more Federal Firearm License (FFL) holders has actually decreased crime in that area (Wiebe *et. al.*, *Homicide and geographic access to gun dealers in the United States*, BMC Public Health, 9:199, 2009; Plerhoples Stacy *et al.*, *Neighborhood-level economic activity and crime*, Journal of Urban Affairs, 39: 225-240, 2017).

The building design will not be completed until after the UbSR is complete, and as such, we have not yet drafted the operating standards for Back 40 Range. That said, the following is a high-level summary of the key items that will be addressed:

- 1) Once we are under construction, as a deterrent, and to ensure safety, for security reasons there will be certain security features of the facility we intend to make public through a series of press releases. Other measures will remain undisclosed to avoid aiding would-be criminal intentions.
- 2) Facility maintenance, cleaning, and recycling will follow all applicable industry standards. The Five- Star rating system recently revamped by the National Shooting Sports Foundation is THE standard for indoor shooting ranges, and we will be following its recommendations. EPA and OSHA compliance will be maintained with scheduled testing, cleaning, and maintenance, with all reports maintained and preserved in writing. Each employee, as per their job responsibilities, will be trained to deploy these procedures and fulfill these tasks.

- 3) OSHA requires a safe work environment for employees which we will test for upon opening to establish a baseline of data on the Range prior to usage. Each employee will be required to produce written reports documenting their maintenance, cleaning and recycling activities.
- 4) The EPA regulates environmental matters. Please see the documentation from our specialized range HVAC contractor, who has been involved in over 800 ranges around the world, outlining how the air exiting this facility will, in fact, be cleaner than the air going into it (see attached). Also, note that only 25% of the air in the range will be exhausted from the building, while 75% will be reused inside the range. The filtration systems do such an effective job of providing clean air that range users will breathe it with no ill effects. See attached letter from our Range HVAC subcontractor for more information about the cleanliness of the air that enters and exits the facility.
- 5) Back 40 will be designed using the standards necessary to achieve the NSSF's Five-Star designation mentioned above. Those standards are attached for your reference. There are less than 30 Five-Star range facilities in the U.S. because of the overhaul of the Five-Star requirements which the NSSF completed in 2016. Achieving this designation is costly, but we are excited and committed to completing the facility in a manner that allows us to earn this coveted designation.

Below is a list of items that will be addressed through Standard Operating Procedures (SOP's) that focus on the specific physical layout and building conditions, the sales process, and services processes provided by Back 40 as well as the protocol for the various tasks employees will be charged with carrying out daily, weekly, and monthly. The SOP documents will be compiled by management during construction of Back 40 Range. They will be tailored to the Back 40 facility specifically and will contain proprietary information/strategies. They include but are not limited to:

- Firearms safety
- Employee training and communications plans
- Firearms (customer) – sale process and policies, 4437's, bound book, background checks, etc.
- Gunsmith procedures - check-in / out (implications on FFL and bound book)
- Security
- Inventory management
- Range check in / check out
- Food and drink policy
- Range (and retail) maintenance and monitoring for the highest level of service (LOS)
- Marketing plan / strategy
- HR matters / employee handbook
- HVAC maintenance requirements
- Monitoring employee Blood Lead Levels (BLL)
- Prohibited, limited, modified or accommodated users of the range
- Lead standards training - what does it affect, symptoms of exposure
- Hazardous communications – SDS's
- ATF, OSHA, compliance, training and risk management
- Procedures and incident report for injuries/slip and falls, etc.

- Natural disaster procedures – tornado/flood, etc.
- Safety rules / range waiver and criteria for range usage
- Range operations - opening the facility, closing the facility, range commands
- Scheduling and reservations
- Training classes
- Accounts receivable and payable
- Audit procedures
- Record retention and file management
- Employee responsibilities
- Planning
- Maintenance and inspections
- Customer firearm procedure for entering an existing facility
- Brand / brand equity
- Sales and rentals
- Employee benefits
- First aid and Emergency Procedures
- Recycling and waste management
- Employee health and safety practices
- Storing of materials and supplies
- Information systems management

Conclusion:

If Back 40 Range is not constructed on the site, retail shops will be constructed on this property. The UbSR process insures that neighbors have their concerns more favorably addressed than would otherwise occur during a standard Site Plan approval process, which is subject to only administrative approval. Use by Right buildings would almost certainly include multiple utility and service doors, noise and visual sightlines from loading docks, and 24/7 delivery truck traffic immediately adjacent to the southern residential area. Behind-the-building parking and the associated headlights of such a scenario are also a certainty, as is dumpster storage and trash truck noise. This is not the case with the Back 40 plan. The southern façade does not contain loading bays, parking, or delivery truck drive isles; only berming and landscape plantings designed to negate the transition between residential and commercial uses.

In harmony with Parker’s **“Think Local, Buy Local”** campaign, Back 40 Range will also provide an opportunity for Parker to capture retail sales tax revenues currently lost to other surrounding communities. As Parker’s current campaign highlights:

“Think Local. Buy Local. #ChooseParker”

- Keep Tax Dollars in YOUR Town
- Grow Jobs Close to Home
- Connect With Friends and Neighbors
- Help Your Community Thrive

By bringing the retail sales associated with this unique enterprise to Parker, Back 40 will contribute a projected 5-year sales tax revenue of \$1.1M and a projected 10-year sales tax revenue of \$2.8M. Back

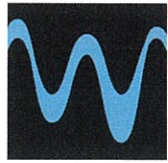
40 will grow jobs close to home and provide a venue for friends and neighbors to gather, helping our community to thrive.

The retail sales conducted at this facility are unlikely to be replaced by on-line transactions, given the nature of the products offered for sale. Archery and firearm sales typically include the consumer directly interfacing with the retailer for demonstration and personal advice, creating a lasting relationship and securing repeat business. This is an opportunity which is simply not available over the internet.

Overall, we feel that Back 40 will be a valuable business added to the Parker community and provide unique services that are not currently offered. This Narrative addresses as many of the concerns and comments submitted through the community open house and emails sent to the Town as are practical to address in a UBSR. Back 40 will not contribute to air, water, or sound pollution through its custom-designed building, and is committed to being a good neighbor. Research has shown that Back 40 will contribute to a safer town, and we will act as a neighborhood gathering spot for the benefit of the greater community. We are excited to grow a relationship with our neighbors and The Town of Parker as the Back 40 Range development is realized.

Sincerely,

The Back 40 Range, LLC team



WaveEngineering

Acoustics, Noise & Vibration

February 14, 2019

Mr. Rion Buswell
PO Box 293
Parker, CO 80134

Re: Back 40 – Preliminary Acoustic Report
Wave #1819

Dear Rion,

This report summarizes Wave Engineering's baseline sound level measurement procedures and results. It also discusses the potential sound and vibration impact of the proposed Back 40 shooting range on sensitive neighboring land uses. A detailed evaluation of the shooting range building has not been performed yet as the building has not been designed. *The report has been revised to address the comments from the Town of Parker Planning.*

Executive Summary

Wave Engineering has evaluated the potential sound and vibration impact of the proposed Back 40 shooting range on sensitive neighboring land uses, including residential properties. The intent of this study is to determine if the shooting range facility can be compatible with surrounding land uses from a sound and vibration standpoint.

The Town of Parker does not have an objective ordinance that sets allowable sound levels or vibration levels. In the United States, a common sound level limit at a residential property line is 50 dBA at night (55 dBA during the day). For impulsive sounds such as gunshots, a "penalty" of perhaps 5 dBA is sometimes applied. In this case, the penalty would reduce the limit to 45 dBA for gunshots. This is the approach of the State of Colorado Revised Statute (CFR 25-12) which sets a 50 dBA nighttime limit for residential properties (55 dBA daytime) and a 5 dBA penalty for impulsive noise. However, the state statute specifically exempts sport shooting ranges.

Since there is a buffer zone between the commercial property and the residences, the state commercial limits would be applied to the other commercial properties being developed around the shooting range. The CFR 25-12 limit for Commercial zones is 55 dBA at night and 60 dBA during the day. This is measured at a distance of 25' or more beyond the commercial property line. Since the Back 40 range is part of a larger commercial development, the other commercial

uses will produce noise that will be limited to the commercial limits. This will tend to raise the baseline level above what we have measured before the commercial parcel is developed.

The Back 40 shooting range facility will be designed to reduce the sound of gunshots below 45 dBA at the closest residential properties. The project is also committed to reduce gunshot sound levels to 45 dBA or less at a point 25' beyond the site property line, which is 10 dBA below the State of Colorado nighttime commercial limit.

As part of the sound assessment, Wave Engineering measured ambient sound levels at two locations in the vicinity of the proposed site of the Back 40 shooting range in Parker, Colorado. The purpose of the measurements was to determine the existing ambient levels in the area so that the data can be used as a baseline in the design and assessment of the shooting range itself. Sound pressure levels were measured continuously at two locations from Friday October 5, 2018, to Monday, October 15, 2018. This captured two weekends and five full weekdays. Hourly sound levels were measured at two locations near residential properties near the proposed shooting range. Hourly average, minimum, maximum, and daily average sound levels were measured and the data is included herein. *Daily* average sound levels (L_{DN} and CNEL) were also measured at the request of the Town of Parker Planning. Please note that a glossary of terminology is provided at the end of this report.

The measured sound levels near the closest residences were typically in the range of 35 to 40 dBA during the quietest times of day that the range will be open (10:00 a.m. to 9:00 p.m.), with a few periods as low as 32 dBA. The complete ambient sound level data is provided in graphical and tabular form as part of this report. The building will be designed to reduce gunshot sound levels below these ambient sound levels at the residential properties.

The goal of the range building design is to make the sound of gunshots inaudible at the residential properties. The measured baseline sound levels will be used in that analysis. Whereas the *daily* average sound levels are often used to assess the noise impact of a development on a community, they are not as useful in judging a shooting range because the very short duration of gunshot sound may not even affect the daily average. Instead, we will be using shorter term sound levels measured during lulls in traffic and other quiet times to assess whether or not gunshots will be audible.

The shooting range building has not yet been designed. Wave Engineering will be working on the architectural and engineering team designing the shooting range building. Each building is different and the exact details are not yet determined, but we have identified many design features that can be used to successfully mitigate gunshot sound from the building. The design features could include concrete wall and roof construction, sound absorbing materials inside the ranges, duct silencers in the ventilation ductwork, and rubber bullet traps. These features are outlined in more detail in the report section on Approval Criteria #7. Wave Engineering's

recommendations for these and perhaps other sound mitigation measures will be tailored to satisfy the UBSR requirements.

Wave Engineering does not typically assess ground borne vibration from shooting ranges because it has not been an issue and we are not familiar with any complaints of vibration from ranges. Nonetheless, Wave Engineering assessed the potential impact of ground borne vibration on adjacent sensitive uses at the request of the Town of Parker Planning. Groundborne vibration from the range will be imperceptible at the closest residential property line. The range will use a rubber bullet trap instead of a steel trap, and very little vibration will be transmitted to the ground through the trap or from the sound of the gunshot. The details of this assessment are presented in the Vibration Assessment section of this report.

Once the design of the Back 40 range building is underway, Wave Engineering will recommend specific design measures to mitigate gunshot sound. The project will be designed such that sound levels are below background sound levels with the intent that gunshots are inaudible at the nearest residential properties. In addition, I understand that the project is committed to meet a sound level limit of 45 dBA at a location 25' beyond the project site boundary in the direction of the nearest residences.

Measurement Locations

Figure 1 shows an aerial photo of the project vicinity with the proposed location of the Back 40 range and adjacent homes shown. Two measurement locations were selected to represent the ambient sound conditions around the subject property. The locations were chosen according the following criteria:

- proximity to adjacent residential areas
- proximity to traffic and roads in the area
- availability of access and permission from property owners.

Measurement Location 1 is south-southwest of the Back 40 site, near the closest homes to the site.

Measurement Location 2 is northeast of the Back 40 site, east of South Chambers Road.



FIGURE 1: VICINITY MAP (NOT TO SCALE)

Figure 2 below shows a closer view of the measurement locations.

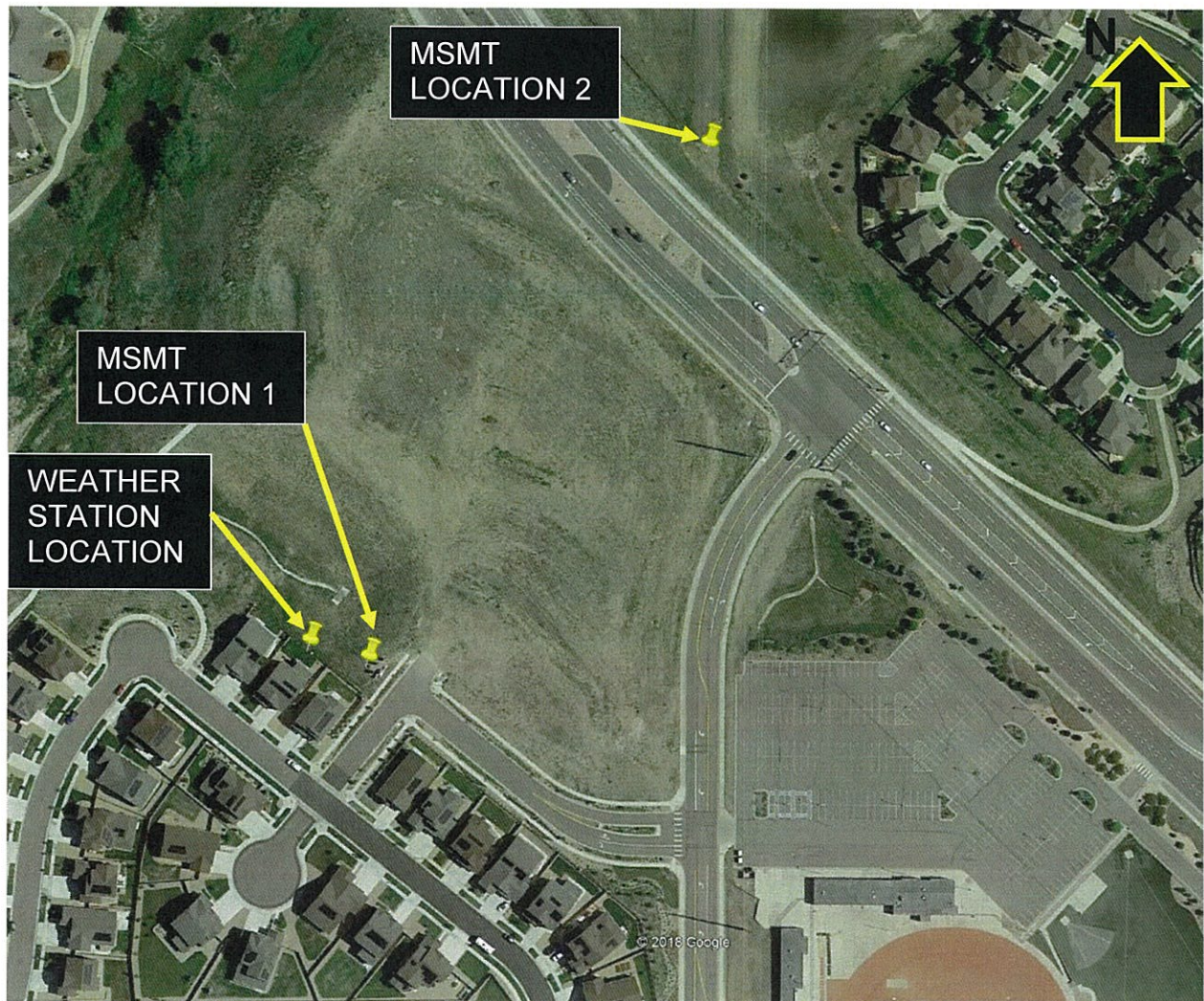


FIGURE 2: MEASUREMENT LOCATIONS (IMAGE FROM GOOGLE EARTH)

Photos 1 - 3 show the two monitors and weather station in place.



PHOTO 1: SOUND MONITOR AT LOCATION 1



PHOTO 2: SOUND MONITOR AT LOCATION 2



PHOTO 3: WEATHER STATION AT LOCATION 1

Test Equipment

Sound levels were measured with the following equipment.

Location 1

Larson Davis Model 831 sound level meter S/N 0003788, Type 1 per ANSI S1.4
PCB preamp PRM831, S/N 029613
PCB ½" microphone Model 377B02, S/N 146359
Larson Davis FitPC-NT / SN 0178

Location 2

Larson Davis Model 831 sound level meter S/N 0001119, Type 1 per ANSI S1.4
PCB preamp PRM831, S/N 026106
PCB ½" microphone Model 377B02, S/N 138652

Larson Davis CAL200 acoustic calibrator, S/N 11780

The two microphones were fitted with a Larson Davis EPS2108 Environmental Shroud, 4" cylindrical windscreen and bird spikes during the measurements. A correction was applied (by the sound level meters) to provide a random incidence response using the free-field microphones. The system calibration was checked before and after measurements.

A Davis Instruments Vantage Vue Model 6250 Weather Station with sensors mounted approximately 8' above ground at Location 1 was used to measure weather conditions.

Weather

Weather and meteorological conditions can influence the transmission of sound outdoors and have a significant effect at distances greater than about 300 feet. Wind speed and direction, and the presence of a temperature lapse or inversion, have the most influence on sound transmission between distant points. Wind and rain can also have a significant effect on measured sound levels due to the sound from rustling leaves, grass, rainfall, etc.

Weather conditions including temperature, relative humidity, wind speed, and wind direction were logged continuously in 15 minute intervals during the sound level measurements. The weather data are provided in Appendix B.

The sustained wind speed occasionally exceeded 10 mph and these time periods are indicated on the sound data charts in Figures 3 through 24 below.

There was a small amount of precipitation during the test period. There was light rain and/or snow in the area at various times from Friday night, October 5, through Monday morning October 8, 2018, but likely had minimal effect on the sound levels except that the roads were wet during the snow.

Sound Level Measurements

The sound level meters measured a continuous series of one hour duration measurements for approximately ten days. The intent was to determine the ambient sound levels over the course of multiple weekdays and weekend days.

The following sound pressure levels data were recorded and are presented in this report.

Hourly Metrics

L_{EQ} (dBA), Figures 3-24 and Appendix C
 L_{MAX} (dBA), Appendix C
 L_{MIN} (dBA), Appendix C
 L_{90} (dBA), Figures 3-24 and Appendix C
Octave band (dB, unweighted), Appendix C

Daily Metrics (Tables 1 and 2)

DNL (dBA)
 L_{DAY} (dBA)
 L_{NIGHT} (dBA)
CNEL (dBA)

The Equivalent sound level (L_{EQ}) in dBA and the 90% percentile level (L_{90}) in dBA are plotted in Figures 3 through 24.

The hourly L_{EQ} (equivalent sound level) is similar to the average sound level for a one-hour period.

The hourly L_{90} is the sound level that is exceeded 90% of the time. The L_{90} is usually close to the minimum measured sound levels and is used to indicate the steady sound level without the influence of passing cars, aircraft overflights, occasional wind gusts, etc.

Please refer to Appendix A for more definitions and acoustical terminology.

In the hourly charts, each data point represents a one-hour long measurement. The data is plotted at the beginning of the hour, so the data point at 7:00 a.m. represents the hour from 7:00 a.m. to 8:00 a.m.

Where the wind was greater than 10 mph and likely influencing the measured sound levels, a yellow band is shown over the data in the charts.

The **hourly** data from Location 1 is shown below in Figures 3-13.

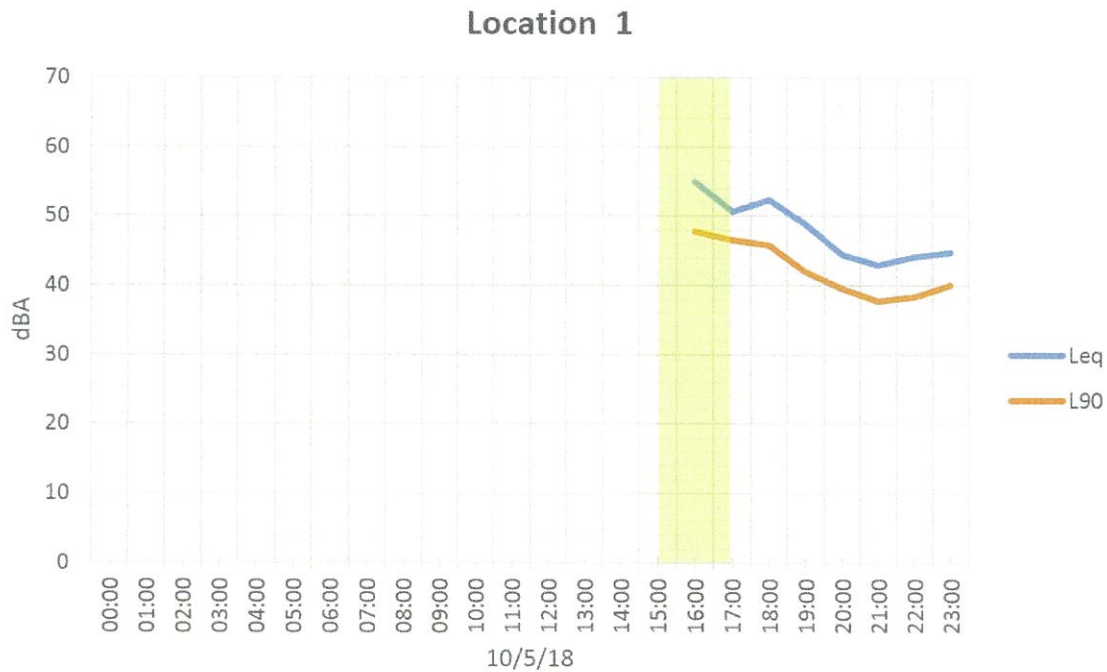


Figure 3: Hourly Sound Levels at Location 1

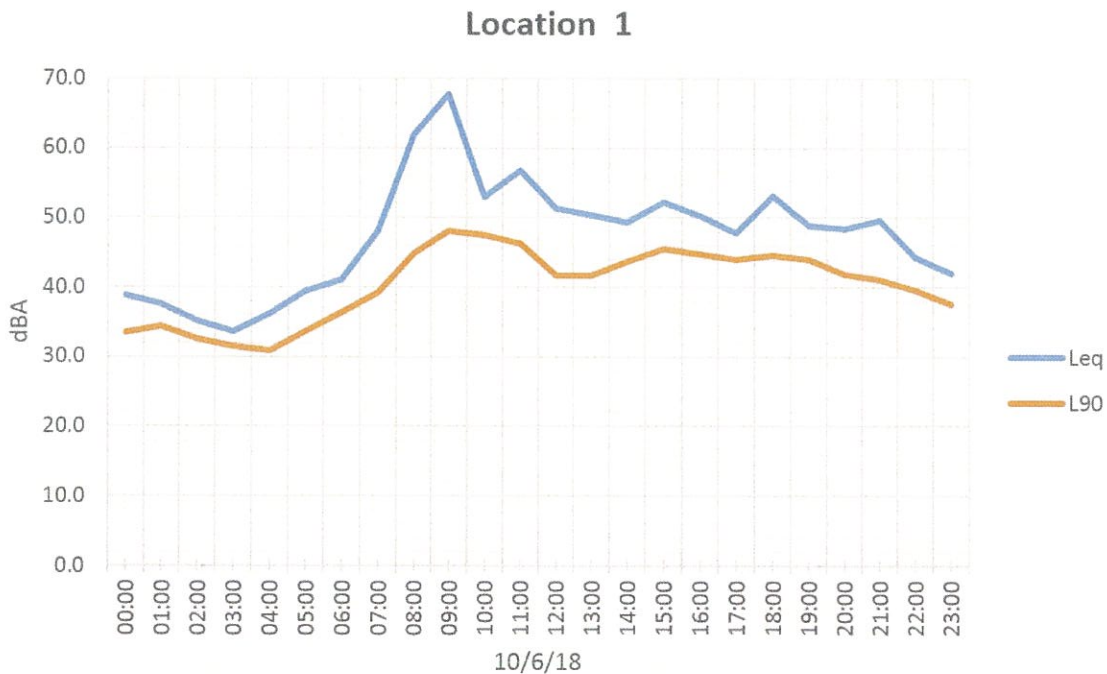


Figure 4: Hourly Sound Levels at Location 1

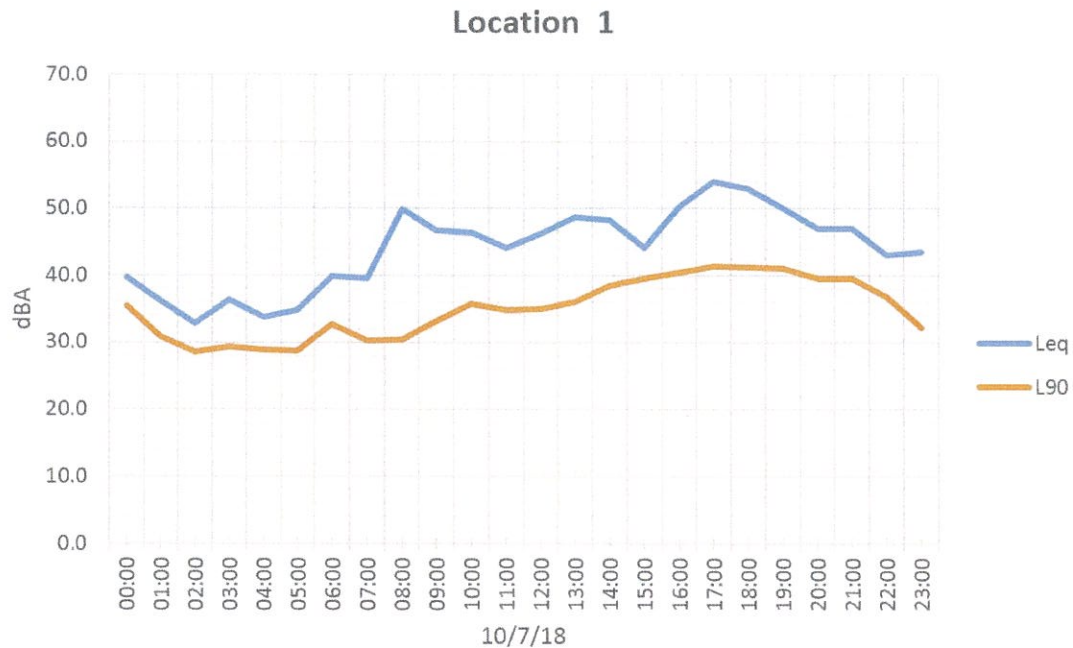


Figure 5: Hourly Sound Levels at Location 1



Figure 6: Hourly Sound Levels at Location 1

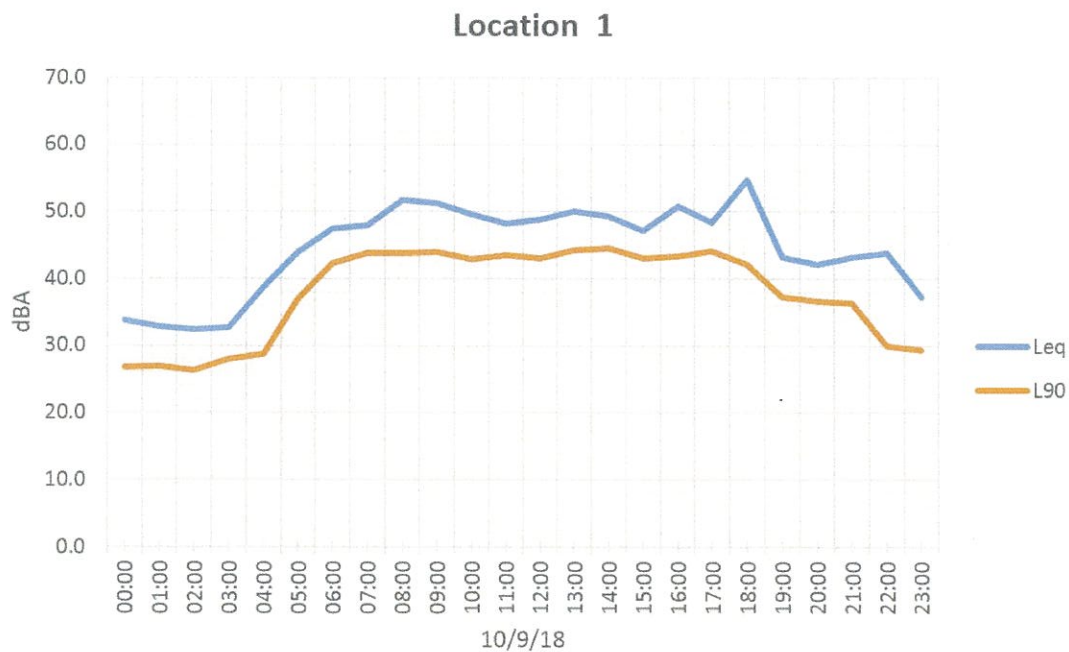


Figure 7: Hourly Sound Levels at Location 1

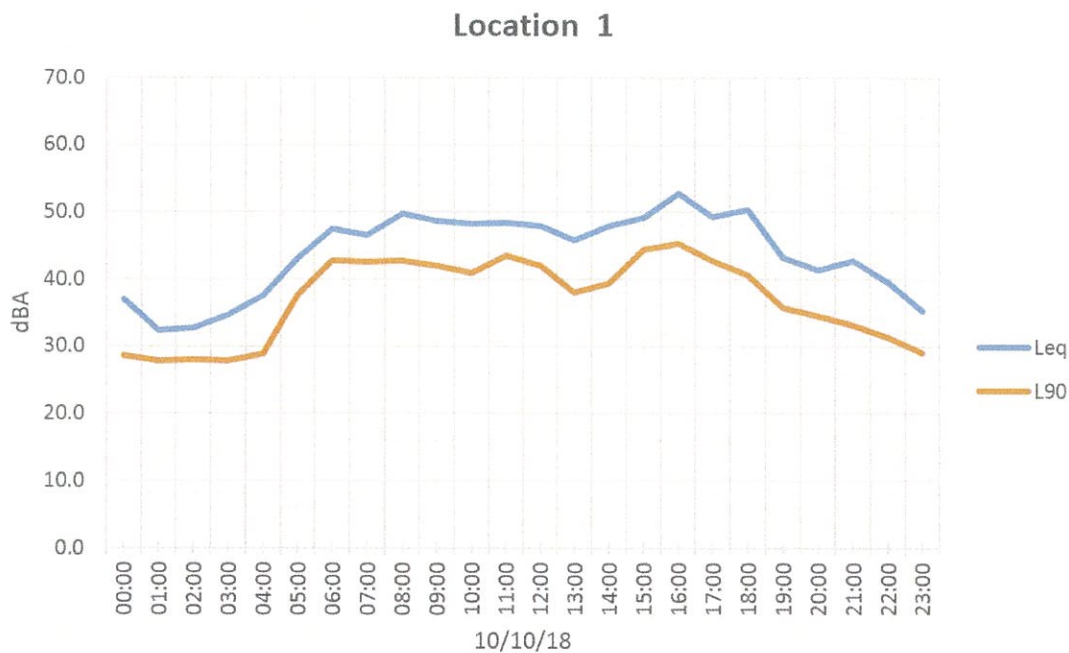


Figure 8: Hourly Sound Levels at Location 1

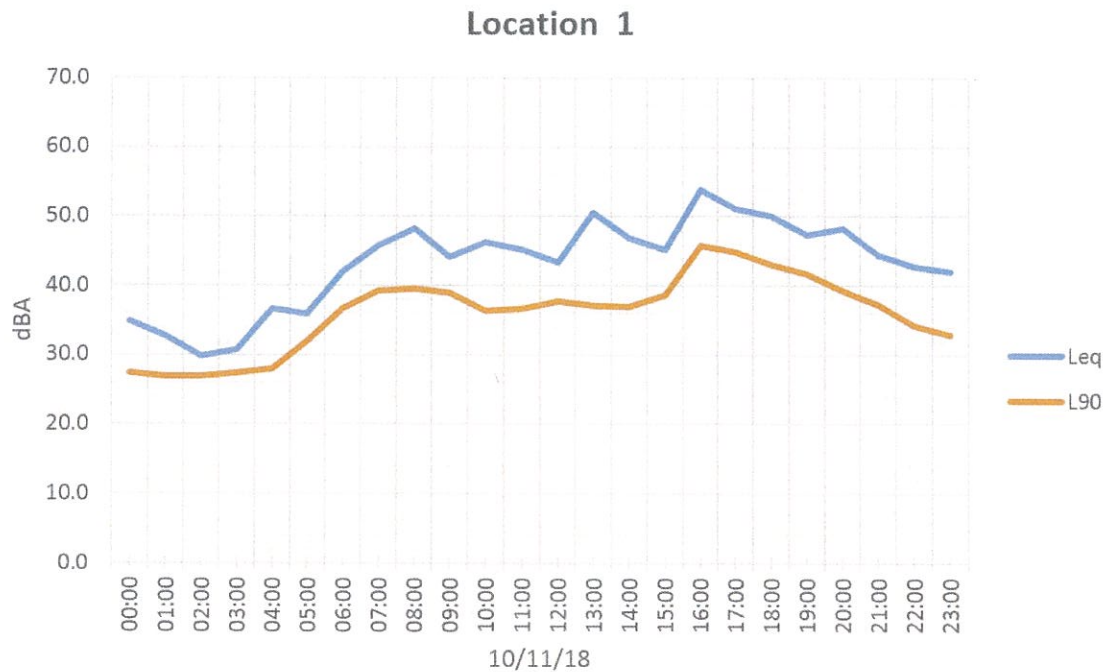


Figure 9: Hourly Sound Levels at Location 1

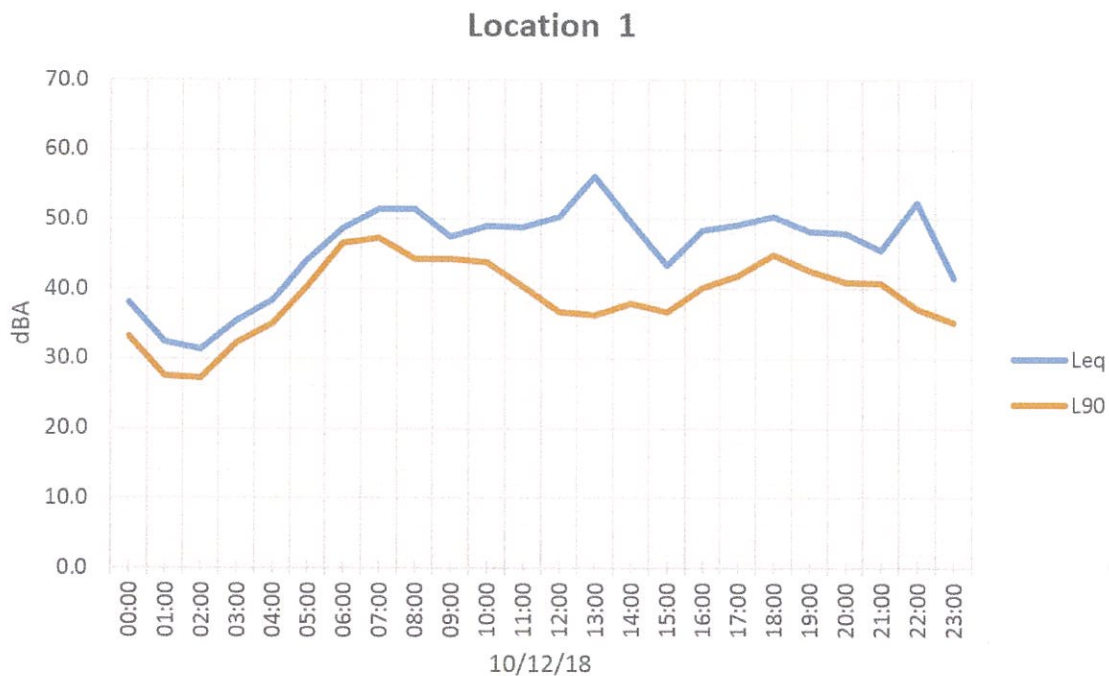


Figure 10: Hourly Sound Levels at Location 1

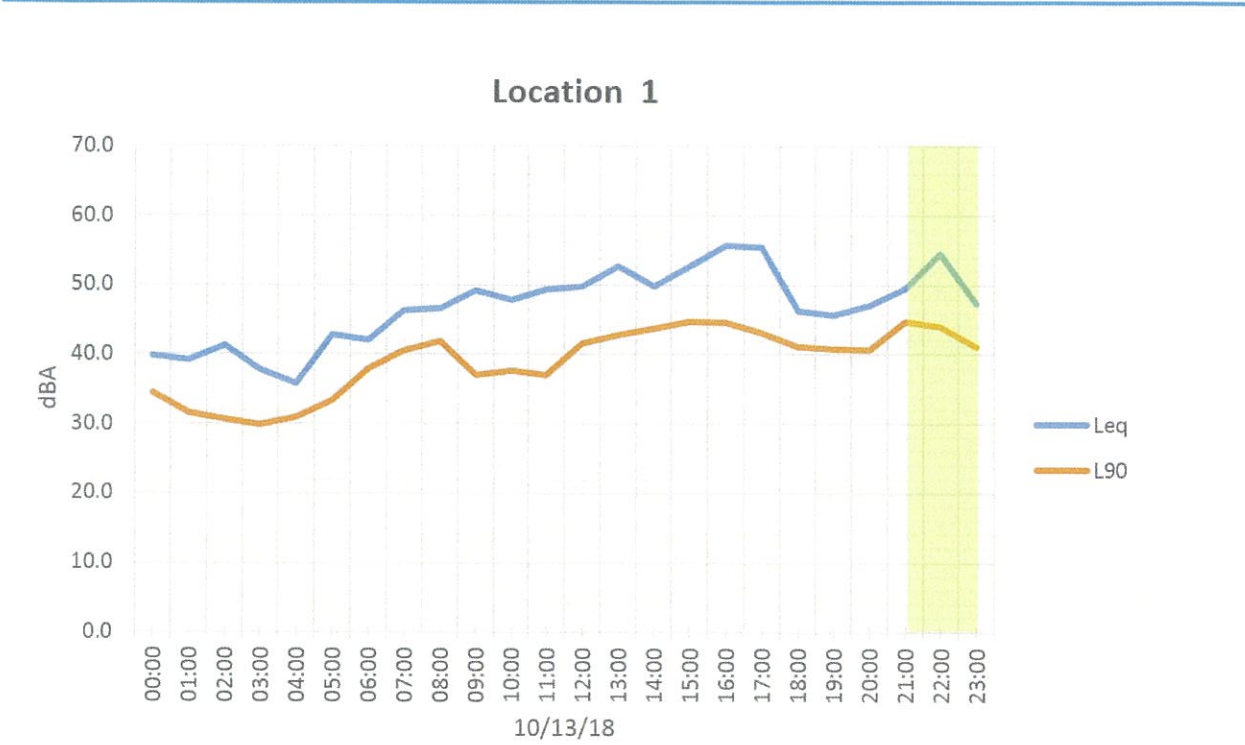


Figure 11: Hourly Sound Levels at Location 1

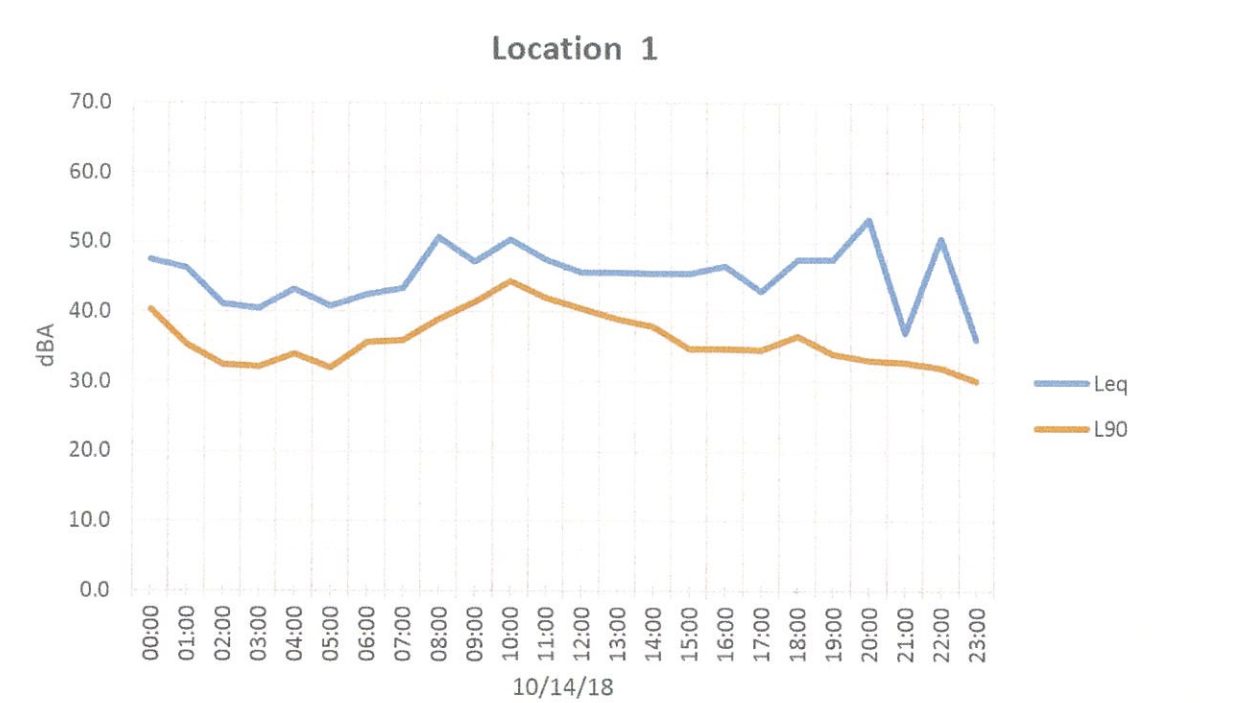


Figure 12: Hourly Sound Levels at Location 1

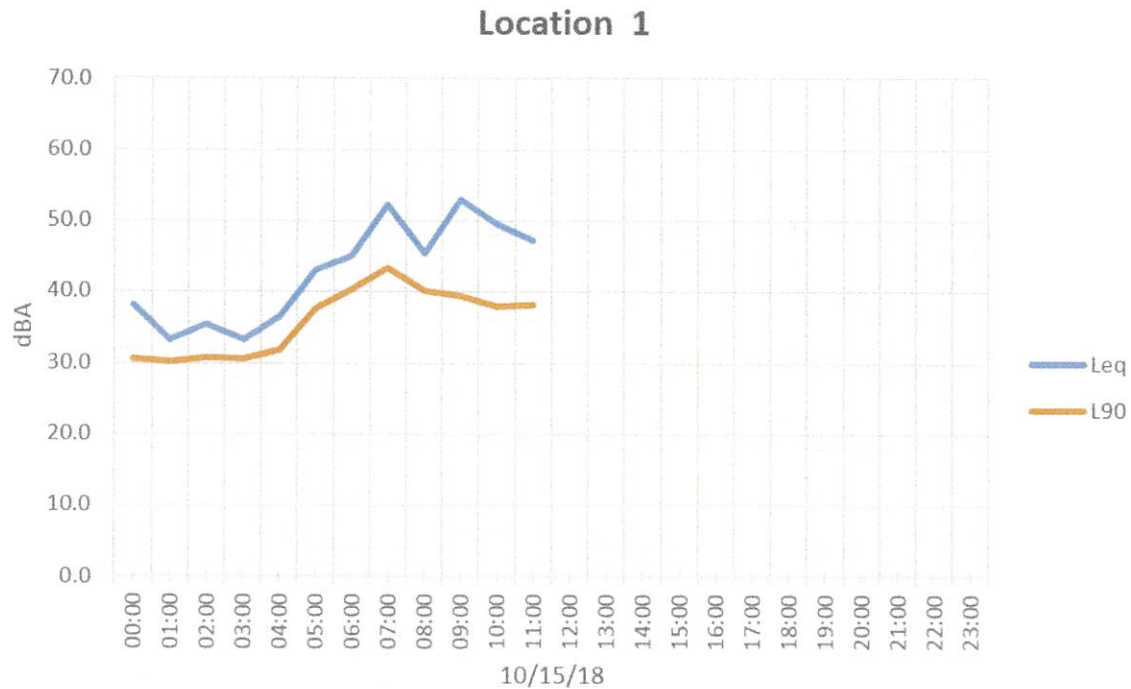


Figure 13: Hourly Sound Levels at Location 1

Again, the yellow bands on the charts indicate periods of high wind.

A peak is evident in the hourly L_{EQ} at Location 1 from about 8:00 a.m. to 10:00 a.m. on Saturday, October 6, 2018. From an audio file recorded by the meter, this appears to be due to lawn maintenance equipment, including a string trimmer, working in the area of the sound meter.

Location 2 hourly data is shown below in Figures 14-24.

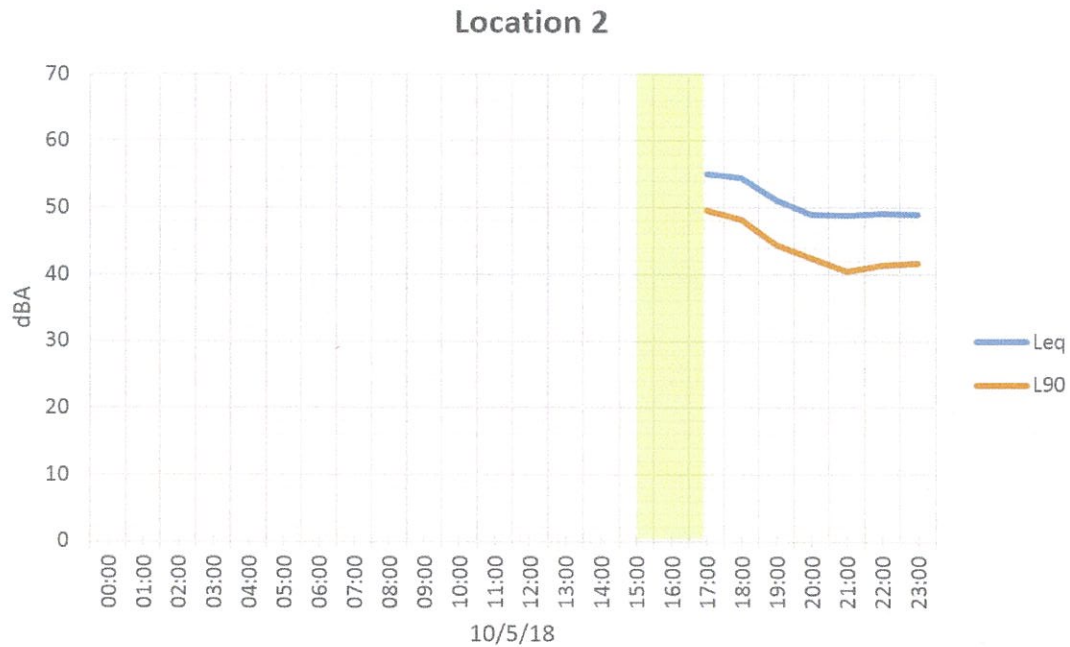


Figure 14: Hourly Sound Levels at Location 2

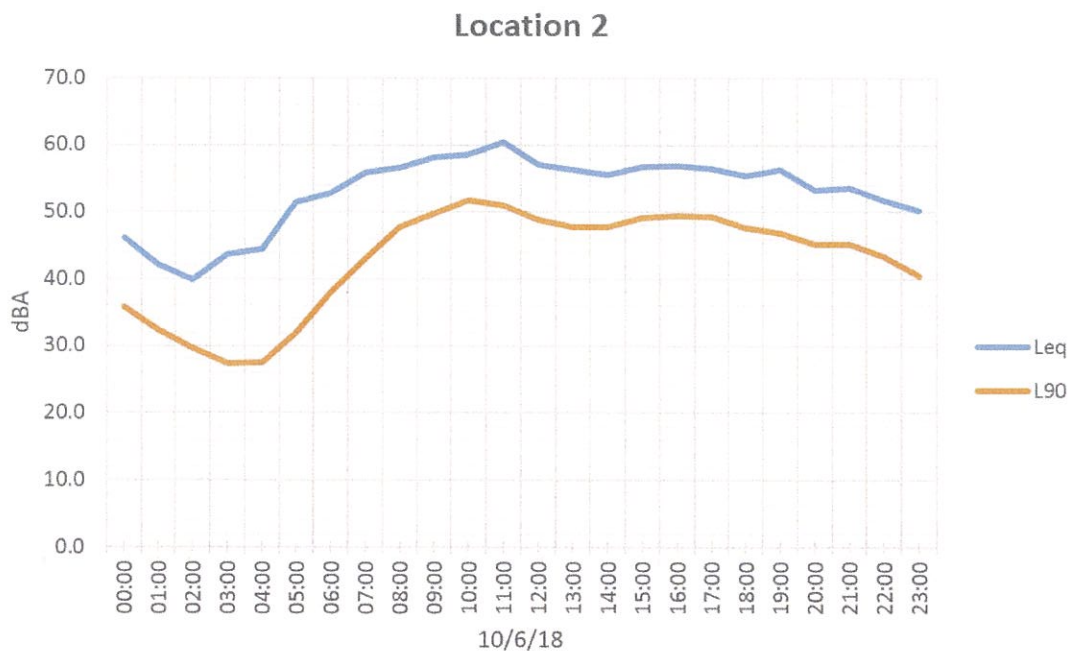


Figure 15: Hourly Sound Levels at Location 2

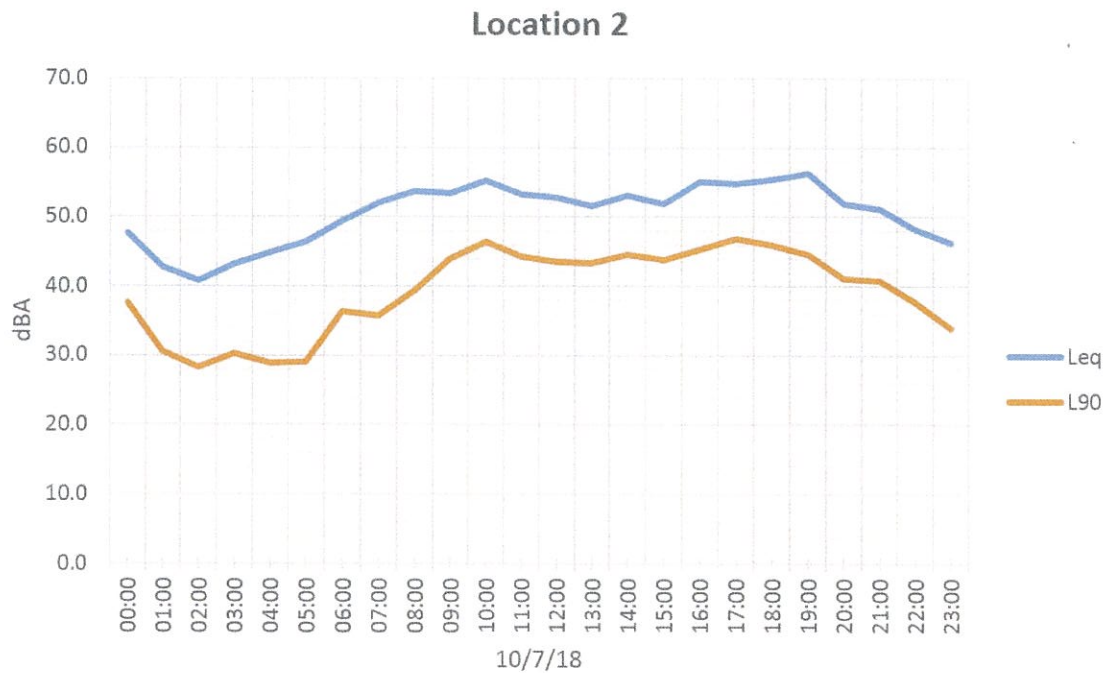


Figure 16: Hourly Sound Levels at Location 2

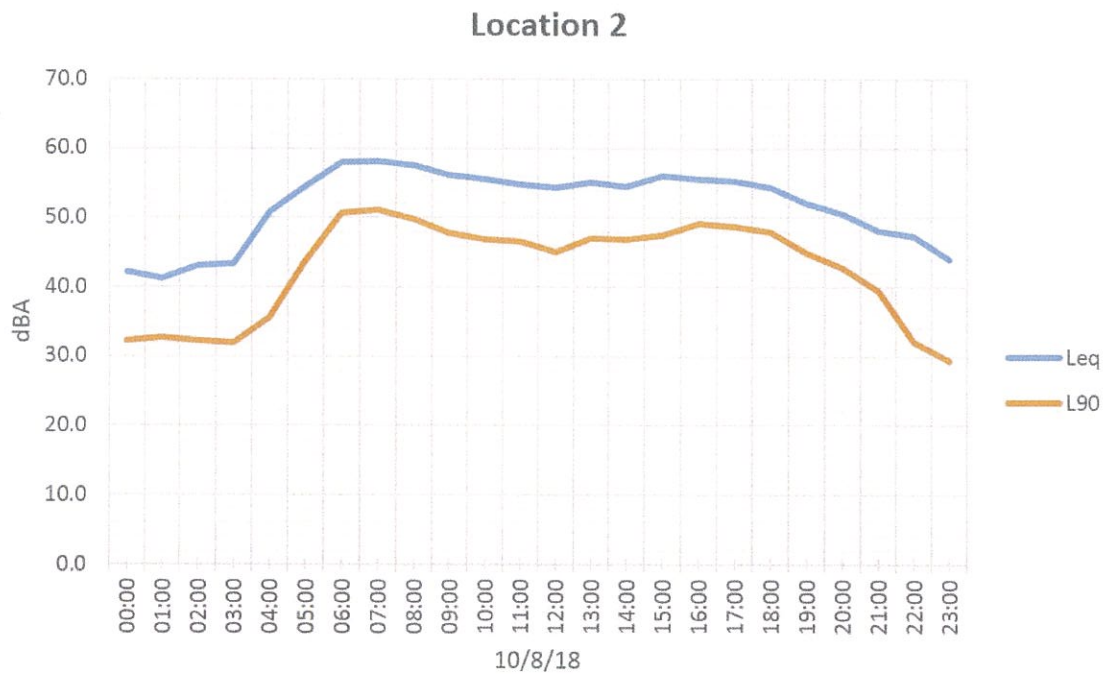


Figure 17: Hourly Sound Levels at Location 2

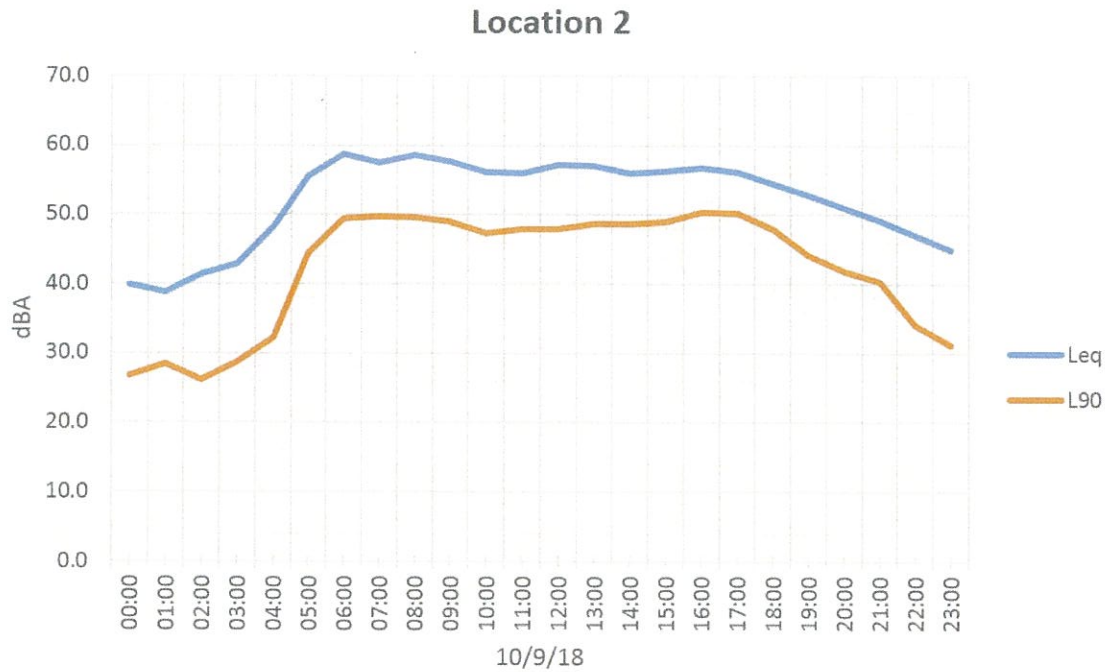


Figure 18: Hourly Sound Levels at Location 2

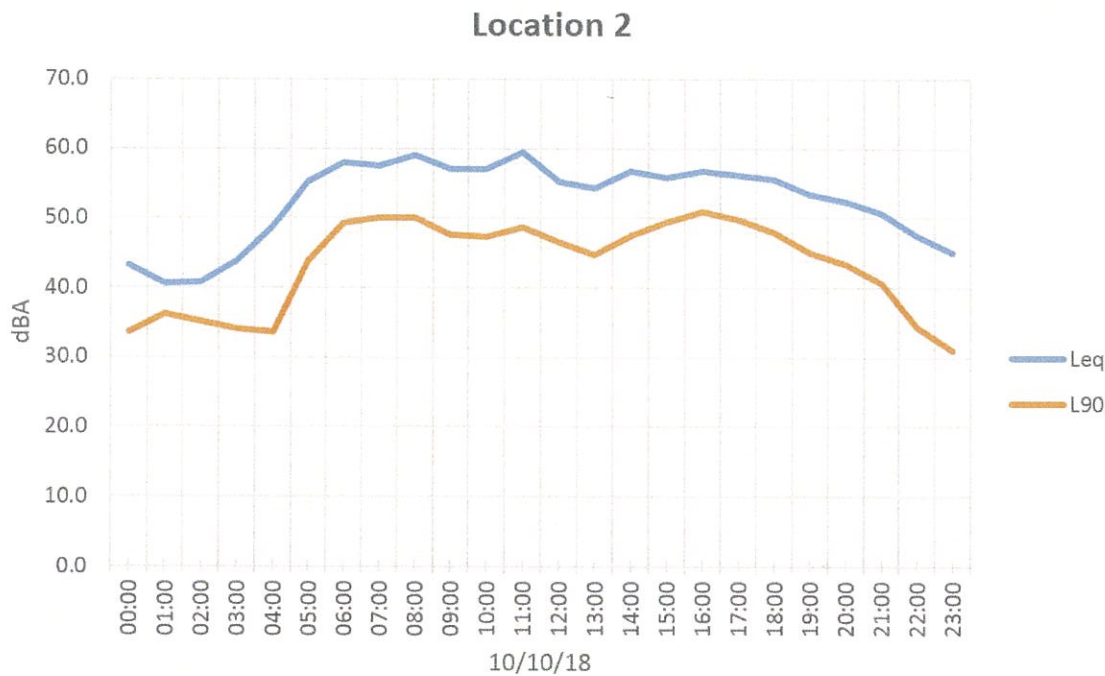


Figure 19: Hourly Sound Levels at Location 2

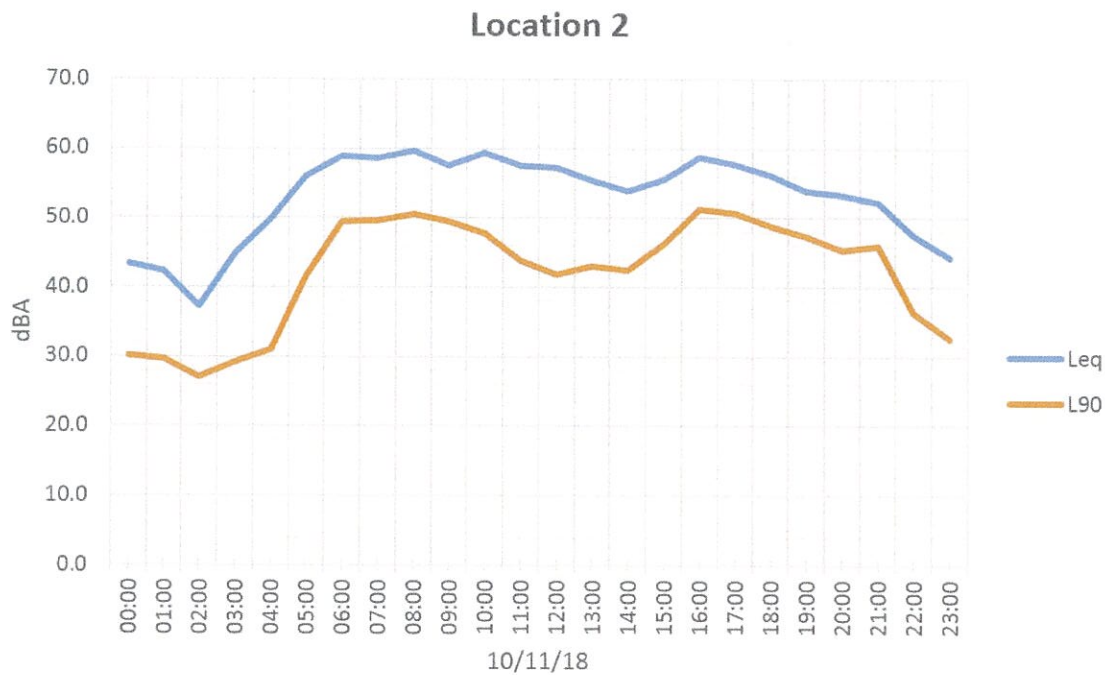


Figure 20: Hourly Sound Levels at Location 2

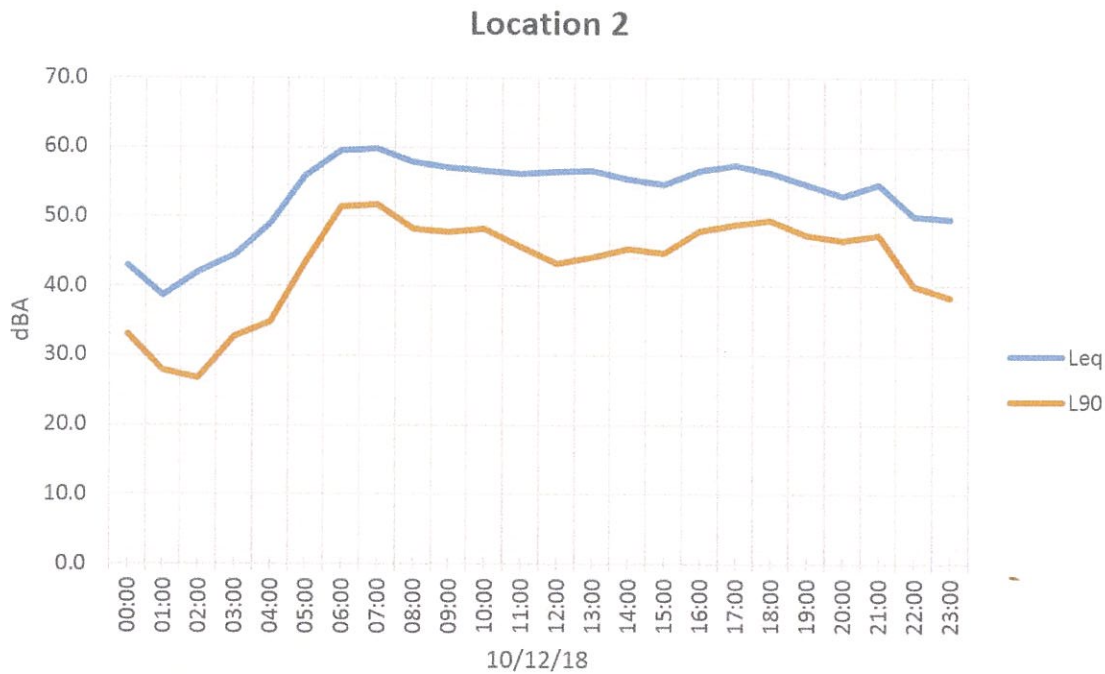


Figure 21: Hourly Sound Levels at Location 2

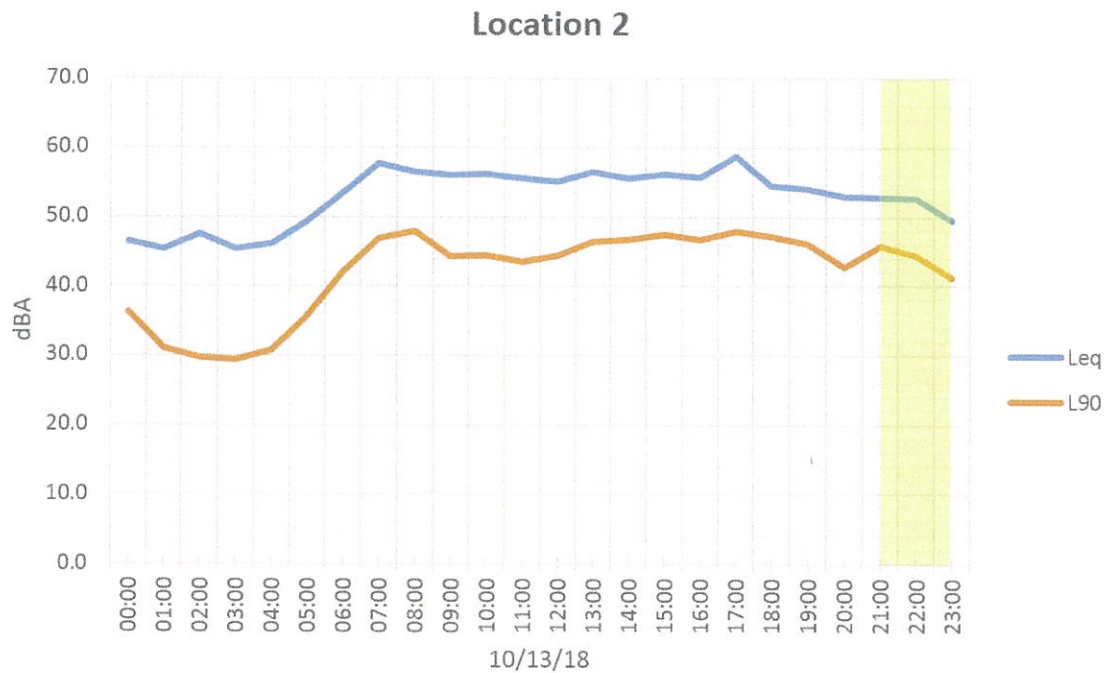


Figure 22: Hourly Sound Levels at Location 2

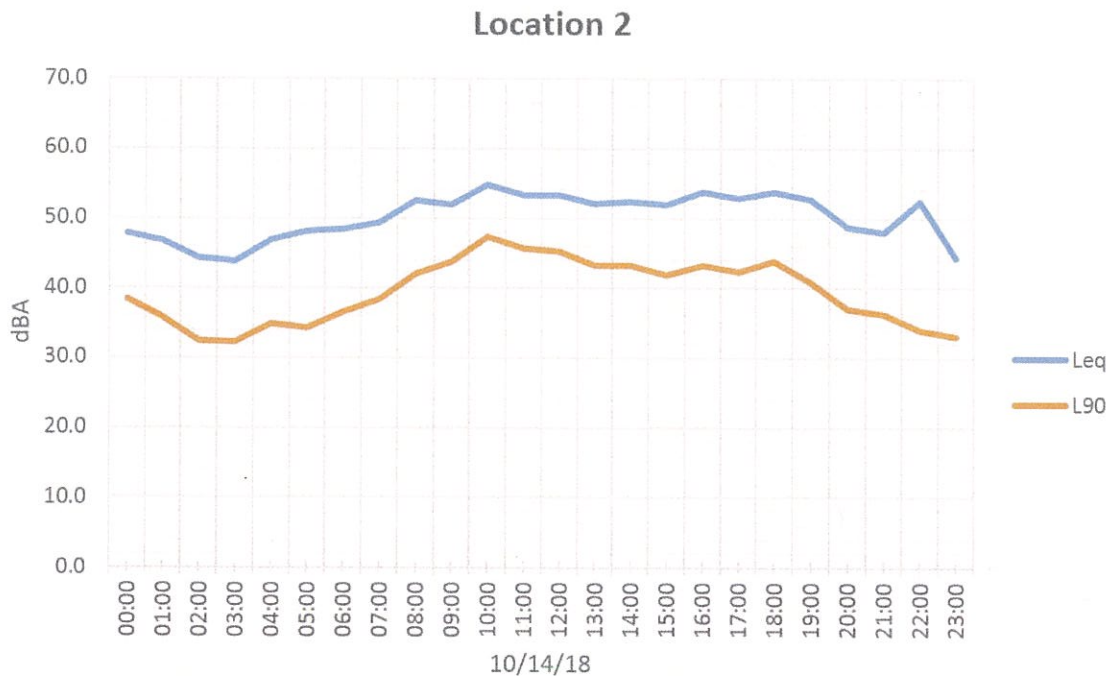


Figure 23: Hourly Sound Levels at Location 2

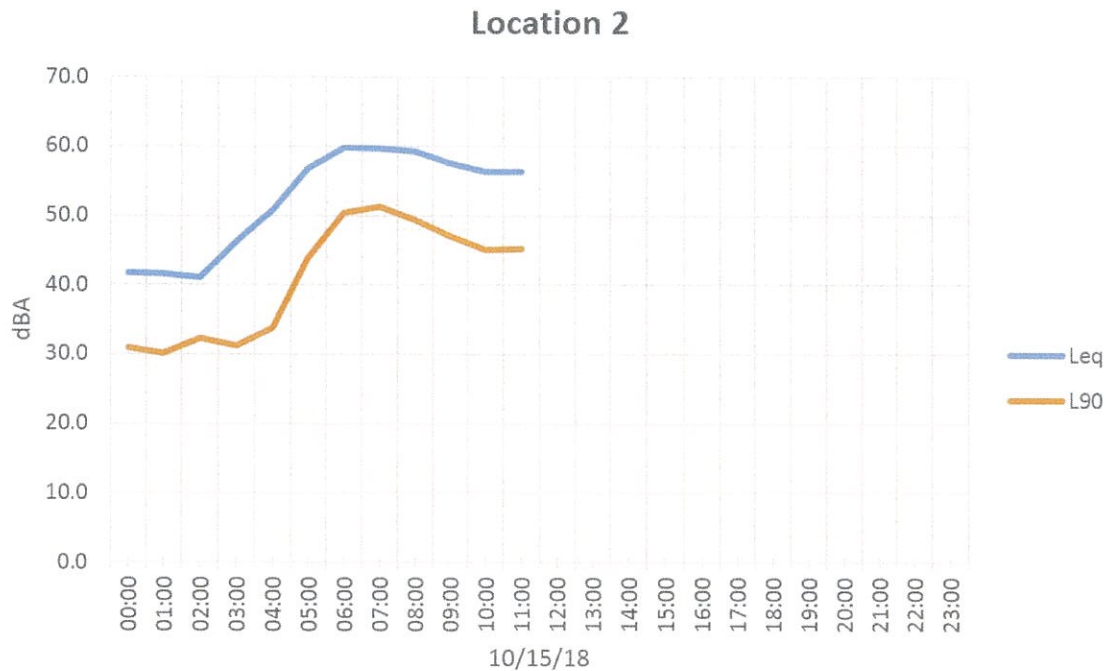


Figure 24: Hourly Sound Levels at Location 2

The **daily** sound data are presented in Tables 1 and 2 below. Daily metrics are not shown for the first and last day because they were not full days.

Table 1: Daily Sound Levels at Location 1

Date	LDN (dBA)	L _{DAY} (dBA)	L _{NIGHT} (dBA)	CNEL (dBA)
Friday, 10/5/2018	--	--	--	--
Saturday, 10/6/2018	56.3	57.9	39.9	56.5
Sunday, 10/7/2018	49.1	49.0	39.4	50.0
Monday 10/8/2018	50.1	47.9	42.2	50.4
Tuesday, 10/9/2018	50.4	49.6	41.4	50.6
Wednesday, 10/10/2018	49.4	48.4	40.7	49.6
Thursday, 10/11/2018	48.5	48.4	38.7	49.3
Friday, 10/12/2018	52.9	50.1	45.3	53.2
Saturday, 10/13/2018	54.0	50.9	46.7	54.3
Sunday, 10/14/2018	52.0	47.8	45.1	52.6
Monday, 10/15/2018	--	--	--	--
Logarithmic Average	52.2	51.5	43.0	52.5

Table 2: Daily Sound Levels at Location 2

Date	LDN (dBA)	LDAY (dBA)	LNIGHT (dBA)	CNEL (dBA)
Friday, 10/5/2018	--	--	--	--
Saturday, 10/6/2018	57.7	56.8	48.9	58.3
Sunday, 10/7/2018	54.8	53.7	46.2	55.7
Monday 10/8/2018	58.4	55.1	51.2	58.6
Tuesday, 10/9/2018	59.0	56.1	51.6	59.2
Wednesday, 10/10/2018	58.8	56.3	51.2	59.1
Thursday, 10/11/2018	59.6	56.9	52.0	59.9
Friday, 10/12/2018	59.8	56.5	52.6	60.1
Saturday, 10/13/2018	57.6	55.8	49.5	58.0
Sunday, 10/14/2018	55.3	52.4	47.8	55.6
Monday, 10/15/2018	--	--	--	--
Logarithmic Average	58.2	55.7	50.5	58.5

Vibration Assessment

There is very little data available on ground borne vibration from indoor shooting ranges. It is not studied often because it is typically not an issue. However, Wave Engineering evaluated ground borne vibration using the vibration of a *jackhammer*. Vibration data is available for jackhammers. They will produce much more vibration energy than the acoustic energy of a gunshot or from the impact of a bullet on a rubber bullet trap. If jackhammer vibration is not an issue, then gunshot induced vibration will not be an issue.

The basis of the analysis of human perception of the vibration is the US Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018). The manual outlines an industry standard method for assessing vibration in the United States. It outlines procedures to calculate ground borne vibration levels from trains and from construction equipment (such as jackhammers). The FTA manual uses Vibration Velocity Decibels (VdB) to assess the effect of vibration on people.

The FTA manual gives vibration levels for a typical jackhammer and outlines the methodology to calculate the vibration levels at various distances. As an example, Wave Engineering calculated the vibration from a jackhammer to be 52 VdB at a distance of 200'. We chose 200' because this is approximately the distance between the shooting range building and the nearest residential property line. The threshold of when people can feel vibration is 65 VdB (according to FTA manual Table 5-5). The vibration of the jackhammer at 52 VdB is well below the threshold of perception and therefore would not be felt by people. Vibration from gunshots is

expected to be much lower than what is produced by a jackhammer and so it will not be perceptible by people at the residential properties.

Another way to assess vibration is to measure it in terms of Peak Particle Velocity (PPV) instead of VdB. This method is recommended by the FTA manual to assess the potential for ground borne vibration to damage buildings, but it can be also used to assess the impact on people. Using the same FTA methodology, the vibration of the jackhammer would be $0.0015 \text{ }^{\text{IN}}/\text{SEC}$ PPV. The threshold where people can just barely start to feel vibration is approximately $0.007 \text{ }^{\text{IN}}/\text{SEC}$ PPV (according to ISO Standard 2631-1 *Mechanical vibration and shock -- Evaluation of human exposure to whole-body vibration -- Part 1: General requirements*). Please refer to Figure 25.

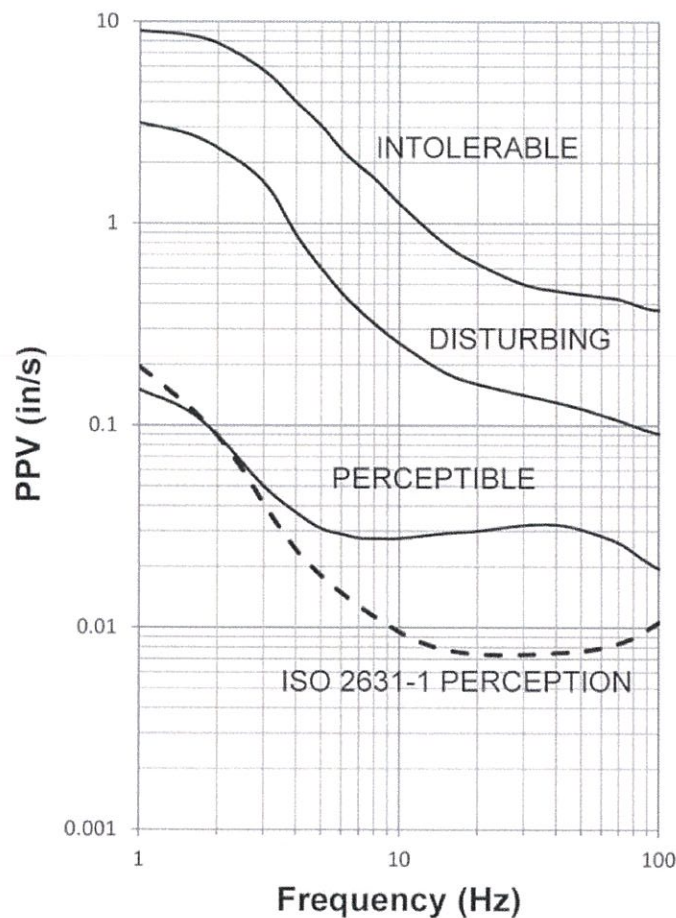


Figure 25: Perception Levels of Vibration ($^{\text{IN}}/\text{SEC}$ PPV), from *Vibration Limits for Historic Buildings and Art Collections*, *Journal of Preservation Technology* 46:2-3 2015, Arne P. Johnson and W. Robert Hannen)

The vibration levels of a jackhammer, and therefore of a gunshot, are well below where people 200' away can feel vibration through the ground. The vibration levels that can cause damage to a

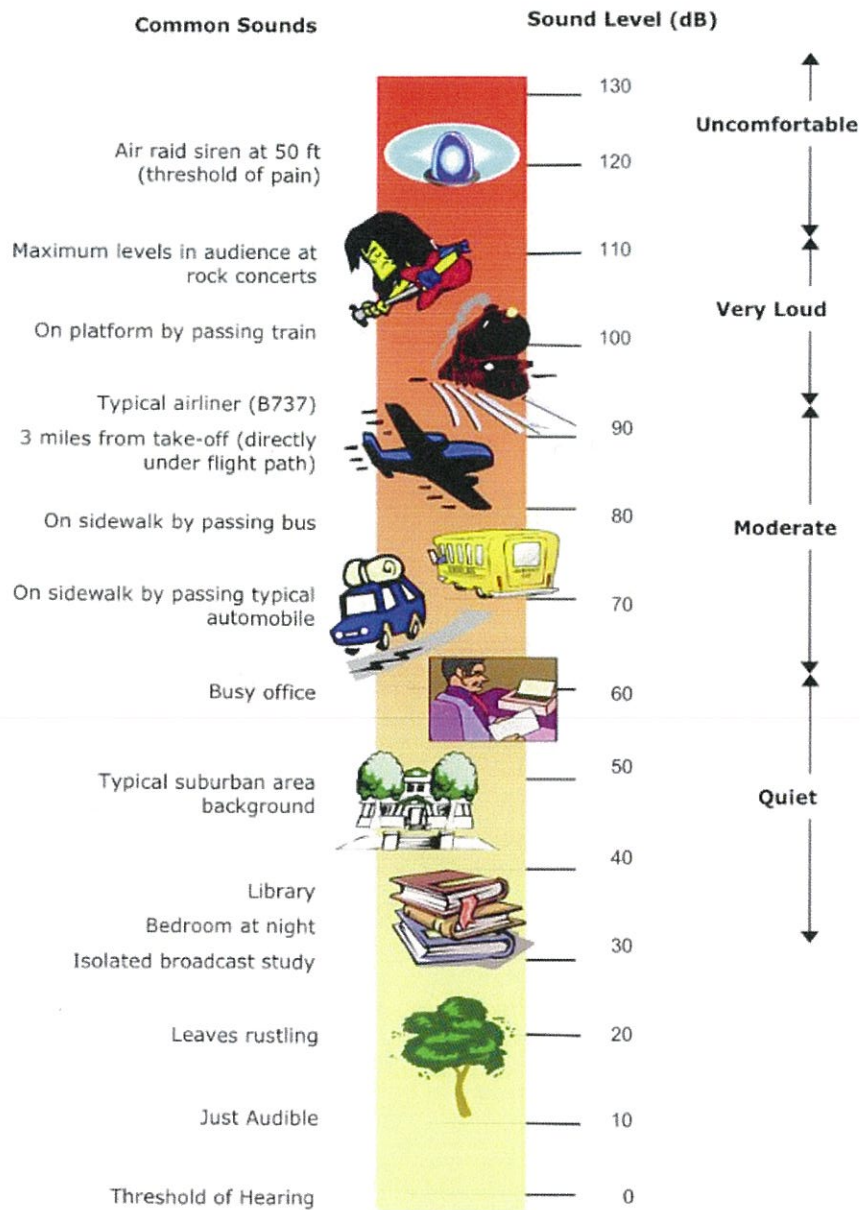
building are much higher than levels that people can feel. For example, the cosmetic damage threshold levels for a typical home are approximately 0.5 IN/SEC PPV (according to the United States Bureau of Mines USBM RI 8507).

The Town of Parker planning department also asked about vibration induced in buildings from the sound of gunshots, such as vibration that could cause windows to rattle. High sound levels at low frequencies are required to induce vibration in windows and other building components. Since the range building will be designed to reduce gunshot sound to levels below the ambient sound levels in the area, the gunshot sound levels will be well below what can rattle windows of nearby homes. Vibration induced by gunshots will be imperceptible at homes in the vicinity of the range.

Discussion of Results

Wave Engineering measured the existing ambient sound levels at two locations near the proposed Back 40 indoor shooting range. The purpose of the measurements was to establish a baseline of ambient sound levels in the area to help evaluate the site and to use in the design process.

For your reference, Figure 26 shows common sound levels in the environment.



Source: Handbook of Environmental Acoustics, James P. Cowan, 1994

Figure 26: Common Sound Levels (in dBA)

The sound levels that we measured at Locations 1 and 2 are in the range of a “typical suburban area background.”

The hourly data at Location 1 is primarily what we will use in our analysis and design. It is close to the houses that are closest to the range. Location 2 provides additional information on the environment east of South Chambers Road.

Tables 1 and 2 show the logarithmic average daytime sound levels (L_{DAY}) at Locations 1 and 2 were approximately 52 and 56 dBA, respectively. The overall logarithmic daytime average (average of the two locations) is 54 dBA.

Tables 1 and 2 show the logarithmic average nighttime sound levels (L_{NIGHT}) at Locations 1 and 2 were approximately 43 and 51 dBA, respectively. The overall logarithmic nighttime average (average of the two locations) is 49 dBA.

The hourly sound level patterns at both locations are fairly typical of suburban sites that are near fairly busy streets. The sound of traffic dominates the sound environment, but aircraft, construction activity, lawn mowers, dogs barking and other sources also contribute to sound levels. The sound levels are usually their lowest from about 2:00 a.m. to 4:00 a.m. and then increase with morning traffic. After a morning peak, they are relatively constant throughout the day and then gradually drop in the evening hours.

The ambient sound in the area is mostly from vehicular traffic. However, we were able to record occasional aircraft flyovers, lawn care equipment, and dogs barking that were above 75 dBA.

The EchoPark Stadium is approximately 700' southwest of Location 1, and 1,000' south of Location 2. While there are likely short-term impacts on traffic, it is difficult to see any direct impacts on the hourly sound levels at either location. The EchoPark Stadium schedule that you provided is attached as Appendix D for reference.

Comparing the daily metrics in Tables 1 and 2, you can see that Location 1 is significantly quieter than Location 2. However, this is expected since Location 1 is close to residences and somewhat shielded from South Chambers Road, and Location 2 is much closer to South Chambers Road.

The L_{DN} , L_{DAY} , L_{NIGHT} , and CNEL data in Tables 1 and 2 consist of relatively long term averages. While useful to characterize the overall sound environment in an area, they are not particularly useful to evaluate the impact of a shooting range. Gunshots are very short duration and even if there were several very loud gunshots on a given day that were disturbing to residents nearby, they would have very little impact on the day, night, or daily averages. They may not change the L_{DN} and CNEL at all, but that does not mean that there was no impact on the community. When evaluating the impact of a shooting range, it is important to know the short-term background sound levels during the range operation hours, and in particular, the lowest background sound levels that occur near the closest residents.

The L_{DN} can be used to help compare the site to other residential areas. For example, the US Department of Housing and Urban Development (HUD) considers a site with an L_{DN} of 55 dBA or less to be acceptable for residential use with no mitigation needed. Location 1 is below 55 dBA. Location 2 is above 55 dBA, but the actual residences on that side of the road are further away and the sound level is likely lower than 55 dBA at the homes.

For design purposes, the hourly data is more useful. We will primarily be using the hourly L_{90} values to evaluate whether or not gunshots will be audible outside the range building. The L_{90} is a good indication of the ambient sound level during quieter times when there are no cars passing in the immediate area. We are less interested in the hourly *average* values since we intend to design for the quietest times that occur during normal range operating hours.

While we measured 24 hours per day, I understand that the range hours are expected to be from approximately 10:00 a.m. to 9:00 p.m. While the L_{90} dropped to as low as 26 to 30 dBA at the quietest time of the night at Location 1, it did not drop lower than 32 dBA during the hours of 10:00 a.m. to 9:00 p.m. and was usually 35 to 40 dBA or higher.

At Location 2, the L_{90} was usually slightly higher than Location 1 but dropped to as low as about 27 dBA at night. During the hours of 10:00 a.m. to 9:00 p.m., it dropped to as low as 36 dBA even though it was 40 dBA or higher most of the time.

Our assessment of ground borne vibration shows that it will be imperceptible at the nearest residential property line.

Approval Criteria #7

One of the comments on our original report asked us to address Approval Criteria #7. Criteria #7 is titled “Will not cause significant air, water or noise pollution.” The criteria is referring to the completed shooting range facility. Wave Engineering will consult with the architect, mechanical engineer, and design team on how to best satisfy the sound concerns of Criteria #7.

This report details the baseline ambient sound levels measurements that were done in the vicinity of the Back 40 range and the nearest homes. The ambient baseline sound data will be used to help design the facility so that “gunshots do not cause the measured sound level to rise in the presence of the ambient sound level during normal operating hours at the residential property line.” The design goal will be to make gunshots inaudible at the residential property lines.

The subject property and the adjacent commercial parcels are currently undeveloped. Any commercial development will add sound to the area from traffic and other activity. However, the standard that Back 40 is designing to for gunshots is much lower than would otherwise be required of a commercial or office property.

Containing the sound of gunshots within the range building requires proper analysis and design of the building walls, roof, ceiling, doors, windows, and ventilation system. There is more than one correct way to design the walls, roof, etc., but the bottom line is that the building construction will reduce the gunshot sound level outdoors to meet the criteria in Criteria #7.

The exact building construction for this facility will not be determined until the detailed design is underway with the architect, mechanical engineer, and design team. However, the following are examples of the types of special construction that will be considered for the building and implemented as necessary.

- Install a concrete slab over the range roof (as opposed to a typical lightweight roof)
- Install a gypsum board or plywood ceiling above the baffles in the ranges themselves.
- Provide rockwool or fiberglass insulation in the cavity between the roof and the range ceilings.
- Design walls to have multiple wythes or layers. For example, walls could include dual concrete or CMU panels with rockwool or fiberglass insulation in a center cavity.
- Range ventilation systems will be designed to mitigate gunshot sound that can transmit through the exhaust and ventilation ductwork, through the fans, and then outdoors. Mitigation measures will include internally lined ductwork, additional elbows, and/or inline duct silencers as needed.
- Range ventilation equipment will be placed in locations that are selected to reduce the potential for sound transmission to residences.
- The range floor plan may make use of non-sensitive “buffer” spaces to further isolate the shooting ranges from the exterior walls or roof.
- Rubber bullet traps may be used in lieu of steel traps to reduce sound from bullets impacting the trap.
- The range bays themselves will likely include sound absorbing treatments to significantly reduce sound levels inside the ranges.

Please let me know if you have questions or would like to discuss this report.

Sincerely,



Jeff Kwalkoski, P.E., INCE Bd. Cert.
President

Appendix A: Acoustical Terminology
Appendix B: Weather Data
Appendix C: Hourly Sound Level Data
Appendix D: Echopark Stadium Schedule

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Appendix A

Acoustic Terminology

Appendix A: Acoustic Terminology

Acoustics: the science of mechanical waves dealing with the generation, transmission and effects of waves including vibration, sound and ultrasound.

Airborne Sound: sound that arrives at the point of interest by transmission through air.

Ambient Sound: *all* sounds that exist in a particular area, regardless of source. Ambient sound includes the sound to be measured.

A-weighted Sound Level (measured in dBA): sound pressure levels determined by using the common A-weighting scale. The A-weighting scale is designed to approximate the response of the human ear by altering (weighting) the lower and higher frequencies. It is commonly used for the measurement of environmental noise and industrial noise. The effect of low frequency noise is reduced when using the A-weighting scale.

Background Sound: all sounds from sources *other* than the sound source being measured.

Community Noise Equivalent Level (CNEL): the A-weighted average sound level over a 24 hour period. The CNEL incorporates weighting factors for both evening and nighttime noise levels. Hourly L_{eq} values for the evening period (7 p.m.-10 p.m.) are increased by 5 dB, while L_{eq} values for the nighttime period (10 p.m.-7 a.m.) are increased by 10 dB. The CNEL is then computed from the 24 one-hour measurements.

Decibel (dB): a logarithmic unit of sound measurement, used to quantify sound pressure levels and sound power levels relative to a reference level.

Most people have difficulty distinguishing the louder of two noise sources if they differ by less than two decibels. Subjectively, most people perceive changes in sound levels as follows.

- A 2-3 dB change is just perceptible.
- A 5-6 dB change is clearly perceptible.
- A 10 dB change is perceived as being twice-as-loud or half-as-loud

Frequency (Hz): the number of cycles per second of a periodic wave, usually expressed in Hertz (Hz).

Day-Night Average Sound Level (DNL or L_{dn}): Average sound level over a 24-hour period, calculated from hourly L_{eq} values with the nighttime levels from 10:00 pm to 7:00 am increased by a “penalty” of 10 dB.

Daytime Equivalent Sound Level, L_{DAY} : The hourly Equivalent Sound Level averaged during the fifteen daytime hours between 7:00 a.m. and 10:00 p.m.

Equivalent Sound Level (L_{EQ}): The sound level which, in a stated period of time, would contain the same acoustical energy as the time varying sound during the same period. The actual instantaneous noise levels typically fluctuate above and below the measured L_{EQ} during the measurement period. The A-weighted L_{EQ} is a common descriptor for measuring environmental noise.

Maximum Sound Level (L_{MAX}): the maximum sound level that occurred during the measurement period.

Minimum Sound Level (L_{MIN}): the minimum sound level that occurred during the measurement period.

Nighttime Equivalent Sound Level, L_{NIGHT} : the hourly Equivalent Sound Level averaged during the nine nighttime hours between 10:00 p.m. and 7:00 a.m.

Noise: Any unwanted or undesirable sound.

Octave Band: a frequency band that is one octave wide. A standard series of octave bands is used in practical acoustics and are identified by their center frequencies. An octave is the interval between two sounds having a frequency ratio of two.

Percentile Sound Level (L_{NN}): the sound level that was exceeded NN% of the time over a given time period. For example, the L_{90} is the decibel level that is exceeded 90% of the time. The L_{90} is often used as a measure of the “residual” sound level, or the relatively steady sound level excluding short term events such as an occasional car passing or aircraft over flight. Other percentile sound levels such as the L_1 and L_{10} are also used to analyze sound environments.

Receiver Location: For environmental acoustics, a point at which sound levels are analyzed or predicted is often referred to as a receiver location.

Sound: is an oscillation of pressure transmitted through a solid, liquid, or gas at frequencies within the range of hearing and strong enough to be heard.

Sound Pressure Level (L_p or SPL): is an objective measure of sound pressure expressed in a logarithmic decibel scale. Sound pressure is the minute fluctuation of atmospheric pressure due the passage of a sound wave.

Appendix B

Weather Data

	A	B	C	F	H	I	O	P
1	Back 40	APPENDIX B: WEATHER DATA						
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
5	10/5/2018	3:00 PM	71	46	8	NNW	28.736	0
6	10/5/2018	3:15 PM	71.1	46	9	NNW	28.726	0
7	10/5/2018	3:30 PM	62.3	59	12	NE	28.761	0
8	10/5/2018	3:45 PM	58.5	63	10	NE	28.779	0
9	10/5/2018	4:00 PM	56.5	66	9	NE	28.811	0
10	10/5/2018	4:15 PM	54.5	67	9	NE	28.844	0
11	10/5/2018	4:30 PM	54.1	67	7	NNE	28.871	0
12	10/5/2018	4:45 PM	52.2	69	7	NNW	28.906	0
13	10/5/2018	5:00 PM	50.6	70	9	NNW	28.939	0
14	10/5/2018	5:15 PM	49.2	72	8	NNW	28.97	0
15	10/5/2018	5:30 PM	48.7	71	6	NNW	28.991	0
16	10/5/2018	5:45 PM	47.4	72	7	NNW	29.008	0
17	10/5/2018	6:00 PM	46.9	73	5	N	29.018	0
18	10/5/2018	6:15 PM	46.9	73	4	NNE	29.037	0
19	10/5/2018	6:30 PM	46.4	73	4	NE	29.057	0
20	10/5/2018	6:45 PM	45.9	73	5	NNE	29.08	0
21	10/5/2018	7:00 PM	45.2	74	5	NE	29.092	0
22	10/5/2018	7:15 PM	44.8	74	4	NNW	29.113	0
23	10/5/2018	7:30 PM	44.5	75	4	NNE	29.111	0
24	10/5/2018	7:45 PM	44.2	75	3	NE	29.125	0
25	10/5/2018	8:00 PM	43.8	75	3	NE	29.136	0
26	10/5/2018	8:15 PM	43.4	76	3	NE	29.129	0
27	10/5/2018	8:30 PM	43	76	3	NE	29.148	0
28	10/5/2018	8:45 PM	42.8	76	3	NNE	29.151	0
29	10/5/2018	9:00 PM	42.5	77	3	NNW	29.173	0
30	10/5/2018	9:15 PM	42.5	77	2	NE	29.181	0
31	10/5/2018	9:30 PM	42.3	77	3	NNW	29.179	0
32	10/5/2018	9:45 PM	42.2	78	4	NNW	29.179	0
33	10/5/2018	10:00 PM	42.2	78	2	NNE	29.2	0
34	10/5/2018	10:15 PM	41.9	80	2	NNW	29.212	0
35	10/5/2018	10:30 PM	41.3	84	1	NNW	29.216	0
36	10/5/2018	10:45 PM	40.6	85	1	NW	29.223	0.03
37	10/5/2018	11:00 PM	39.7	84	1	NW	29.234	0.03
38	10/5/2018	11:15 PM	38.7	87	1	NNW	29.228	0.05
39	10/5/2018	11:30 PM	37.6	89	1	NNW	29.234	0.03
40	10/5/2018	11:45 PM	37.1	89	0	NW	29.242	0.04
41	10/6/2018	12:00 AM	36.8	89	1	NW	29.251	0.02
42	10/6/2018	12:15 AM	36.5	90	0	NW	29.254	0.01
43	10/6/2018	12:30 AM	36.2	91	0	NW	29.253	0
44	10/6/2018	12:45 AM	36	91	0	NW	29.256	0.04
45	10/6/2018	1:00 AM	35.6	91	0	---	29.261	0.03
46	10/6/2018	1:15 AM	34.8	91	0	---	29.266	0.02

	A	B	C	F	H	I	O	P
1	Back 40		APPENDIX B: WEATHER DATA					
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
47	10/6/2018	1:30 AM	34	91	0	---	29.272	0.01
48	10/6/2018	1:45 AM	33.4	92	0	SE	29.28	0.01
49	10/6/2018	2:00 AM	33.7	93	0	E	29.284	0
50	10/6/2018	2:15 AM	33.9	93	0	E	29.29	0.01
51	10/6/2018	2:30 AM	33.8	93	0	ESE	29.291	0
52	10/6/2018	2:45 AM	34.1	93	0	ESE	29.292	0.01
53	10/6/2018	3:00 AM	34.4	94	0	ESE	29.291	0
54	10/6/2018	3:15 AM	34.6	94	0	ESE	29.292	0.01
55	10/6/2018	3:30 AM	35.1	94	0	ESE	29.295	0
56	10/6/2018	3:45 AM	35.3	93	0	ESE	29.295	0.01
57	10/6/2018	4:00 AM	35.6	93	0	ESE	29.29	0
58	10/6/2018	4:15 AM	35.8	93	1	ESE	29.288	0.01
59	10/6/2018	4:30 AM	36.1	93	0	ESE	29.292	0
60	10/6/2018	4:45 AM	36.4	93	0	ESE	29.296	0
61	10/6/2018	5:00 AM	36.7	93	0	ESE	29.293	0.01
62	10/6/2018	5:15 AM	36.9	92	0	ESE	29.282	0
63	10/6/2018	5:30 AM	37.1	93	1	ESE	29.281	0
64	10/6/2018	5:45 AM	37.7	93	1	ESE	29.28	0
65	10/6/2018	6:00 AM	37.9	92	1	ESE	29.279	0
66	10/6/2018	6:15 AM	38.4	93	0	ESE	29.28	0
67	10/6/2018	6:30 AM	38.7	92	0	ESE	29.275	0.01
68	10/6/2018	6:45 AM	39.2	91	0	ESE	29.268	0
69	10/6/2018	7:00 AM	39.6	91	0	ESE	29.265	0
70	10/6/2018	7:15 AM	39.9	90	0	ESE	29.26	0
71	10/6/2018	7:30 AM	40.4	89	0	ESE	29.252	0
72	10/6/2018	7:45 AM	40.6	87	1	SSW	29.246	0
73	10/6/2018	8:00 AM	40.8	86	1	SSW	29.248	0
74	10/6/2018	8:15 AM	41.2	84	1	S	29.246	0
75	10/6/2018	8:30 AM	41.6	83	1	SSW	29.247	0
76	10/6/2018	8:45 AM	43.5	81	2	S	29.253	0
77	10/6/2018	9:00 AM	46.3	79	2	ESE	29.244	0
78	10/6/2018	9:15 AM	47.1	75	2	SW	29.238	0
79	10/6/2018	9:30 AM	47.5	74	3	S	29.239	0
80	10/6/2018	9:45 AM	46.1	75	3	SSW	29.233	0
81	10/6/2018	10:00 AM	46.1	77	3	S	29.23	0
82	10/6/2018	10:15 AM	48.8	72	4	SSW	29.225	0
83	10/6/2018	10:30 AM	50.2	69	4	SSE	29.215	0
84	10/6/2018	10:45 AM	51.2	68	4	ESE	29.206	0
85	10/6/2018	11:00 AM	52.4	66	4	ESE	29.199	0
86	10/6/2018	11:15 AM	53	65	4	SSE	29.189	0
87	10/6/2018	11:30 AM	53.4	64	4	SSE	29.181	0
88	10/6/2018	11:45 AM	54.3	63	4	SSE	29.175	0

	A	B	C	F	H	I	O	P
1	Back 40		APPENDIX B: WEATHER DATA					
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
89	10/6/2018	12:00 PM	55.8	60	4	S	29.161	0
90	10/6/2018	12:15 PM	56.2	60	4	S	29.149	0
91	10/6/2018	12:30 PM	56.6	59	3	S	29.146	0
92	10/6/2018	12:45 PM	57.5	59	2	S	29.134	0
93	10/6/2018	1:00 PM	57.6	58	3	SSW	29.12	0
94	10/6/2018	1:15 PM	57.3	58	2	SSW	29.115	0
95	10/6/2018	1:30 PM	58	58	3	ESE	29.1	0
96	10/6/2018	1:45 PM	59	58	3	ESE	29.094	0
97	10/6/2018	2:00 PM	59.1	57	2	S	29.081	0
98	10/6/2018	2:15 PM	58.8	57	3	ESE	29.076	0
99	10/6/2018	2:30 PM	59	58	4	SSE	29.072	0
100	10/6/2018	2:45 PM	59.6	57	3	ESE	29.07	0
101	10/6/2018	3:00 PM	59	58	3	SE	29.062	0
102	10/6/2018	3:15 PM	57.7	59	4	ESE	29.061	0
103	10/6/2018	3:30 PM	56.5	60	4	ESE	29.058	0
104	10/6/2018	3:45 PM	56.5	60	4	SE	29.052	0
105	10/6/2018	4:00 PM	56.2	60	3	SE	29.048	0
106	10/6/2018	4:15 PM	55.3	60	3	S	29.05	0
107	10/6/2018	4:30 PM	53.9	63	2	SSW	29.046	0
108	10/6/2018	4:45 PM	52.8	63	3	SE	29.051	0
109	10/6/2018	5:00 PM	52.4	63	3	ESE	29.056	0
110	10/6/2018	5:15 PM	51.5	64	3	S	29.063	0
111	10/6/2018	5:30 PM	50.5	65	3	S	29.072	0
112	10/6/2018	5:45 PM	49.8	67	2	SW	29.074	0
113	10/6/2018	6:00 PM	49.4	67	2	S	29.067	0
114	10/6/2018	6:15 PM	49	68	2	SSE	29.071	0
115	10/6/2018	6:30 PM	48.3	68	2	S	29.077	0
116	10/6/2018	6:45 PM	47.5	69	1	SSW	29.085	0
117	10/6/2018	7:00 PM	46.9	70	1	S	29.089	0
118	10/6/2018	7:15 PM	46.4	70	1	S	29.091	0
119	10/6/2018	7:30 PM	46	71	1	SSW	29.091	0
120	10/6/2018	7:45 PM	45.7	71	1	ESE	29.089	0
121	10/6/2018	8:00 PM	45.2	72	1	ESE	29.095	0
122	10/6/2018	8:15 PM	44.9	72	1	SSW	29.098	0
123	10/6/2018	8:30 PM	44.4	73	0	SSW	29.103	0
124	10/6/2018	8:45 PM	44	75	1	SSW	29.114	0
125	10/6/2018	9:00 PM	44.1	75	1	SSW	29.119	0
126	10/6/2018	9:15 PM	44.6	74	1	SSW	29.121	0
127	10/6/2018	9:30 PM	44.1	74	0	ESE	29.122	0
128	10/6/2018	9:45 PM	42.9	75	0	SW	29.122	0
129	10/6/2018	10:00 PM	42.3	76	0	SW	29.122	0
130	10/6/2018	10:15 PM	41.6	77	0	SW	29.119	0

	A	B	C	F	H	I	O	P
1	Back 40	APPENDIX B: WEATHER DATA						
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
131	10/6/2018	10:30 PM	41.4	77	1	ESE	29.121	0
132	10/6/2018	10:45 PM	41.2	77	1	ESE	29.113	0
133	10/6/2018	11:00 PM	40.8	77	1	ESE	29.109	0
134	10/6/2018	11:15 PM	40.6	78	1	SW	29.111	0
135	10/6/2018	11:30 PM	40.3	79	1	ESE	29.102	0
136	10/6/2018	11:45 PM	40.6	80	2	ESE	29.104	0
137	10/7/2018	12:00 AM	40.7	80	1	SSW	29.105	0
138	10/7/2018	12:15 AM	40.7	82	1	SSW	29.098	0
139	10/7/2018	12:30 AM	41.2	82	2	SSW	29.094	0
140	10/7/2018	12:45 AM	42	82	1	SSW	29.09	0
141	10/7/2018	1:00 AM	42	82	1	SSW	29.083	0
142	10/7/2018	1:15 AM	41.7	82	1	SSW	29.081	0
143	10/7/2018	1:30 AM	41.2	83	1	ESE	29.079	0
144	10/7/2018	1:45 AM	40.6	83	0	E	29.086	0
145	10/7/2018	2:00 AM	39.7	84	0	ESE	29.091	0
146	10/7/2018	2:15 AM	38.5	87	0	S	29.092	0
147	10/7/2018	2:30 AM	38.1	87	0	NE	29.09	0
148	10/7/2018	2:45 AM	37.7	88	0	S	29.089	0
149	10/7/2018	3:00 AM	38.2	88	0	SSW	29.088	0
150	10/7/2018	3:15 AM	38.7	88	0	SSE	29.089	0
151	10/7/2018	3:30 AM	38.8	87	0	SSW	29.082	0
152	10/7/2018	3:45 AM	38.6	88	0	WNW	29.083	0
153	10/7/2018	4:00 AM	38.8	88	0	SE	29.076	0
154	10/7/2018	4:15 AM	38.7	88	0	ESE	29.076	0
155	10/7/2018	4:30 AM	38.1	89	0	SSW	29.077	0
156	10/7/2018	4:45 AM	38.3	89	0	NW	29.079	0
157	10/7/2018	5:00 AM	38.5	89	0	NW	29.089	0
158	10/7/2018	5:15 AM	38.7	88	0	NW	29.094	0
159	10/7/2018	5:30 AM	38.1	88	0	NW	29.086	0
160	10/7/2018	5:45 AM	37.3	88	0	---	29.089	0
161	10/7/2018	6:00 AM	36.7	91	0	---	29.088	0
162	10/7/2018	6:15 AM	37	91	0	WSW	29.095	0
163	10/7/2018	6:30 AM	37.7	90	0	W	29.103	0
164	10/7/2018	6:45 AM	38.1	90	0	W	29.104	0
165	10/7/2018	7:00 AM	38.3	90	0	W	29.105	0
166	10/7/2018	7:15 AM	38.6	89	0	NW	29.101	0
167	10/7/2018	7:30 AM	38.8	90	0	NW	29.099	0
168	10/7/2018	7:45 AM	39	89	0	NW	29.105	0
169	10/7/2018	8:00 AM	39.4	89	0	NW	29.108	0
170	10/7/2018	8:15 AM	39.7	89	0	NW	29.103	0
171	10/7/2018	8:30 AM	40.2	88	0	NW	29.1	0
172	10/7/2018	8:45 AM	40.5	87	0	W	29.109	0

	A	B	C	F	H	I	O	P
1	Back 40	APPENDIX B: WEATHER DATA						
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
173	10/7/2018	9:00 AM	40.3	87	1	NW	29.106	0
174	10/7/2018	9:15 AM	40.6	87	1	NW	29.099	0
175	10/7/2018	9:30 AM	41	87	2	NW	29.099	0
176	10/7/2018	9:45 AM	40.9	86	2	NW	29.098	0
177	10/7/2018	10:00 AM	41.5	86	1	NW	29.101	0
178	10/7/2018	10:15 AM	41.4	86	2	NW	29.096	0
179	10/7/2018	10:30 AM	41.7	85	1	NNW	29.096	0
180	10/7/2018	10:45 AM	42	85	3	NW	29.089	0
181	10/7/2018	11:00 AM	42.6	84	4	NNW	29.082	0
182	10/7/2018	11:15 AM	43.1	83	2	NW	29.082	0
183	10/7/2018	11:30 AM	43.6	83	1	NE	29.083	0
184	10/7/2018	11:45 AM	44	81	1	NNE	29.076	0
185	10/7/2018	12:00 PM	43.8	81	1	NW	29.075	0
186	10/7/2018	12:15 PM	44.1	81	2	NNW	29.072	0
187	10/7/2018	12:30 PM	44.4	81	1	NNW	29.067	0
188	10/7/2018	12:45 PM	44.9	81	2	NW	29.051	0
189	10/7/2018	1:00 PM	44.7	81	2	NW	29.047	0
190	10/7/2018	1:15 PM	45	80	2	NNW	29.037	0
191	10/7/2018	1:30 PM	45.6	80	2	NW	29.027	0
192	10/7/2018	1:45 PM	45.7	80	3	NNW	29.027	0
193	10/7/2018	2:00 PM	46	79	3	NNW	29.021	0
194	10/7/2018	2:15 PM	46.5	78	3	NNW	29.024	0
195	10/7/2018	2:30 PM	46.5	79	3	NW	29.028	0
196	10/7/2018	2:45 PM	46.3	79	4	NNW	29.03	0
197	10/7/2018	3:00 PM	46.1	80	4	NNW	29.033	0
198	10/7/2018	3:15 PM	45.7	81	3	NNE	29.047	0
199	10/7/2018	3:30 PM	45.5	81	4	NNW	29.046	0
200	10/7/2018	3:45 PM	45.3	82	4	NNW	29.046	0
201	10/7/2018	4:00 PM	44.9	83	4	NNW	29.054	0
202	10/7/2018	4:15 PM	44.7	84	4	NNW	29.054	0
203	10/7/2018	4:30 PM	44.2	86	4	NW	29.065	0
204	10/7/2018	4:45 PM	43.7	89	4	NNW	29.07	0
205	10/7/2018	5:00 PM	42.9	91	4	NNW	29.07	0
206	10/7/2018	5:15 PM	42.4	92	5	NW	29.076	0
207	10/7/2018	5:30 PM	42.4	93	5	NW	29.087	0
208	10/7/2018	5:45 PM	42.2	93	5	NW	29.085	0
209	10/7/2018	6:00 PM	42.1	94	5	NW	29.095	0
210	10/7/2018	6:15 PM	42.1	94	4	NW	29.098	0
211	10/7/2018	6:30 PM	42.3	94	4	NW	29.106	0
212	10/7/2018	6:45 PM	42.3	95	4	NW	29.115	0.01
213	10/7/2018	7:00 PM	42.3	95	5	NW	29.112	0
214	10/7/2018	7:15 PM	42	95	5	NW	29.122	0

	A	B	C	F	H	I	O	P
1	Back 40	APPENDIX B: WEATHER DATA						
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
215	10/7/2018	7:30 PM	41.9	95	5	NW	29.12	0
216	10/7/2018	7:45 PM	41.7	95	5	NW	29.125	0
217	10/7/2018	8:00 PM	41.5	95	7	NW	29.122	0.01
218	10/7/2018	8:15 PM	41.7	95	6	NW	29.128	0
219	10/7/2018	8:30 PM	41.8	95	6	NW	29.128	0
220	10/7/2018	8:45 PM	41.8	95	6	NW	29.126	0
221	10/7/2018	9:00 PM	41.7	95	6	NW	29.124	0
222	10/7/2018	9:15 PM	41.5	95	7	NW	29.129	0
223	10/7/2018	9:30 PM	41.4	95	5	NW	29.148	0.01
224	10/7/2018	9:45 PM	41.3	95	4	NW	29.145	0.01
225	10/7/2018	10:00 PM	40.9	95	5	NW	29.151	0.03
226	10/7/2018	10:15 PM	41	95	5	NW	29.15	0.01
227	10/7/2018	10:30 PM	40.5	95	4	NNW	29.146	0
228	10/7/2018	10:45 PM	40.5	95	4	NNW	29.152	0
229	10/7/2018	11:00 PM	40.2	95	4	NNW	29.139	0
230	10/7/2018	11:15 PM	40.1	95	3	NNW	29.142	0
231	10/7/2018	11:30 PM	40	95	4	NNW	29.153	0
232	10/7/2018	11:45 PM	39.6	95	3	NNW	29.161	0.01
233	10/8/2018	12:00 AM	39.4	95	2	NNE	29.158	0
234	10/8/2018	12:15 AM	39.1	95	3	NE	29.155	0
235	10/8/2018	12:30 AM	39.1	95	2	NE	29.163	0
236	10/8/2018	12:45 AM	39.1	95	2	NNW	29.175	0
237	10/8/2018	1:00 AM	39.1	95	3	NNW	29.165	0
238	10/8/2018	1:15 AM	38.9	95	2	NNW	29.158	0
239	10/8/2018	1:30 AM	38.8	95	2	NE	29.158	0
240	10/8/2018	1:45 AM	38.8	95	2	NNW	29.153	0.01
241	10/8/2018	2:00 AM	38.6	95	2	N	29.165	0
242	10/8/2018	2:15 AM	38.5	95	2	NNW	29.163	0.01
243	10/8/2018	2:30 AM	38.2	95	3	NNW	29.161	0.01
244	10/8/2018	2:45 AM	38.1	95	3	NNW	29.164	0
245	10/8/2018	3:00 AM	37.9	95	3	NNW	29.158	0
246	10/8/2018	3:15 AM	37.7	95	2	NNW	29.156	0
247	10/8/2018	3:30 AM	37.7	95	2	NNW	29.162	0
248	10/8/2018	3:45 AM	37.6	95	2	NNW	29.166	0.01
249	10/8/2018	4:00 AM	37.4	95	3	NNW	29.164	0
250	10/8/2018	4:15 AM	37.1	95	4	NNW	29.162	0
251	10/8/2018	4:30 AM	37.1	95	3	NNW	29.165	0.01
252	10/8/2018	4:45 AM	36.4	95	4	NNW	29.162	0.01
253	10/8/2018	5:00 AM	36.4	95	2	NNW	29.172	0
254	10/8/2018	5:15 AM	36.1	95	3	NNW	29.17	0.01
255	10/8/2018	5:30 AM	35.9	95	3	NNW	29.178	0
256	10/8/2018	5:45 AM	35.7	95	2	NE	29.175	0

	A	B	C	F	H	I	O	P
1	Back 40		APPENDIX B: WEATHER DATA					
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
257	10/8/2018	6:00 AM	35.4	94	2	NE	29.182	0
258	10/8/2018	6:15 AM	35.4	94	1	N	29.182	0
259	10/8/2018	6:30 AM	35.4	95	1	NE	29.184	0
260	10/8/2018	6:45 AM	35.5	95	2	ENE	29.177	0
261	10/8/2018	7:00 AM	35.5	95	3	NNE	29.167	0
262	10/8/2018	7:15 AM	35.3	95	2	NW	29.201	0
263	10/8/2018	7:30 AM	35.5	95	1	NNW	29.205	0
264	10/8/2018	7:45 AM	35.6	95	1	NE	29.2	0
265	10/8/2018	8:00 AM	35.6	95	2	NNE	29.203	0
266	10/8/2018	8:15 AM	35.7	95	2	N	29.209	0
267	10/8/2018	8:30 AM	35.8	95	2	NNW	29.213	0
268	10/8/2018	8:45 AM	36.1	95	2	NNW	29.213	0
269	10/8/2018	9:00 AM	36.2	95	1	NE	29.21	0
270	10/8/2018	9:15 AM	36.6	95	2	NE	29.209	0
271	10/8/2018	9:30 AM	36.6	94	2	NE	29.21	0
272	10/8/2018	9:45 AM	36.6	95	2	NNW	29.211	0
273	10/8/2018	10:00 AM	36.9	94	2	NE	29.208	0
274	10/8/2018	10:15 AM	36.7	93	2	NNE	29.214	0
275	10/8/2018	10:30 AM	37.1	94	3	NNE	29.201	0
276	10/8/2018	10:45 AM	37	94	2	NE	29.203	0
277	10/8/2018	11:00 AM	37.1	94	2	NE	29.203	0
278	10/8/2018	11:15 AM	36.9	94	2	NNE	29.196	0
279	10/8/2018	11:30 AM	36.7	92	3	NE	29.196	0.02
280	10/8/2018	11:45 AM	37.3	93	3	NNE	29.196	0
281	10/8/2018	12:00 PM	37.2	93	2	ENE	29.192	0.01
282	10/8/2018	12:15 PM	38	93	2	ENE	29.186	0
283	10/8/2018	12:30 PM	37.6	93	2	NNE	29.191	0
284	10/8/2018	12:45 PM	37.7	92	2	NE	29.183	0
285	10/8/2018	1:00 PM	38.2	92	2	ENE	29.178	0
286	10/8/2018	1:15 PM	38.1	92	2	NE	29.171	0
287	10/8/2018	1:30 PM	38.4	92	2	NE	29.17	0
288	10/8/2018	1:45 PM	38.2	91	2	NE	29.167	0
289	10/8/2018	2:00 PM	38	92	2	ENE	29.166	0
290	10/8/2018	2:15 PM	37.9	92	2	NE	29.162	0
291	10/8/2018	2:30 PM	38.1	92	2	NE	29.158	0.01
292	10/8/2018	2:45 PM	37.9	93	2	ENE	29.16	0
293	10/8/2018	3:00 PM	38.4	92	2	ENE	29.157	0
294	10/8/2018	3:15 PM	38.5	92	2	NE	29.162	0
295	10/8/2018	3:30 PM	38.7	91	2	NE	29.168	0
296	10/8/2018	3:45 PM	38.8	91	2	NE	29.17	0
297	10/8/2018	4:00 PM	38.8	90	2	NNW	29.171	0
298	10/8/2018	4:15 PM	38.7	90	2	NE	29.166	0

	A	B	C	F	H	I	O	P
1	Back 40	APPENDIX B: WEATHER DATA						
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
299	10/8/2018	4:30 PM	38.8	90	1	NE	29.165	0
300	10/8/2018	4:45 PM	38.7	90	1	NE	29.171	0
301	10/8/2018	5:00 PM	38.9	90	1	NE	29.17	0
302	10/8/2018	5:15 PM	38.7	89	2	NE	29.175	0
303	10/8/2018	5:30 PM	38.7	89	1	ENE	29.184	0
304	10/8/2018	5:45 PM	38.7	89	1	NE	29.189	0
305	10/8/2018	6:00 PM	38.5	91	1	ENE	29.19	0
306	10/8/2018	6:15 PM	38	92	1	NNE	29.19	0
307	10/8/2018	6:30 PM	37.5	92	2	NE	29.197	0
308	10/8/2018	6:45 PM	37.3	93	2	NE	29.201	0
309	10/8/2018	7:00 PM	37.1	94	2	NNW	29.21	0
310	10/8/2018	7:15 PM	37.2	94	2	NNE	29.211	0
311	10/8/2018	7:30 PM	37	93	3	NNW	29.22	0
312	10/8/2018	7:45 PM	36.8	93	2	NE	29.233	0
313	10/8/2018	8:00 PM	36.9	94	1	NE	29.237	0
314	10/8/2018	8:15 PM	36.8	94	1	N	29.246	0
315	10/8/2018	8:30 PM	36.7	94	1	NE	29.247	0.01
316	10/8/2018	8:45 PM	36.6	94	0	E	29.242	0
317	10/8/2018	9:00 PM	36.5	94	1	NE	29.246	0
318	10/8/2018	9:15 PM	36.5	95	0	ENE	29.249	0
319	10/8/2018	9:30 PM	36.7	95	0	ENE	29.252	0
320	10/8/2018	9:45 PM	36.6	94	1	ENE	29.257	0
321	10/8/2018	10:00 PM	36.7	94	0	ENE	29.257	0
322	10/8/2018	10:15 PM	36.7	94	0	NE	29.257	0
323	10/8/2018	10:30 PM	36.8	94	0	ENE	29.249	0
324	10/8/2018	10:45 PM	36.9	94	1	NE	29.248	0
325	10/8/2018	11:00 PM	37	93	2	ENE	29.251	0
326	10/8/2018	11:15 PM	36.9	93	2	E	29.256	0
327	10/8/2018	11:30 PM	37	93	0	ENE	29.251	0
328	10/8/2018	11:45 PM	36.8	93	0	---	29.26	0
329	10/9/2018	12:00 AM	36.8	93	0	---	29.26	0
330	10/9/2018	12:15 AM	37	93	0	NNW	29.253	0
331	10/9/2018	12:30 AM	36.7	94	2	N	29.26	0
332	10/9/2018	12:45 AM	36.3	94	3	NNW	29.252	0
333	10/9/2018	1:00 AM	36.3	94	1	NNW	29.272	0
334	10/9/2018	1:15 AM	36.5	94	1	NNW	29.262	0
335	10/9/2018	1:30 AM	36.5	94	2	NNW	29.255	0
336	10/9/2018	1:45 AM	36.4	94	2	NNW	29.273	0
337	10/9/2018	2:00 AM	36.3	94	1	NE	29.264	0
338	10/9/2018	2:15 AM	36.2	94	1	NE	29.257	0
339	10/9/2018	2:30 AM	35.9	94	1	NNE	29.261	0
340	10/9/2018	2:45 AM	35.7	95	1	ENE	29.256	0

	A	B	C	F	H	I	O	P
1	Back 40	APPENDIX B: WEATHER DATA						
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
341	10/9/2018	3:00 AM	35.7	95	1	ENE	29.263	0
342	10/9/2018	3:15 AM	35.6	95	1	E	29.252	0
343	10/9/2018	3:30 AM	35.6	95	1	ENE	29.252	0
344	10/9/2018	3:45 AM	35.6	95	1	E	29.25	0
345	10/9/2018	4:00 AM	35.7	95	0	E	29.24	0
346	10/9/2018	4:15 AM	35.8	95	0	E	29.242	0
347	10/9/2018	4:30 AM	35.6	95	1	ENE	29.226	0.01
348	10/9/2018	4:45 AM	35.6	95	0	NE	29.223	0
349	10/9/2018	5:00 AM	35.5	95	0	ENE	29.219	0
350	10/9/2018	5:15 AM	35.5	95	0	---	29.224	0
351	10/9/2018	5:30 AM	35.6	95	0	E	29.228	0
352	10/9/2018	5:45 AM	35.4	95	1	ENE	29.232	0
353	10/9/2018	6:00 AM	35.3	95	1	ENE	29.234	0
354	10/9/2018	6:15 AM	35.3	95	1	E	29.232	0
355	10/9/2018	6:30 AM	35.1	95	1	E	29.234	0
356	10/9/2018	6:45 AM	35.1	95	1	ENE	29.237	0
357	10/9/2018	7:00 AM	35.1	95	1	E	29.243	0
358	10/9/2018	7:15 AM	34.8	94	2	NE	29.238	0
359	10/9/2018	7:30 AM	34.5	95	2	NE	29.241	0
360	10/9/2018	7:45 AM	34.4	95	1	NE	29.243	0
361	10/9/2018	8:00 AM	34.5	95	1	NE	29.25	0
362	10/9/2018	8:15 AM	34.6	94	1	ENE	29.253	0
363	10/9/2018	8:30 AM	34.8	94	1	ENE	29.255	0
364	10/9/2018	8:45 AM	34.9	94	1	NNW	29.251	0
365	10/9/2018	9:00 AM	35	94	2	NE	29.242	0
366	10/9/2018	9:15 AM	35.2	93	3	NNW	29.248	0
367	10/9/2018	9:30 AM	35.4	92	3	NNW	29.249	0
368	10/9/2018	9:45 AM	35.5	93	2	NNE	29.25	0
369	10/9/2018	10:00 AM	35.3	91	3	NNW	29.246	0
370	10/9/2018	10:15 AM	35.3	92	3	NNW	29.246	0
371	10/9/2018	10:30 AM	35.4	92	3	NNW	29.241	0
372	10/9/2018	10:45 AM	35.1	92	4	NNW	29.235	0
373	10/9/2018	11:00 AM	35.1	92	4	NNW	29.24	0
374	10/9/2018	11:15 AM	35	92	4	NNW	29.235	0
375	10/9/2018	11:30 AM	35	92	4	NNW	29.231	0
376	10/9/2018	11:45 AM	34.9	92	3	NNW	29.231	0
377	10/9/2018	12:00 PM	34.6	92	4	NNW	29.232	0
378	10/9/2018	12:15 PM	34.7	92	4	NNW	29.24	0
379	10/9/2018	12:30 PM	34.7	92	3	NNW	29.241	0
380	10/9/2018	12:45 PM	33.9	93	3	NNE	29.237	0.01
381	10/9/2018	1:00 PM	33.9	94	3	NNW	29.232	0
382	10/9/2018	1:15 PM	34.1	94	3	NNW	29.233	0.01

	A	B	C	F	H	I	O	P
1	Back 40		APPENDIX B: WEATHER DATA					
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
383	10/9/2018	1:30 PM	33.5	94	3	NE	29.234	0
384	10/9/2018	1:45 PM	33.6	94	2	NE	29.228	0
385	10/9/2018	2:00 PM	33.5	94	3	NNW	29.225	0.01
386	10/9/2018	2:15 PM	33.4	94	3	NNW	29.218	0
387	10/9/2018	2:30 PM	33.4	94	2	NNW	29.217	0
388	10/9/2018	2:45 PM	33.5	94	3	NNW	29.218	0
389	10/9/2018	3:00 PM	33.6	94	2	NNW	29.216	0
390	10/9/2018	3:15 PM	33.8	94	2	NNW	29.212	0
391	10/9/2018	3:30 PM	34.1	94	2	NNW	29.208	0
392	10/9/2018	3:45 PM	34.4	93	2	NNW	29.208	0
393	10/9/2018	4:00 PM	34.4	92	3	NNW	29.206	0.01
394	10/9/2018	4:15 PM	34.7	92	3	NW	29.201	0
395	10/9/2018	4:30 PM	34.8	93	3	NNW	29.198	0
396	10/9/2018	4:45 PM	35.1	92	3	NNW	29.195	0
397	10/9/2018	5:00 PM	34.8	92	3	N	29.194	0
398	10/9/2018	5:15 PM	34.7	92	3	NNW	29.192	0
399	10/9/2018	5:30 PM	34.5	92	2	NNW	29.192	0
400	10/9/2018	5:45 PM	34	92	2	NE	29.195	0
401	10/9/2018	6:00 PM	33.9	93	2	NE	29.201	0
402	10/9/2018	6:15 PM	33.7	93	1	NE	29.207	0
403	10/9/2018	6:30 PM	33.4	94	2	NNW	29.209	0
404	10/9/2018	6:45 PM	33.3	94	1	NE	29.213	0
405	10/9/2018	7:00 PM	33.3	94	1	NE	29.213	0
406	10/9/2018	7:15 PM	33.3	94	1	NE	29.219	0
407	10/9/2018	7:30 PM	33.4	93	1	ENE	29.22	0
408	10/9/2018	7:45 PM	33.4	93	0	NE	29.223	0
409	10/9/2018	8:00 PM	33.5	93	0	ENE	29.235	0
410	10/9/2018	8:15 PM	33.6	93	0	ENE	29.241	0
411	10/9/2018	8:30 PM	33.7	93	1	NE	29.242	0
412	10/9/2018	8:45 PM	33.6	93	1	N	29.243	0
413	10/9/2018	9:00 PM	33.5	93	2	NE	29.243	0
414	10/9/2018	9:15 PM	33.4	92	1	ENE	29.25	0
415	10/9/2018	9:30 PM	33.3	91	1	ENE	29.251	0
416	10/9/2018	9:45 PM	33.3	91	1	NE	29.251	0
417	10/9/2018	10:00 PM	33.2	90	1	NE	29.247	0
418	10/9/2018	10:15 PM	33.2	91	0	NNW	29.259	0
419	10/9/2018	10:30 PM	33.2	91	1	NNW	29.26	0
420	10/9/2018	10:45 PM	33.2	91	0	ENE	29.256	0
421	10/9/2018	11:00 PM	33.3	91	1	NE	29.26	0
422	10/9/2018	11:15 PM	33.2	92	1	ENE	29.265	0
423	10/9/2018	11:30 PM	32.9	93	1	ENE	29.266	0
424	10/9/2018	11:45 PM	32.5	94	1	ENE	29.269	0

	A	B	C	F	H	I	O	P
1	Back 40		APPENDIX B: WEATHER DATA					
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
425	10/10/2018	12:00 AM	31.9	94	2	E	29.27	0
426	10/10/2018	12:15 AM	31.6	94	2	E	29.272	0
427	10/10/2018	12:30 AM	31.4	94	2	E	29.271	0
428	10/10/2018	12:45 AM	31.1	94	2	ENE	29.275	0
429	10/10/2018	1:00 AM	31	95	2	E	29.273	0
430	10/10/2018	1:15 AM	30.9	95	2	ENE	29.271	0
431	10/10/2018	1:30 AM	30.8	94	2	NE	29.274	0
432	10/10/2018	1:45 AM	30.7	94	1	NE	29.277	0
433	10/10/2018	2:00 AM	30.9	92	1	E	29.274	0
434	10/10/2018	2:15 AM	31	92	1	ENE	29.271	0
435	10/10/2018	2:30 AM	30.9	90	1	E	29.277	0
436	10/10/2018	2:45 AM	30.8	91	1	ENE	29.273	0
437	10/10/2018	3:00 AM	30.7	92	0	E	29.268	0
438	10/10/2018	3:15 AM	30.6	92	1	E	29.272	0
439	10/10/2018	3:30 AM	30.6	92	1	E	29.272	0
440	10/10/2018	3:45 AM	30.5	92	1	NE	29.28	0
441	10/10/2018	4:00 AM	30.5	93	0	N	29.278	0
442	10/10/2018	4:15 AM	30.5	93	0	NNW	29.271	0
443	10/10/2018	4:30 AM	30.4	92	1	N	29.273	0
444	10/10/2018	4:45 AM	30.4	91	1	NE	29.28	0
445	10/10/2018	5:00 AM	30.3	91	1	NE	29.278	0
446	10/10/2018	5:15 AM	30.4	91	0	NNE	29.282	0
447	10/10/2018	5:30 AM	30.4	90	0	NE	29.285	0
448	10/10/2018	5:45 AM	30.3	90	0	NNE	29.284	0
449	10/10/2018	6:00 AM	30	90	1	NE	29.284	0
450	10/10/2018	6:15 AM	29.9	91	1	NE	29.296	0
451	10/10/2018	6:30 AM	29.7	92	1	NNE	29.299	0
452	10/10/2018	6:45 AM	29.7	93	1	NE	29.294	0
453	10/10/2018	7:00 AM	29.4	93	1	NE	29.293	0
454	10/10/2018	7:15 AM	29.4	94	1	ENE	29.292	0
455	10/10/2018	7:30 AM	29.5	94	1	ENE	29.296	0
456	10/10/2018	7:45 AM	29.6	94	1	NE	29.297	0
457	10/10/2018	8:00 AM	29.7	94	1	NE	29.3	0
458	10/10/2018	8:15 AM	29.9	94	1	NNE	29.299	0
459	10/10/2018	8:30 AM	29.8	94	1	NE	29.299	0
460	10/10/2018	8:45 AM	29.8	94	1	N	29.308	0
461	10/10/2018	9:00 AM	29.9	95	1	N	29.308	0
462	10/10/2018	9:15 AM	30	94	1	ENE	29.31	0
463	10/10/2018	9:30 AM	30.2	95	1	NE	29.306	0
464	10/10/2018	9:45 AM	30.6	94	1	E	29.305	0
465	10/10/2018	10:00 AM	30.8	94	1	NE	29.305	0
466	10/10/2018	10:15 AM	31.6	94	1	E	29.299	0

	A	B	C	F	H	I	O	P
1	Back 40		APPENDIX B: WEATHER DATA					
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
467	10/10/2018	10:30 AM	32.1	92	1	ENE	29.302	0
468	10/10/2018	10:45 AM	32.2	90	2	E	29.304	0
469	10/10/2018	11:00 AM	32.6	90	1	ENE	29.304	0
470	10/10/2018	11:15 AM	32.4	90	2	NE	29.305	0
471	10/10/2018	11:30 AM	32.3	91	2	NE	29.305	0
472	10/10/2018	11:45 AM	32.1	92	3	NNE	29.32	0
473	10/10/2018	12:00 PM	31.9	93	2	N	29.324	0
474	10/10/2018	12:15 PM	31.8	93	2	NE	29.317	0
475	10/10/2018	12:30 PM	31.8	94	2	NE	29.322	0
476	10/10/2018	12:45 PM	32.6	94	2	NE	29.307	0
477	10/10/2018	1:00 PM	33.8	93	2	ENE	29.295	0
478	10/10/2018	1:15 PM	34.1	91	1	E	29.307	0
479	10/10/2018	1:30 PM	35	89	1	E	29.3	0
480	10/10/2018	1:45 PM	34.5	89	2	E	29.285	0
481	10/10/2018	2:00 PM	34.9	87	2	E	29.291	0
482	10/10/2018	2:15 PM	34.5	86	1	ENE	29.294	0.01
483	10/10/2018	2:30 PM	34.2	90	2	NNW	29.288	0
484	10/10/2018	2:45 PM	32.9	92	2	NW	29.292	0
485	10/10/2018	3:00 PM	33.4	94	2	NNW	29.295	0
486	10/10/2018	3:15 PM	33.3	93	3	NNW	29.313	0
487	10/10/2018	3:30 PM	33.5	93	2	N	29.324	0.01
488	10/10/2018	3:45 PM	33.2	93	2	NE	29.322	0
489	10/10/2018	4:00 PM	33.3	93	2	NE	29.328	0
490	10/10/2018	4:15 PM	33.4	91	2	ENE	29.329	0
491	10/10/2018	4:30 PM	33.3	90	3	ENE	29.331	0
492	10/10/2018	4:45 PM	33.3	89	2	ENE	29.344	0
493	10/10/2018	5:00 PM	33.5	89	1	NE	29.349	0
494	10/10/2018	5:15 PM	33.5	89	1	NE	29.346	0
495	10/10/2018	5:30 PM	33.7	89	1	NE	29.354	0
496	10/10/2018	5:45 PM	33.5	88	1	ENE	29.361	0
497	10/10/2018	6:00 PM	33.5	88	1	E	29.364	0
498	10/10/2018	6:15 PM	33.3	88	1	ENE	29.379	0
499	10/10/2018	6:30 PM	33.2	89	1	E	29.378	0
500	10/10/2018	6:45 PM	33	90	1	ENE	29.389	0
501	10/10/2018	7:00 PM	32.7	91	1	E	29.397	0
502	10/10/2018	7:15 PM	32.6	92	1	ESE	29.397	0
503	10/10/2018	7:30 PM	32.5	92	1	ESE	29.399	0
504	10/10/2018	7:45 PM	32.5	93	1	ESE	29.403	0
505	10/10/2018	8:00 PM	32.7	92	1	ESE	29.407	0
506	10/10/2018	8:15 PM	32.7	92	0	ESE	29.412	0
507	10/10/2018	8:30 PM	32.7	92	0	ESE	29.411	0
508	10/10/2018	8:45 PM	32.7	91	1	ESE	29.41	0

	A	B	C	F	H	I	O	P
1	Back 40	APPENDIX B: WEATHER DATA						
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
509	10/10/2018	9:00 PM	32.8	92	0	ESE	29.416	0
510	10/10/2018	9:15 PM	32.9	91	0	ESE	29.423	0
511	10/10/2018	9:30 PM	33	90	1	ESE	29.428	0
512	10/10/2018	9:45 PM	32.9	90	1	ESE	29.43	0
513	10/10/2018	10:00 PM	33	91	0	ESE	29.434	0
514	10/10/2018	10:15 PM	33	90	2	ESE	29.434	0
515	10/10/2018	10:30 PM	33.1	91	2	ESE	29.434	0
516	10/10/2018	10:45 PM	32.9	92	2	E	29.431	0
517	10/10/2018	11:00 PM	32.8	92	3	ESE	29.428	0
518	10/10/2018	11:15 PM	32.9	92	2	ESE	29.427	0
519	10/10/2018	11:30 PM	33	92	1	ESE	29.434	0
520	10/10/2018	11:45 PM	33	92	1	ENE	29.431	0
521	10/11/2018	12:00 AM	33.1	92	0	ENE	29.43	0
522	10/11/2018	12:15 AM	33.2	93	0	ENE	29.423	0
523	10/11/2018	12:30 AM	33.2	93	0	ENE	29.42	0
524	10/11/2018	12:45 AM	33.3	92	0	NNE	29.419	0
525	10/11/2018	1:00 AM	33.3	92	0	NNW	29.419	0
526	10/11/2018	1:15 AM	33.3	92	1	NNW	29.42	0
527	10/11/2018	1:30 AM	33.4	92	0	N	29.423	0
528	10/11/2018	1:45 AM	33.6	92	0	NNE	29.423	0
529	10/11/2018	2:00 AM	33.6	91	0	E	29.419	0
530	10/11/2018	2:15 AM	33.7	92	0	E	29.417	0
531	10/11/2018	2:30 AM	33.6	92	0	E	29.415	0
532	10/11/2018	2:45 AM	33.7	92	0	---	29.414	0
533	10/11/2018	3:00 AM	33.7	92	0	WNW	29.408	0
534	10/11/2018	3:15 AM	33.7	92	0	NW	29.404	0
535	10/11/2018	3:30 AM	33.7	92	0	NW	29.396	0
536	10/11/2018	3:45 AM	33.7	92	0	NW	29.392	0
537	10/11/2018	4:00 AM	33.7	92	0	N	29.384	0
538	10/11/2018	4:15 AM	33.6	93	0	N	29.38	0
539	10/11/2018	4:30 AM	33.9	92	0	WNW	29.389	0
540	10/11/2018	4:45 AM	33.7	92	0	W	29.389	0
541	10/11/2018	5:00 AM	33.5	92	0	---	29.388	0
542	10/11/2018	5:15 AM	33.9	91	0	W	29.382	0
543	10/11/2018	5:30 AM	33.9	91	0	---	29.373	0
544	10/11/2018	5:45 AM	33.9	91	0	---	29.377	0
545	10/11/2018	6:00 AM	34	90	0	---	29.381	0
546	10/11/2018	6:15 AM	34.2	90	0	NNW	29.378	0
547	10/11/2018	6:30 AM	34.3	89	0	NNW	29.377	0
548	10/11/2018	6:45 AM	34.4	90	0	N	29.373	0
549	10/11/2018	7:00 AM	34.2	90	0	ENE	29.369	0
550	10/11/2018	7:15 AM	34.3	90	0	N	29.368	0

	A	B	C	F	H	I	O	P
1	Back 40		APPENDIX B: WEATHER DATA					
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
551	10/11/2018	7:30 AM	34.2	91	0	---	29.37	0
552	10/11/2018	7:45 AM	34.4	92	0	NNW	29.368	0
553	10/11/2018	8:00 AM	34.5	92	0	N	29.371	0
554	10/11/2018	8:15 AM	34.7	92	0	NNW	29.371	0
555	10/11/2018	8:30 AM	35	91	0	NNW	29.373	0
556	10/11/2018	8:45 AM	35.1	90	1	NW	29.377	0
557	10/11/2018	9:00 AM	35.2	91	1	N	29.377	0
558	10/11/2018	9:15 AM	35.3	91	2	NW	29.376	0
559	10/11/2018	9:30 AM	35.2	90	1	NW	29.377	0
560	10/11/2018	9:45 AM	35.4	90	1	NW	29.377	0
561	10/11/2018	10:00 AM	35.5	89	1	NNW	29.378	0
562	10/11/2018	10:15 AM	35.8	90	2	NW	29.371	0
563	10/11/2018	10:30 AM	36.1	88	1	NW	29.363	0
564	10/11/2018	10:45 AM	37	89	0	NE	29.353	0
565	10/11/2018	11:00 AM	38.2	87	0	NW	29.354	0
566	10/11/2018	11:15 AM	38.3	85	0	NE	29.349	0
567	10/11/2018	11:30 AM	38.3	86	1	NE	29.337	0
568	10/11/2018	11:45 AM	40.2	84	0	E	29.328	0
569	10/11/2018	12:00 PM	40.9	83	1	NW	29.316	0
570	10/11/2018	12:15 PM	44.3	82	1	E	29.306	0
571	10/11/2018	12:30 PM	45.8	75	1	ESE	29.294	0
572	10/11/2018	12:45 PM	46	76	1	E	29.277	0
573	10/11/2018	1:00 PM	44.9	80	2	ESE	29.26	0
574	10/11/2018	1:15 PM	46.2	75	2	ESE	29.248	0
575	10/11/2018	1:30 PM	47.2	75	1	ESE	29.231	0
576	10/11/2018	1:45 PM	49.5	72	1	ESE	29.234	0
577	10/11/2018	2:00 PM	49.6	73	1	ESE	29.214	0
578	10/11/2018	2:15 PM	49.3	72	2	ESE	29.2	0
579	10/11/2018	2:30 PM	49.3	72	2	ENE	29.192	0
580	10/11/2018	2:45 PM	49	71	1	E	29.18	0
581	10/11/2018	3:00 PM	48.3	72	1	ENE	29.171	0
582	10/11/2018	3:15 PM	50.6	69	1	NNE	29.168	0
583	10/11/2018	3:30 PM	50.1	70	2	NW	29.158	0
584	10/11/2018	3:45 PM	49.9	70	4	NW	29.151	0
585	10/11/2018	4:00 PM	48.4	72	6	NNW	29.154	0
586	10/11/2018	4:15 PM	46.7	74	7	NNW	29.159	0
587	10/11/2018	4:30 PM	45.8	76	7	NW	29.156	0
588	10/11/2018	4:45 PM	44.3	78	8	NNW	29.175	0
589	10/11/2018	5:00 PM	43	79	8	NW	29.194	0
590	10/11/2018	5:15 PM	42.2	81	7	NNW	29.193	0
591	10/11/2018	5:30 PM	41.3	85	4	NNW	29.19	0
592	10/11/2018	5:45 PM	40.9	86	1	NE	29.173	0

	A	B	C	F	H	I	O	P
1	Back 40		APPENDIX B: WEATHER DATA					
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
593	10/11/2018	6:00 PM	40.9	85	0	E	29.192	0
594	10/11/2018	6:15 PM	40.7	85	1	NW	29.2	0
595	10/11/2018	6:30 PM	40.4	88	1	NW	29.212	0
596	10/11/2018	6:45 PM	39.7	89	1	NNW	29.213	0
597	10/11/2018	7:00 PM	38.8	90	0	N	29.22	0
598	10/11/2018	7:15 PM	38.6	91	1	NNW	29.225	0
599	10/11/2018	7:30 PM	38.5	92	1	NNW	29.231	0
600	10/11/2018	7:45 PM	38.2	92	1	NNW	29.228	0
601	10/11/2018	8:00 PM	37.8	92	0	E	29.227	0
602	10/11/2018	8:15 PM	37.3	93	0	N	29.236	0
603	10/11/2018	8:30 PM	36.7	93	0	W	29.241	0
604	10/11/2018	8:45 PM	36.3	94	0	SSW	29.246	0
605	10/11/2018	9:00 PM	36.1	94	0	SSW	29.247	0
606	10/11/2018	9:15 PM	36.1	94	0	SW	29.243	0
607	10/11/2018	9:30 PM	35.5	94	0	SW	29.244	0
608	10/11/2018	9:45 PM	35.1	94	0	SW	29.238	0
609	10/11/2018	10:00 PM	35.1	95	0	SSW	29.239	0
610	10/11/2018	10:15 PM	35.2	95	0	SSW	29.235	0
611	10/11/2018	10:30 PM	35.6	95	0	W	29.238	0
612	10/11/2018	10:45 PM	35.8	95	0	SSW	29.237	0
613	10/11/2018	11:00 PM	35.6	95	0	SSW	29.238	0
614	10/11/2018	11:15 PM	35.3	95	0	S	29.235	0
615	10/11/2018	11:30 PM	35.6	95	0	ESE	29.238	0
616	10/11/2018	11:45 PM	35.6	95	0	SSW	29.236	0
617	10/12/2018	12:00 AM	34.9	95	0	ESE	29.241	0
618	10/12/2018	12:15 AM	34.2	95	0	SE	29.243	0
619	10/12/2018	12:30 AM	33.2	95	0	ESE	29.245	0
620	10/12/2018	12:45 AM	32.6	95	0	---	29.24	0
621	10/12/2018	1:00 AM	32.1	95	0	---	29.251	0
622	10/12/2018	1:15 AM	32.7	96	0	NW	29.258	0
623	10/12/2018	1:30 AM	32.9	96	1	NNW	29.258	0
624	10/12/2018	1:45 AM	33.5	96	1	NW	29.279	0.01
625	10/12/2018	2:00 AM	33.9	96	1	NW	29.281	0
626	10/12/2018	2:15 AM	34.6	96	0	NW	29.287	0
627	10/12/2018	2:30 AM	34.8	96	0	NNW	29.284	0
628	10/12/2018	2:45 AM	34.9	96	0	E	29.281	0
629	10/12/2018	3:00 AM	35	96	0	SSW	29.279	0
630	10/12/2018	3:15 AM	35.2	96	0	ESE	29.281	0
631	10/12/2018	3:30 AM	35.5	96	0	SSW	29.278	0
632	10/12/2018	3:45 AM	35.5	96	0	SSW	29.271	0
633	10/12/2018	4:00 AM	35.5	96	0	S	29.274	0
634	10/12/2018	4:15 AM	35.1	96	0	SSW	29.278	0

	A	B	C	F	H	I	O	P
1	Back 40		APPENDIX B: WEATHER DATA					
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
635	10/12/2018	4:30 AM	34.9	96	0	SSW	29.285	0
636	10/12/2018	4:45 AM	34.9	96	0	S	29.282	0
637	10/12/2018	5:00 AM	34.9	96	1	ESE	29.294	0
638	10/12/2018	5:15 AM	34.6	96	1	S	29.293	0
639	10/12/2018	5:30 AM	34.5	96	1	S	29.287	0
640	10/12/2018	5:45 AM	34.1	96	1	ESE	29.298	0
641	10/12/2018	6:00 AM	34.1	96	0	SSE	29.29	0
642	10/12/2018	6:15 AM	34	96	1	ESE	29.298	0
643	10/12/2018	6:30 AM	32.6	95	0	SSW	29.307	0
644	10/12/2018	6:45 AM	33.2	96	0	W	29.313	0
645	10/12/2018	7:00 AM	34.3	96	0	W	29.32	0
646	10/12/2018	7:15 AM	33	94	3	ESE	29.336	0
647	10/12/2018	7:30 AM	33	95	1	ESE	29.341	0
648	10/12/2018	7:45 AM	33.5	93	1	ESE	29.351	0
649	10/12/2018	8:00 AM	33.2	94	1	ENE	29.36	0
650	10/12/2018	8:15 AM	33.8	95	0	ESE	29.361	0
651	10/12/2018	8:30 AM	34.4	95	0	ESE	29.352	0
652	10/12/2018	8:45 AM	34.9	95	0	ESE	29.365	0
653	10/12/2018	9:00 AM	37.8	94	1	ESE	29.364	0
654	10/12/2018	9:15 AM	40.9	87	0	ESE	29.356	0
655	10/12/2018	9:30 AM	40.7	87	2	ESE	29.351	0
656	10/12/2018	9:45 AM	40.6	87	3	ESE	29.343	0
657	10/12/2018	10:00 AM	42.1	86	3	ESE	29.34	0
658	10/12/2018	10:15 AM	44.1	81	2	ESE	29.328	0
659	10/12/2018	10:30 AM	46.2	76	2	ESE	29.324	0
660	10/12/2018	10:45 AM	47.4	74	3	ESE	29.315	0
661	10/12/2018	11:00 AM	48.6	69	3	ESE	29.304	0
662	10/12/2018	11:15 AM	49.9	69	3	ESE	29.304	0
663	10/12/2018	11:30 AM	51.7	67	2	ESE	29.293	0
664	10/12/2018	11:45 AM	53.5	63	2	ESE	29.279	0
665	10/12/2018	12:00 PM	55.5	57	2	ESE	29.274	0
666	10/12/2018	12:15 PM	56.6	55	2	ESE	29.257	0
667	10/12/2018	12:30 PM	58	51	1	ESE	29.243	0
668	10/12/2018	12:45 PM	58.5	50	1	ENE	29.232	0
669	10/12/2018	1:00 PM	60.8	50	2	ESE	29.222	0
670	10/12/2018	1:15 PM	60.7	51	1	SSW	29.207	0
671	10/12/2018	1:30 PM	60.8	48	2	ESE	29.196	0
672	10/12/2018	1:45 PM	61	48	2	ESE	29.184	0
673	10/12/2018	2:00 PM	60	50	2	ESE	29.167	0
674	10/12/2018	2:15 PM	60.7	49	2	ESE	29.159	0
675	10/12/2018	2:30 PM	61.1	48	2	ESE	29.146	0
676	10/12/2018	2:45 PM	61.9	46	2	ESE	29.135	0

	A	B	C	F	H	I	O	P
1	Back 40	APPENDIX B: WEATHER DATA						
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
677	10/12/2018	3:00 PM	61.6	47	2	E	29.125	0
678	10/12/2018	3:15 PM	61.7	47	1	E	29.119	0
679	10/12/2018	3:30 PM	62.5	46	1	ESE	29.116	0
680	10/12/2018	3:45 PM	62.7	46	1	ESE	29.111	0
681	10/12/2018	4:00 PM	62	46	1	ESE	29.106	0
682	10/12/2018	4:15 PM	61.6	50	1	E	29.099	0
683	10/12/2018	4:30 PM	60.9	55	1	SE	29.098	0
684	10/12/2018	4:45 PM	59.9	57	2	SSW	29.093	0
685	10/12/2018	5:00 PM	58.7	58	2	ESE	29.089	0
686	10/12/2018	5:15 PM	57.8	60	2	SSE	29.092	0
687	10/12/2018	5:30 PM	57.1	62	1	SW	29.091	0
688	10/12/2018	5:45 PM	55.7	64	1	SW	29.09	0
689	10/12/2018	6:00 PM	54.5	67	1	SSW	29.089	0
690	10/12/2018	6:15 PM	53.1	68	1	SW	29.093	0
691	10/12/2018	6:30 PM	51.5	71	1	S	29.096	0
692	10/12/2018	6:45 PM	50.5	72	1	SSW	29.095	0
693	10/12/2018	7:00 PM	49.5	74	0	SSW	29.096	0
694	10/12/2018	7:15 PM	48.6	75	0	SW	29.094	0
695	10/12/2018	7:30 PM	46.9	78	0	NW	29.094	0
696	10/12/2018	7:45 PM	45.9	79	0	S	29.096	0
697	10/12/2018	8:00 PM	45.3	79	0	SSW	29.098	0
698	10/12/2018	8:15 PM	44.8	80	0	SSW	29.1	0
699	10/12/2018	8:30 PM	44.5	81	0	SSW	29.095	0
700	10/12/2018	8:45 PM	45.8	79	0	ESE	29.096	0
701	10/12/2018	9:00 PM	45.2	78	0	ESE	29.099	0
702	10/12/2018	9:15 PM	44.7	79	0	SSW	29.099	0
703	10/12/2018	9:30 PM	45.1	79	0	ESE	29.099	0
704	10/12/2018	9:45 PM	44.7	79	0	ESE	29.102	0
705	10/12/2018	10:00 PM	44.1	79	0	ESE	29.101	0
706	10/12/2018	10:15 PM	43.1	80	0	ESE	29.099	0
707	10/12/2018	10:30 PM	43.3	80	1	ESE	29.094	0
708	10/12/2018	10:45 PM	43.5	80	0	ESE	29.097	0
709	10/12/2018	11:00 PM	43.4	80	1	ESE	29.095	0
710	10/12/2018	11:15 PM	43.1	80	0	SE	29.092	0
711	10/12/2018	11:30 PM	43	79	0	SSE	29.093	0
712	10/12/2018	11:45 PM	42.4	80	1	S	29.092	0
713	10/13/2018	12:00 AM	41.6	83	0	WNW	29.091	0
714	10/13/2018	12:15 AM	41.1	86	0	SW	29.085	0
715	10/13/2018	12:30 AM	40.8	85	0	ESE	29.079	0
716	10/13/2018	12:45 AM	40.5	86	0	SSW	29.081	0
717	10/13/2018	1:00 AM	40.8	80	0	S	29.077	0
718	10/13/2018	1:15 AM	41.6	79	1	S	29.073	0

	A	B	C	F	H	I	O	P
1	Back 40	APPENDIX B: WEATHER DATA						
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
719	10/13/2018	1:30 AM	41.2	77	0	S	29.073	0
720	10/13/2018	1:45 AM	40.6	78	0	WSW	29.077	0
721	10/13/2018	2:00 AM	40.1	76	0	---	29.074	0
722	10/13/2018	2:15 AM	39.8	77	0	SW	29.075	0
723	10/13/2018	2:30 AM	37.5	81	0	SSW	29.077	0
724	10/13/2018	2:45 AM	35.9	85	0	---	29.075	0
725	10/13/2018	3:00 AM	37	82	0	S	29.069	0
726	10/13/2018	3:15 AM	36.6	82	0	WNW	29.067	0
727	10/13/2018	3:30 AM	35	85	0	WNW	29.065	0
728	10/13/2018	3:45 AM	33.9	85	0	WNW	29.063	0
729	10/13/2018	4:00 AM	33.4	88	0	SSW	29.059	0
730	10/13/2018	4:15 AM	36.4	86	0	S	29.058	0
731	10/13/2018	4:30 AM	37.3	84	0	SSW	29.057	0
732	10/13/2018	4:45 AM	38.4	82	0	S	29.051	0
733	10/13/2018	5:00 AM	38.1	82	0	SSW	29.045	0
734	10/13/2018	5:15 AM	37.5	82	0	SSE	29.044	0
735	10/13/2018	5:30 AM	37.4	82	0	S	29.04	0
736	10/13/2018	5:45 AM	36.9	81	0	SE	29.038	0
737	10/13/2018	6:00 AM	37	79	0	S	29.036	0
738	10/13/2018	6:15 AM	37	80	0	S	29.036	0
739	10/13/2018	6:30 AM	37.3	78	0	SSE	29.033	0
740	10/13/2018	6:45 AM	37.7	78	0	WSW	29.034	0
741	10/13/2018	7:00 AM	37.2	80	0	SE	29.032	0
742	10/13/2018	7:15 AM	37.9	75	0	S	29.031	0
743	10/13/2018	7:30 AM	39.2	74	0	SSE	29.034	0
744	10/13/2018	7:45 AM	41.2	71	0	WSW	29.036	0
745	10/13/2018	8:00 AM	44.4	64	0	ESE	29.034	0
746	10/13/2018	8:15 AM	45.2	63	1	ESE	29.034	0
747	10/13/2018	8:30 AM	46.8	62	0	SSW	29.034	0
748	10/13/2018	8:45 AM	48.6	60	1	ESE	29.036	0
749	10/13/2018	9:00 AM	49	61	1	ESE	29.037	0
750	10/13/2018	9:15 AM	53.4	57	0	ESE	29.027	0
751	10/13/2018	9:30 AM	57.1	51	0	ESE	29.022	0
752	10/13/2018	9:45 AM	58.8	47	1	ESE	29.013	0
753	10/13/2018	10:00 AM	59.9	46	1	SE	29.009	0
754	10/13/2018	10:15 AM	59.3	47	1	ESE	29.001	0
755	10/13/2018	10:30 AM	58.5	49	3	ESE	28.995	0
756	10/13/2018	10:45 AM	59.5	46	2	E	28.987	0
757	10/13/2018	11:00 AM	59.8	44	3	ENE	28.978	0
758	10/13/2018	11:15 AM	60.8	43	2	E	28.961	0
759	10/13/2018	11:30 AM	61.7	41	2	E	28.953	0
760	10/13/2018	11:45 AM	62.4	44	2	ENE	28.944	0

	A	B	C	F	H	I	O	P
1	Back 40	APPENDIX B: WEATHER DATA						
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
761	10/13/2018	12:00 PM	62	47	5	E	28.934	0
762	10/13/2018	12:15 PM	62.6	46	5	E	28.92	0
763	10/13/2018	12:30 PM	62.9	45	5	ESE	28.909	0
764	10/13/2018	12:45 PM	62.7	44	6	ENE	28.902	0
765	10/13/2018	1:00 PM	63.2	46	5	ENE	28.89	0
766	10/13/2018	1:15 PM	62.2	47	6	E	28.876	0
767	10/13/2018	1:30 PM	62.1	48	7	ESE	28.865	0
768	10/13/2018	1:45 PM	62.1	48	7	ESE	28.856	0
769	10/13/2018	2:00 PM	62.2	49	7	ESE	28.849	0
770	10/13/2018	2:15 PM	62.1	50	7	E	28.837	0
771	10/13/2018	2:30 PM	61	51	8	E	28.832	0
772	10/13/2018	2:45 PM	60.9	50	7	ESE	28.826	0
773	10/13/2018	3:00 PM	60.6	51	7	ESE	28.82	0
774	10/13/2018	3:15 PM	60.1	51	8	ESE	28.816	0
775	10/13/2018	3:30 PM	60.1	51	8	ESE	28.816	0
776	10/13/2018	3:45 PM	60.2	51	8	ESE	28.807	0
777	10/13/2018	4:00 PM	60.1	51	7	ESE	28.806	0
778	10/13/2018	4:15 PM	60	51	6	ESE	28.81	0
779	10/13/2018	4:30 PM	60	50	6	E	28.815	0
780	10/13/2018	4:45 PM	59.5	51	6	ESE	28.814	0
781	10/13/2018	5:00 PM	59	51	5	ESE	28.812	0
782	10/13/2018	5:15 PM	58.5	52	6	ESE	28.818	0
783	10/13/2018	5:30 PM	58.2	51	5	E	28.822	0
784	10/13/2018	5:45 PM	57.6	52	4	E	28.828	0
785	10/13/2018	6:00 PM	56.9	52	3	ESE	28.835	0
786	10/13/2018	6:15 PM	55.9	53	2	E	28.841	0
787	10/13/2018	6:30 PM	54.8	54	1	E	28.854	0
788	10/13/2018	6:45 PM	53.8	56	0	E	28.86	0
789	10/13/2018	7:00 PM	52.3	57	0	E	28.87	0
790	10/13/2018	7:15 PM	51.4	59	0	E	28.879	0
791	10/13/2018	7:30 PM	49.1	62	0	NE	28.895	0
792	10/13/2018	7:45 PM	46.5	65	0	---	28.907	0
793	10/13/2018	8:00 PM	45.9	68	0	SSW	28.913	0
794	10/13/2018	8:15 PM	45.3	70	0	SSW	28.922	0
795	10/13/2018	8:30 PM	46.1	69	2	NW	28.947	0
796	10/13/2018	8:45 PM	48.1	67	4	NNW	28.959	0
797	10/13/2018	9:00 PM	45.9	74	9	NW	28.993	0
798	10/13/2018	9:15 PM	43.5	80	11	NW	29.011	0
799	10/13/2018	9:30 PM	41.7	83	10	NNW	29.035	0
800	10/13/2018	9:45 PM	40	86	10	NNW	29.058	0
801	10/13/2018	10:00 PM	38.5	87	10	NNW	29.075	0
802	10/13/2018	10:15 PM	34.9	89	12	NNW	29.102	0

	A	B	C	F	H	I	O	P
1	Back 40		APPENDIX B: WEATHER DATA					
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
803	10/13/2018	10:30 PM	32.4	90	12	NW	29.128	0
804	10/13/2018	10:45 PM	31.4	90	10	NNW	29.145	0
805	10/13/2018	11:00 PM	30.7	91	8	NNW	29.161	0
806	10/13/2018	11:15 PM	29.8	92	9	NNW	29.178	0
807	10/13/2018	11:30 PM	29.3	92	8	NW	29.192	0
808	10/13/2018	11:45 PM	28.9	92	8	NNW	29.207	0
809	10/14/2018	12:00 AM	28.1	91	9	NNW	29.229	0
810	10/14/2018	12:15 AM	27.6	92	8	NNW	29.24	0
811	10/14/2018	12:30 AM	27	91	9	NW	29.247	0
812	10/14/2018	12:45 AM	26.4	92	9	NNW	29.257	0
813	10/14/2018	1:00 AM	26.1	92	9	NW	29.26	0
814	10/14/2018	1:15 AM	25.5	91	8	NNW	29.261	0
815	10/14/2018	1:30 AM	24.9	91	8	NNW	29.271	0
816	10/14/2018	1:45 AM	24.6	91	7	NNW	29.281	0
817	10/14/2018	2:00 AM	24.6	92	5	NNW	29.295	0
818	10/14/2018	2:15 AM	24.6	92	5	NNW	29.303	0
819	10/14/2018	2:30 AM	24.2	92	6	NNW	29.307	0
820	10/14/2018	2:45 AM	24.3	93	5	NNW	29.307	0
821	10/14/2018	3:00 AM	23.2	91	4	NNW	29.309	0
822	10/14/2018	3:15 AM	23.3	92	3	NNW	29.298	0
823	10/14/2018	3:30 AM	23.5	92	3	NNW	29.308	0
824	10/14/2018	3:45 AM	23.5	92	5	NW	29.312	0
825	10/14/2018	4:00 AM	23.2	92	6	NNW	29.313	0
826	10/14/2018	4:15 AM	22.9	92	6	NW	29.329	0
827	10/14/2018	4:30 AM	22.1	91	6	NNW	29.335	0
828	10/14/2018	4:45 AM	21.5	91	6	NNW	29.336	0
829	10/14/2018	5:00 AM	21.3	91	4	NNW	29.339	0
830	10/14/2018	5:15 AM	21	90	3	NE	29.354	0
831	10/14/2018	5:30 AM	21.1	91	3	NNW	29.365	0
832	10/14/2018	5:45 AM	21.2	90	4	NNW	29.371	0
833	10/14/2018	6:00 AM	20.7	89	4	NNW	29.374	0
834	10/14/2018	6:15 AM	20.9	91	3	NNW	29.383	0
835	10/14/2018	6:30 AM	20.9	90	5	NW	29.391	0
836	10/14/2018	6:45 AM	20.4	90	5	NNW	29.403	0
837	10/14/2018	7:00 AM	19.2	89	4	NNE	29.414	0
838	10/14/2018	7:15 AM	18.4	89	3	NE	29.421	0
839	10/14/2018	7:30 AM	18.1	89	3	NE	29.436	0
840	10/14/2018	7:45 AM	18	90	2	NNE	29.454	0
841	10/14/2018	8:00 AM	17.8	89	3	N	29.459	0
842	10/14/2018	8:15 AM	17.8	89	2	NE	29.476	0
843	10/14/2018	8:30 AM	17.8	89	2	NE	29.485	0
844	10/14/2018	8:45 AM	17.5	89	3	NE	29.496	0

	A	B	C	F	H	I	O	P
1	Back 40	APPENDIX B: WEATHER DATA						
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
845	10/14/2018	9:00 AM	17.5	88	3	NNE	29.503	0
846	10/14/2018	9:15 AM	17.8	89	3	NNW	29.514	0
847	10/14/2018	9:30 AM	18.2	89	3	NNW	29.521	0
848	10/14/2018	9:45 AM	18.4	89	3	NNW	29.525	0
849	10/14/2018	10:00 AM	18.7	90	4	NNW	29.528	0
850	10/14/2018	10:15 AM	18.5	88	4	NNW	29.532	0
851	10/14/2018	10:30 AM	18.5	88	4	NNW	29.54	0
852	10/14/2018	10:45 AM	18.5	87	4	NNW	29.541	0
853	10/14/2018	11:00 AM	18.4	87	4	NNW	29.552	0
854	10/14/2018	11:15 AM	18.6	89	2	N	29.553	0
855	10/14/2018	11:30 AM	18.4	86	4	NNW	29.559	0
856	10/14/2018	11:45 AM	19.6	86	3	NNW	29.561	0
857	10/14/2018	12:00 PM	19.5	85	3	NNW	29.553	0
858	10/14/2018	12:15 PM	19.8	85	2	NNE	29.553	0
859	10/14/2018	12:30 PM	19.9	85	3	NNW	29.558	0
860	10/14/2018	12:45 PM	20.2	87	2	NNW	29.556	0
861	10/14/2018	1:00 PM	19.8	85	4	NW	29.548	0
862	10/14/2018	1:15 PM	20.6	86	3	NNW	29.549	0
863	10/14/2018	1:30 PM	20.5	85	3	NNW	29.557	0
864	10/14/2018	1:45 PM	20.2	86	3	NNW	29.555	0
865	10/14/2018	2:00 PM	20.4	87	2	NNW	29.557	0
866	10/14/2018	2:15 PM	20.4	87	1	NE	29.554	0
867	10/14/2018	2:30 PM	20.3	87	1	NE	29.555	0
868	10/14/2018	2:45 PM	20.9	88	2	NNE	29.553	0
869	10/14/2018	3:00 PM	21	88	1	NNE	29.558	0
870	10/14/2018	3:15 PM	21.3	87	1	ENE	29.567	0
871	10/14/2018	3:30 PM	21.5	86	1	NNW	29.571	0
872	10/14/2018	3:45 PM	21.7	83	0	NE	29.574	0
873	10/14/2018	4:00 PM	21.8	85	0	NW	29.586	0
874	10/14/2018	4:15 PM	21.8	85	0	NNW	29.59	0
875	10/14/2018	4:30 PM	21.7	84	0	NNW	29.6	0
876	10/14/2018	4:45 PM	21.6	85	0	NNW	29.598	0
877	10/14/2018	5:00 PM	21.8	84	0	NW	29.604	0
878	10/14/2018	5:15 PM	21.7	83	0	NW	29.62	0
879	10/14/2018	5:30 PM	21.6	84	0	N	29.629	0
880	10/14/2018	5:45 PM	21.4	83	0	NNE	29.632	0
881	10/14/2018	6:00 PM	21.7	84	0	E	29.642	0
882	10/14/2018	6:15 PM	21.6	85	1	ENE	29.647	0
883	10/14/2018	6:30 PM	21.3	85	1	ENE	29.657	0
884	10/14/2018	6:45 PM	21.3	85	1	E	29.67	0
885	10/14/2018	7:00 PM	21.1	85	1	E	29.678	0
886	10/14/2018	7:15 PM	21	84	1	ESE	29.692	0

	A	B	C	F	H	I	O	P
1	Back 40	APPENDIX B: WEATHER DATA						
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
887	10/14/2018	7:30 PM	21.1	85	1	E	29.704	0
888	10/14/2018	7:45 PM	21	83	1	E	29.718	0
889	10/14/2018	8:00 PM	21	83	0	ESE	29.727	0
890	10/14/2018	8:15 PM	21	84	0	ENE	29.731	0
891	10/14/2018	8:30 PM	20.9	84	0	ENE	29.745	0
892	10/14/2018	8:45 PM	20.8	85	0	NE	29.755	0
893	10/14/2018	9:00 PM	20.9	84	0	NE	29.763	0
894	10/14/2018	9:15 PM	21	83	0	NE	29.769	0
895	10/14/2018	9:30 PM	20.6	83	0	ESE	29.775	0
896	10/14/2018	9:45 PM	19.7	84	0	WSW	29.781	0
897	10/14/2018	10:00 PM	19.1	84	0	SW	29.789	0
898	10/14/2018	10:15 PM	19.1	85	0	SW	29.797	0
899	10/14/2018	10:30 PM	18.8	86	0	SW	29.805	0
900	10/14/2018	10:45 PM	18.1	87	0	SW	29.809	0
901	10/14/2018	11:00 PM	17.9	86	0	SSW	29.811	0
902	10/14/2018	11:15 PM	17.7	86	0	SW	29.816	0
903	10/14/2018	11:30 PM	17.4	87	0	WSW	29.822	0
904	10/14/2018	11:45 PM	17.4	89	0	SW	29.823	0
905	10/15/2018	12:00 AM	17.4	89	0	W	29.828	0
906	10/15/2018	12:15 AM	18.1	90	0	SW	29.833	0
907	10/15/2018	12:30 AM	17.9	88	0	SW	29.833	0
908	10/15/2018	12:45 AM	17.9	88	0	SW	29.831	0
909	10/15/2018	1:00 AM	18	88	0	SW	29.831	0
910	10/15/2018	1:15 AM	17.6	87	0	SW	29.835	0
911	10/15/2018	1:30 AM	17.4	89	0	SSW	29.844	0
912	10/15/2018	1:45 AM	17.4	88	0	ESE	29.852	0
913	10/15/2018	2:00 AM	16.3	86	0	ESE	29.851	0
914	10/15/2018	2:15 AM	15.8	85	0	ESE	29.853	0
915	10/15/2018	2:30 AM	15.3	85	0	SSW	29.853	0
916	10/15/2018	2:45 AM	15.1	86	0	SSW	29.857	0
917	10/15/2018	3:00 AM	15.4	86	0	ESE	29.853	0
918	10/15/2018	3:15 AM	16.4	89	0	ESE	29.849	0
919	10/15/2018	3:30 AM	15.2	84	0	SW	29.848	0
920	10/15/2018	3:45 AM	15.8	88	0	SSW	29.846	0
921	10/15/2018	4:00 AM	16.9	88	0	SE	29.845	0
922	10/15/2018	4:15 AM	16.8	86	0	SSW	29.854	0
923	10/15/2018	4:30 AM	17	87	0	E	29.857	0
924	10/15/2018	4:45 AM	17.1	88	0	SSW	29.86	0
925	10/15/2018	5:00 AM	17	85	0	ESE	29.868	0
926	10/15/2018	5:15 AM	16.2	86	0	ESE	29.87	0
927	10/15/2018	5:30 AM	15.5	85	0	ESE	29.875	0
928	10/15/2018	5:45 AM	14.6	84	0	S	29.876	0

	A	B	C	F	H	I	O	P
1	Back 40	APPENDIX B: WEATHER DATA						
2	Wave 1819							
3			Temp	RH	Wind Speed	Wind	Barometer	Rain
4	Date	Time	(Deg. F)	(%)	(MPH)	Direction	(in hg)	(inches)
929	10/15/2018	6:00 AM	14.8	86	0	SE	29.878	0
930	10/15/2018	6:15 AM	17.1	89	0	S	29.88	0
931	10/15/2018	6:30 AM	17.8	87	0	S	29.883	0
932	10/15/2018	6:45 AM	18	87	0	S	29.879	0
933	10/15/2018	7:00 AM	18.2	87	0	W	29.882	0
934	10/15/2018	7:15 AM	18	86	0	SE	29.883	0
935	10/15/2018	7:30 AM	17.1	85	0	SE	29.887	0
936	10/15/2018	7:45 AM	19.1	86	0	SE	29.889	0
937	10/15/2018	8:00 AM	22.2	83	0	E	29.89	0
938	10/15/2018	8:15 AM	23.4	82	0	SW	29.89	0
939	10/15/2018	8:30 AM	25.5	81	0	SW	29.897	0
940	10/15/2018	8:45 AM	27.1	77	0	SSW	29.898	0
941	10/15/2018	9:00 AM	29.4	76	0	S	29.903	0
942	10/15/2018	9:15 AM	31.2	72	0	ESE	29.894	0
943	10/15/2018	9:30 AM	31.6	72	0	SSW	29.889	0
944	10/15/2018	9:45 AM	32.2	71	0	SSW	29.885	0
945	10/15/2018	10:00 AM	32.8	69	1	SSW	29.879	0
946	10/15/2018	10:15 AM	33.6	61	1	S	29.87	0
947	10/15/2018	10:30 AM	33.5	59	1	SSW	29.862	0
948	10/15/2018	10:45 AM	34.1	61	1	ESE	29.86	0
949	10/15/2018	11:00 AM	34.8	62	1	SSW	29.852	0
950	10/15/2018	11:15 AM	35.4	62	1	S	29.847	0
951	10/15/2018	11:30 AM	36.2	62	1	ESE	29.842	0.01
952	10/15/2018	11:45 AM	37	58	1	SSW	29.837	0
953	10/15/2018	12:00 PM	37.4	54	2	ESE	29.832	0.01
954	10/15/2018	12:15 PM	38.8	82	1	NW	29.786	0.03
955	10/15/2018	12:30 PM	41.3	84	0	---	29.769	0

Appendix C1

Hourly Data from Location 1

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Back 40	APPENDIX C1: HOURLY DATA FOR LOCATION 1													
2	Wave 1819														
3	Location 1						octave band center frequencies (Hz)								
4			dBA	dBA	dBA	dBA	octave band sound levels (dB)								
5	Date	Time	Leq	Lmin	Lmax	L90	31.5	63.0	125	250	500	1000	2000	4000	8000
6	10/5/2018	00:00:00													
7		01:00:00													
8		02:00:00													
9		03:00:00													
10		04:00:00													
11		05:00:00													
12		06:00:00													
13		07:00:00													
14		08:00:00													
15		09:00:00													
16		10:00:00													
17		11:00:00													
18		12:00:00													
19		13:00:00													
20		14:00:00													
21		15:00:00													
22	10/5/2018	16:00:00	54.9	43.7	77.6	47.8	67.1	58.8	52.4	47.9	53.4	52.0	44.3	32.6	31.2
23		17:00:00	50.6	42.1	61.3	46.6	61.3	56.0	50.2	46.2	45.5	48.3	42.3	29.2	27.0
24		18:00:00	52.4	41.0	73.6	45.8	55.8	54.0	50.9	49.5	51.0	48.9	41.9	31.2	23.5
25		19:00:00	48.8	36.0	72.0	42.0	52.4	51.7	47.0	42.4	47.8	45.5	39.0	24.5	20.1
26		20:00:00	44.4	33.9	55.4	39.5	50.7	50.0	45.6	38.7	40.2	41.6	36.6	22.3	19.1
27		21:00:00	42.9	34.0	57.6	37.7	49.1	49.1	43.1	40.1	38.9	39.9	34.8	20.4	17.7
28		22:00:00	44.1	32.4	57.2	38.3	45.5	49.0	45.3	42.6	41.3	38.9	36.3	31.4	29.0
29		23:00:00	44.8	37.0	59.8	40.0	44.9	47.8	44.0	40.0	40.2	38.9	38.1	35.3	33.8
30	2018/10/06	00:00:00	38.9	31.8	50.7	33.5	43.8	44.6	40.2	35.0	33.5	32.7	32.3	29.4	28.5
31		01:00:00	37.5	32.2	44.8	34.3	43.3	44.5	41.3	33.0	31.1	30.5	31.9	28.1	26.9
32		02:00:00	35.2	31.2	49.3	32.5	41.9	43.4	38.5	35.7	32.3	27.9	27.7	23.1	19.3
33		03:00:00	33.6	30.3	47.0	31.4	42.8	41.7	37.1	31.1	29.3	28.4	26.9	22.0	17.6
34		04:00:00	36.2	29.8	50.2	30.8	41.7	41.0	40.6	39.3	31.8	28.3	27.4	21.9	17.5
35		05:00:00	39.4	30.0	65.2	33.6	46.2	49.3	47.6	39.1	35.4	34.6	31.2	22.3	16.8
36		06:00:00	41.1	33.4	55.9	36.3	48.7	51.5	50.4	42.5	36.6	35.4	32.4	23.0	16.7
37		07:00:00	48.0	34.9	71.8	39.3	54.4	53.7	53.0	45.8	46.1	43.9	38.9	31.9	23.1
38		08:00:00	62.0	40.2	82.5	44.8	59.3	57.7	57.9	54.3	55.5	55.0	54.5	55.1	54.4
39		09:00:00	67.7	42.7	88.9	48.0	65.6	60.2	61.4	58.0	57.9	59.6	61.4	61.2	60.8
40		10:00:00	52.9	43.0	70.3	47.4	71.5	63.1	59.2	53.4	49.4	48.1	43.3	37.3	34.5
41		11:00:00	56.7	41.4	80.4	46.3	70.5	62.4	59.6	56.9	56.3	51.7	42.2	34.7	33.2
42		12:00:00	51.2	37.6	71.5	41.7	67.2	58.9	56.4	50.5	48.9	46.9	40.2	36.2	35.9
43		13:00:00	50.4	38.2	70.9	41.7	61.0	57.4	55.6	50.0	49.8	45.6	37.8	28.2	27.5
44		14:00:00	49.4	39.7	69.6	43.6	65.2	58.4	55.6	50.0	46.4	44.9	38.9	30.2	29.7
45		15:00:00	52.1	40.7	72.7	45.5	66.1	59.8	55.4	49.1	51.0	48.3	41.5	33.0	32.6
46		16:00:00	50.3	38.6	68.9	44.7	66.0	58.9	54.5	48.2	45.3	47.0	41.8	31.9	30.7

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Back 40		APPENDIX C1: HOURLY DATA FOR LOCATION 1												
2	Wave 1819														
3	Location 1							octave band center frequencies (Hz)							
4			dBA	dBA	dBA	dBA		octave band sound levels (dB)							
5	Date	Time	Leq	Lmin	Lmax	L90	31.5	63.0	125	250	500	1000	2000	4000	8000
47		17:00:00	47.8	40.0	62.2	44.0	66.0	57.6	53.5	46.0	43.9	44.0	38.4	30.5	29.5
48		18:00:00	53.1	40.7	74.9	44.5	60.3	56.6	55.9	47.3	52.9	49.6	40.7	29.9	25.4
49		19:00:00	48.9	39.6	67.4	44.0	57.0	57.0	54.9	47.9	45.3	44.8	40.3	28.4	24.0
50		20:00:00	48.4	37.5	63.1	41.9	57.0	57.9	55.8	48.5	46.0	43.8	37.9	26.3	20.2
51		21:00:00	49.6	38.4	71.7	41.0	56.0	57.5	53.0	47.6	47.6	46.3	38.4	25.3	20.0
52		22:00:00	44.2	34.4	61.3	39.6	54.7	53.9	49.9	42.2	38.7	41.1	35.5	24.7	24.3
53		23:00:00	42.0	33.1	53.3	37.6	56.4	49.8	46.5	38.9	36.5	38.9	33.4	26.6	28.2
54	2018/10/07	00:00:00	39.8	32.4	55.1	35.4	58.0	49.8	45.2	39.3	36.0	35.7	30.0	23.2	24.0
55		01:00:00	36.1	29.1	46.5	30.8	51.7	45.2	41.3	35.6	32.4	32.0	26.7	19.8	20.9
56		02:00:00	32.9	26.8	50.1	28.6	44.7	45.5	39.0	31.5	29.4	28.7	23.2	14.7	15.5
57		03:00:00	36.4	27.8	58.5	29.3	45.1	45.3	44.6	39.3	31.4	30.3	24.9	15.3	16.1
58		04:00:00	33.8	26.6	48.8	28.9	42.5	41.0	39.2	30.5	29.6	30.3	25.4	14.4	15.5
59		05:00:00	34.8	26.9	47.2	28.7	42.4	42.0	38.8	32.2	31.9	31.6	24.7	14.2	15.3
60		06:00:00	39.8	29.9	62.1	32.7	44.8	45.7	42.4	41.0	38.2	35.5	26.8	20.2	15.4
61		07:00:00	39.6	28.4	62.5	30.2	46.8	48.6	44.2	41.6	38.3	33.9	26.6	22.0	16.8
62		08:00:00	49.9	28.3	74.4	30.4	47.0	49.1	49.8	48.4	48.4	45.2	41.8	29.2	16.0
63		09:00:00	46.7	30.9	66.9	33.2	48.2	48.8	49.0	47.5	46.7	41.6	31.7	19.5	16.2
64		10:00:00	46.4	32.0	66.8	35.8	51.1	53.3	53.9	49.1	45.3	39.9	31.8	20.5	17.3
65		11:00:00	44.2	32.2	61.7	34.8	49.8	51.1	49.3	46.5	43.3	38.4	29.5	18.8	15.9
66		12:00:00	46.3	31.4	62.7	35.0	50.9	51.3	53.0	47.9	45.4	40.6	31.9	20.9	16.3
67		13:00:00	48.6	32.4	70.9	36.1	50.6	52.1	49.5	44.9	43.4	39.6	41.4	42.9	35.8
68		14:00:00	48.2	35.0	66.7	38.5	51.3	51.4	51.5	46.4	44.6	41.9	41.2	38.5	31.5
69		15:00:00	44.1	33.1	55.0	39.5	49.9	53.3	48.2	38.6	37.9	41.3	36.9	23.8	18.4
70		16:00:00	50.3	34.5	67.2	40.4	50.8	52.5	52.8	50.0	48.8	46.3	39.6	26.2	18.5
71		17:00:00	54.0	37.2	75.9	41.4	53.0	50.1	50.2	43.8	54.9	48.9	41.2	28.1	19.8
72		18:00:00	53.0	37.2	73.9	41.2	53.3	60.3	52.6	49.4	52.5	48.7	41.4	31.0	20.7
73		19:00:00	50.0	37.8	74.7	41.1	58.5	51.7	48.9	47.4	48.5	46.3	39.9	30.6	21.1
74		20:00:00	47.0	35.5	69.4	39.6	57.5	51.6	49.1	47.3	44.3	43.0	37.8	30.5	20.9
75		21:00:00	47.0	34.5	71.3	39.5	56.0	51.4	50.3	47.8	44.0	42.0	38.8	33.4	26.0
76		22:00:00	43.1	32.4	56.9	36.8	50.5	47.8	45.3	41.9	38.4	38.3	36.6	30.7	22.9
77		23:00:00	43.5	30.2	63.6	32.3	47.9	46.0	46.4	44.1	41.5	38.8	34.0	25.9	17.6
78	2018/10/08	00:00:00	37.1	28.9	52.6	30.1	45.4	42.8	40.3	37.6	31.9	32.0	30.3	23.7	16.8
79		01:00:00	35.9	30.1	47.8	31.0	42.3	39.7	37.3	31.1	29.2	30.9	30.5	24.8	17.9
80		02:00:00	35.7	29.8	47.2	31.6	43.4	42.4	37.5	30.8	29.2	30.5	30.0	25.2	21.6
81		03:00:00	35.9	29.5	50.6	30.3	44.7	42.8	37.7	30.4	29.8	31.7	30.1	23.3	17.1
82		04:00:00	43.4	30.9	67.1	34.0	48.5	49.8	45.3	41.7	39.8	38.9	35.9	29.6	23.8
83		05:00:00	45.0	33.6	53.9	39.6	47.2	48.7	45.9	39.7	37.9	41.1	39.5	31.1	19.6
84		06:00:00	47.8	39.5	59.7	43.3	49.6	51.5	50.9	42.7	41.9	44.4	41.6	31.5	18.4
85		07:00:00	48.0	40.2	64.2	43.3	50.1	53.9	52.5	46.1	43.3	44.4	40.3	30.1	18.9
86		08:00:00	49.2	38.6	64.6	42.5	50.4	52.8	52.8	47.5	47.1	45.2	39.7	28.4	17.5
87		09:00:00	49.4	38.5	65.1	42.1	50.4	54.9	51.7	48.6	47.3	45.3	39.8	30.7	17.8

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Back 40		APPENDIX C1: HOURLY DATA FOR LOCATION 1												
2	Wave 1819														
3	Location 1							octave band center frequencies (Hz)							
4			dBA	dBA	dBA	dBA		octave band sound levels (dB)							
5	Date	Time	Leq	Lmin	Lmax	L90	31.5	63.0	125	250	500	1000	2000	4000	8000
88		10:00:00	47.6	38.6	65.7	41.9	52.0	56.0	51.6	47.2	43.8	43.1	40.0	29.2	21.0
89		11:00:00	48.0	37.4	66.9	41.9	51.6	56.7	51.3	46.7	45.0	43.4	40.1	32.7	22.8
90		12:00:00	47.4	34.7	67.7	40.7	50.5	51.9	48.6	42.8	43.1	44.3	39.7	32.3	19.3
91		13:00:00	48.4	38.3	63.1	41.5	50.6	57.3	52.2	47.0	45.2	43.8	40.7	32.7	20.1
92		14:00:00	47.6	38.4	65.3	41.9	50.0	57.2	51.4	45.4	43.8	42.8	40.5	32.4	19.2
93		15:00:00	48.5	38.8	72.7	42.3	50.5	56.3	53.2	44.2	44.3	45.0	40.7	30.0	19.0
94		16:00:00	51.2	38.9	72.5	43.0	51.3	54.5	53.4	48.8	49.3	47.9	41.5	28.2	17.2
95		17:00:00	47.3	36.7	62.0	41.1	51.1	53.9	52.7	45.3	42.7	43.3	40.2	27.0	16.2
96		18:00:00	47.5	37.5	60.7	41.8	50.0	53.7	52.1	46.3	43.8	43.6	39.8	26.8	16.2
97		19:00:00	46.2	33.6	61.5	39.5	48.9	51.7	50.0	44.5	43.3	42.5	37.5	23.9	15.9
98		20:00:00	44.4	31.3	61.7	36.8	47.1	50.8	50.0	44.1	41.9	38.5	36.3	29.4	17.7
99		21:00:00	43.7	29.4	70.8	33.1	46.2	48.2	43.3	38.2	42.2	39.8	35.3	27.8	16.8
100		22:00:00	41.6	27.6	62.4	30.1	45.9	46.3	46.0	43.8	40.0	35.5	31.5	23.2	15.8
101		23:00:00	36.2	27.1	57.2	28.4	44.1	44.6	43.7	37.8	32.7	29.8	27.6	17.8	15.4
102	2018/10/09	00:00:00	33.8	26.0	50.1	26.8	43.0	40.9	41.7	32.4	29.3	29.3	26.3	15.9	15.4
103		01:00:00	32.9	26.2	53.2	26.9	42.1	40.6	36.6	35.3	27.9	27.5	23.7	14.8	15.3
104		02:00:00	32.3	25.7	47.6	26.3	41.4	38.5	36.7	28.9	26.8	28.2	25.8	16.5	15.3
105		03:00:00	32.7	26.3	46.6	28.0	42.9	38.4	36.9	27.3	26.5	28.3	27.0	17.4	15.6
106		04:00:00	38.8	27.4	70.9	28.8	43.1	44.7	39.0	33.7	33.2	36.3	30.7	22.0	15.9
107		05:00:00	43.9	30.5	55.3	37.0	46.3	48.1	45.2	37.9	34.9	40.1	38.8	28.2	16.8
108		06:00:00	47.4	35.9	59.5	42.3	51.0	56.2	52.4	44.7	40.0	43.4	41.4	29.4	17.2
109		07:00:00	47.9	40.2	58.6	43.8	52.0	55.1	51.1	43.1	40.4	44.3	42.1	30.5	17.8
110		08:00:00	51.7	39.4	66.5	43.8	53.1	59.2	55.4	51.1	49.8	47.4	41.8	30.1	17.7
111		09:00:00	51.3	39.7	65.0	43.9	52.7	56.3	54.3	51.3	49.4	47.1	40.8	26.9	16.7
112		10:00:00	49.6	38.7	66.7	42.9	52.8	58.5	53.9	50.7	47.0	45.2	39.2	26.2	17.3
113		11:00:00	48.2	39.3	63.3	43.5	52.9	59.3	52.3	45.8	44.0	44.9	39.9	26.9	18.3
114		12:00:00	48.9	39.6	67.5	43.1	53.5	57.1	52.8	48.2	46.0	44.6	40.1	30.6	21.0
115		13:00:00	50.1	41.0	64.4	44.3	53.3	60.3	53.4	49.2	46.1	45.2	42.9	35.4	23.0
116		14:00:00	49.3	39.1	64.1	44.6	52.6	57.8	55.8	48.7	45.1	44.3	41.9	34.8	21.4
117		15:00:00	47.2	37.9	59.7	43.1	51.1	56.3	53.1	45.5	42.1	42.8	40.1	31.9	19.3
118		16:00:00	50.8	38.5	64.7	43.3	51.9	53.8	54.4	50.3	48.9	46.6	41.0	28.4	18.9
119		17:00:00	48.3	39.9	59.4	44.2	51.9	55.3	55.0	46.3	42.6	44.7	41.0	27.3	16.6
120		18:00:00	54.8	37.5	72.4	42.1	50.3	53.9	54.5	48.7	54.7	51.8	41.9	26.8	18.0
121		19:00:00	43.2	33.1	61.6	37.3	48.7	53.9	51.4	44.7	38.6	38.0	34.4	22.9	15.8
122		20:00:00	42.1	32.0	54.5	36.6	48.3	49.8	48.7	41.5	37.3	38.1	34.4	21.5	15.5
123		21:00:00	43.2	31.8	67.8	36.4	46.4	48.5	47.0	40.9	39.5	40.2	34.7	21.0	15.4
124		22:00:00	43.8	27.0	69.8	29.9	43.5	44.6	44.9	39.1	42.7	41.5	30.5	17.6	15.4
125		23:00:00	37.3	27.2	55.0	29.3	44.5	46.0	44.5	37.3	30.0	33.2	30.6	17.0	15.4
126	2018/10/10	00:00:00	37.0	27.4	56.4	28.6	45.2	41.8	42.3	34.1	32.5	33.0	30.0	20.0	16.0
127		01:00:00	32.5	27.3	48.9	27.8	42.2	39.2	38.0	29.3	27.8	27.8	25.6	18.7	16.2
128		02:00:00	32.8	27.2	47.8	28.0	40.8	39.0	40.2	30.2	26.7	27.7	26.3	18.4	16.0

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Back 40		APPENDIX C1: HOURLY DATA FOR LOCATION 1												
2	Wave 1819														
3	Location 1							octave band center frequencies (Hz)							
4			dBA	dBA	dBA	dBA		octave band sound levels (dB)							
5	Date	Time	Leq	Lmin	Lmax	L90	31.5	63.0	125	250	500	1000	2000	4000	8000
129		03:00:00	34.7	27.1	51.9	27.9	44.0	42.2	40.2	35.7	30.4	29.4	26.8	17.6	16.2
130		04:00:00	37.6	27.1	50.6	28.9	42.7	42.8	41.9	33.6	31.6	34.0	31.1	20.2	15.8
131		05:00:00	43.0	31.9	54.9	37.6	45.4	46.8	45.2	39.0	37.5	39.9	36.2	22.8	15.6
132		06:00:00	47.5	38.4	64.1	42.7	49.7	53.2	52.1	46.5	43.8	43.7	39.2	26.2	22.5
133		07:00:00	46.6	39.0	60.1	42.6	50.8	56.1	53.2	45.7	40.4	42.8	39.1	25.4	15.9
134		08:00:00	49.8	37.8	63.1	42.8	53.0	56.4	54.2	48.8	48.0	45.5	39.8	26.9	16.1
135		09:00:00	48.7	36.8	65.6	42.0	53.5	55.2	54.6	49.8	45.7	43.9	40.2	29.3	17.1
136		10:00:00	48.2	35.0	63.4	41.0	53.1	57.3	54.4	49.8	45.5	42.7	39.1	27.9	20.2
137		11:00:00	48.5	38.1	64.6	43.5	55.2	59.0	55.6	47.7	44.7	43.7	40.3	29.5	21.9
138		12:00:00	47.9	38.2	66.5	42.0	54.5	59.2	54.7	47.0	43.8	41.9	41.1	34.0	23.9
139		13:00:00	45.8	34.0	61.7	38.1	52.2	54.6	52.3	46.7	42.7	40.3	37.7	29.0	17.3
140		14:00:00	47.9	34.9	65.2	39.4	53.5	57.4	57.4	48.9	44.4	42.2	39.1	31.0	19.9
141		15:00:00	49.1	40.2	66.3	44.5	52.1	54.8	53.1	47.6	43.3	44.5	42.9	35.2	23.3
142		16:00:00	52.7	40.3	70.2	45.3	53.1	56.0	56.7	53.0	50.2	48.0	44.3	33.0	19.1
143		17:00:00	49.3	38.1	69.5	42.7	52.2	55.6	54.4	46.9	45.3	46.2	41.1	28.1	17.1
144		18:00:00	50.4	36.8	71.2	40.7	50.9	54.5	54.1	50.6	49.3	45.6	39.8	25.1	16.1
145		19:00:00	43.2	31.0	57.2	35.8	49.5	51.4	49.0	42.3	38.7	39.1	35.7	21.1	15.3
146		20:00:00	41.5	29.9	61.3	34.6	49.2	50.5	49.8	42.2	37.0	36.6	33.0	20.0	15.6
147		21:00:00	42.8	29.4	71.5	33.2	48.4	49.7	47.1	44.5	41.2	37.5	32.7	19.3	15.8
148		22:00:00	39.6	28.9	54.7	31.3	49.1	48.9	47.2	40.4	36.3	34.4	30.8	17.8	16.2
149		23:00:00	35.3	26.7	47.7	29.0	44.3	43.6	41.4	33.2	28.8	31.2	29.0	16.2	15.3
150	2018/10/11	00:00:00	34.8	26.6	52.8	27.4	43.9	47.6	44.8	33.6	29.5	29.6	26.4	15.9	15.3
151		01:00:00	32.8	26.2	49.0	26.9	42.1	41.1	39.6	32.4	30.0	28.4	22.3	13.6	15.2
152		02:00:00	29.7	26.3	43.7	26.9	43.6	41.9	37.7	30.6	26.8	24.3	17.4	12.7	15.2
153		03:00:00	30.7	26.4	40.4	27.4	45.3	45.1	38.9	30.0	27.4	25.9	19.5	12.7	15.2
154		04:00:00	36.6	26.9	58.8	28.0	44.7	44.3	42.9	36.7	35.1	32.5	21.5	13.0	15.2
155		05:00:00	35.9	29.7	47.4	32.0	45.2	46.8	44.0	36.6	32.4	31.5	24.8	13.4	15.2
156		06:00:00	42.0	32.7	55.0	36.6	49.0	55.7	50.5	42.1	37.2	37.4	32.4	19.5	15.4
157		07:00:00	45.8	36.6	70.0	39.3	51.0	55.2	55.1	45.5	44.1	40.9	33.6	21.1	15.9
158		08:00:00	48.2	35.6	65.3	39.5	53.4	55.2	53.2	48.6	47.0	43.2	35.8	31.1	23.0
159		09:00:00	44.2	36.0	59.1	38.9	52.6	56.5	52.6	46.2	41.2	38.7	32.0	19.4	15.8
160		10:00:00	46.3	33.3	62.8	36.4	52.2	55.7	54.5	48.3	45.0	40.2	31.0	19.2	15.6
161		11:00:00	45.3	34.4	62.5	36.7	54.2	58.0	53.6	47.0	43.4	39.4	29.8	19.4	15.6
162		12:00:00	43.4	36.0	66.1	37.8	54.1	56.2	53.0	45.3	39.6	36.9	31.7	28.2	21.1
163		13:00:00	50.6	34.7	71.5	37.2	53.3	55.3	57.0	54.6	49.6	42.7	33.9	25.1	21.3
164		14:00:00	46.9	34.3	64.8	37.0	51.7	56.0	52.7	48.3	45.7	41.5	33.8	24.2	20.5
165		15:00:00	45.1	34.9	63.4	38.6	52.9	55.3	52.8	43.7	39.6	41.7	35.9	22.6	20.5
166		16:00:00	53.8	41.7	69.6	45.8	61.6	57.8	56.8	53.9	51.8	50.0	42.8	32.7	26.8
167		17:00:00	51.2	39.5	70.0	44.9	60.1	62.0	57.0	51.7	49.8	45.9	40.7	28.1	21.7
168		18:00:00	50.1	39.1	71.7	43.0	53.1	55.8	55.1	49.0	49.3	44.8	40.6	28.3	18.0
169		19:00:00	47.3	37.7	69.9	41.7	52.5	54.3	53.2	48.0	45.0	42.3	38.4	25.1	16.0

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Back 40	APPENDIX C1: HOURLY DATA FOR LOCATION 1													
2	Wave 1819														
3	Location 1							octave band center frequencies (Hz)							
4			dBa	dBa	dBa	dBa		octave band sound levels (dB)							
5	Date	Time	Leq	Lmin	Lmax	L90	31.5	63.0	125	250	500	1000	2000	4000	8000
170		20:00:00	48.3	34.9	63.9	39.3	54.4	55.1	54.2	51.0	47.0	41.3	37.7	26.3	15.7
171		21:00:00	44.5	34.5	56.7	37.3	52.9	54.3	51.3	45.5	42.8	38.2	34.6	23.4	15.7
172		22:00:00	42.8	31.7	69.6	34.3	50.9	51.2	47.0	42.9	42.3	39.1	27.5	15.1	15.4
173		23:00:00	42.0	31.1	68.5	32.8	49.0	49.7	44.9	39.3	38.5	40.3	27.6	15.8	15.5
174	2018/10/12	00:00:00	38.0	31.4	59.8	33.2	47.2	48.2	45.4	37.4	36.6	33.5	24.2	13.5	15.2
175		01:00:00	32.4	26.5	44.4	27.6	44.4	45.1	42.6	31.6	28.2	27.1	22.2	13.6	15.2
176		02:00:00	31.3	26.4	46.3	27.2	45.1	45.0	40.6	32.1	28.3	25.2	19.9	13.8	15.3
177		03:00:00	35.5	30.9	47.7	32.2	48.0	47.4	43.7	36.7	34.5	29.2	20.8	13.7	15.3
178		04:00:00	38.3	32.9	52.4	35.0	50.4	50.1	46.3	40.6	36.6	32.2	24.5	14.6	15.4
179		05:00:00	44.1	38.0	53.6	40.3	52.7	54.8	50.4	44.5	41.9	39.9	31.8	17.8	15.8
180		06:00:00	48.8	43.8	55.3	46.5	56.2	57.1	54.6	47.9	45.5	45.5	37.8	21.1	16.1
181		07:00:00	51.4	44.6	66.7	47.3	59.4	61.4	56.7	51.3	47.3	47.7	42.0	26.7	17.0
182		08:00:00	51.4	42.5	73.8	44.3	57.9	60.1	55.3	48.4	51.4	47.3	38.7	24.2	16.7
183		09:00:00	47.5	41.8	62.3	44.3	59.3	59.6	54.8	49.2	44.5	42.4	36.8	26.3	19.7
184		10:00:00	49.0	41.4	69.2	43.8	58.4	60.8	57.0	50.0	47.0	43.1	37.7	29.0	21.5
185		11:00:00	48.8	36.7	65.8	40.4	56.2	59.8	56.4	51.0	46.5	43.2	35.8	23.2	19.1
186		12:00:00	50.4	33.6	71.9	36.6	55.2	59.4	57.6	54.7	50.1	39.3	29.5	19.6	18.7
187		13:00:00	56.2	33.3	81.4	36.2	54.3	57.7	57.3	55.3	56.7	51.3	32.7	19.8	19.7
188		14:00:00	49.6	34.2	70.2	37.9	54.3	59.0	59.4	52.0	47.9	42.5	33.2	23.7	18.9
189		15:00:00	43.4	33.1	59.4	36.6	53.2	56.7	54.4	45.2	40.0	36.9	30.2	18.6	17.4
190		16:00:00	48.4	35.7	65.8	40.2	56.2	56.4	58.3	49.4	44.6	43.1	38.9	32.2	25.1
191		17:00:00	49.2	37.8	71.7	41.8	56.3	59.3	55.4	50.9	47.2	44.1	37.6	28.9	24.0
192		18:00:00	50.4	39.5	69.2	44.9	55.1	58.5	55.6	47.9	48.0	46.2	41.6	28.6	20.4
193		19:00:00	48.2	39.7	61.6	42.6	54.1	57.1	51.5	46.1	45.4	44.3	39.9	27.6	17.0
194		20:00:00	47.9	37.7	65.5	40.9	51.8	55.2	51.8	47.1	45.3	43.7	39.1	26.4	16.2
195		21:00:00	45.5	38.2	66.2	40.8	53.6	56.7	55.0	44.6	41.5	40.9	35.3	22.4	15.9
196		22:00:00	52.4	34.0	73.4	37.2	49.6	51.8	50.5	44.8	53.3	48.5	37.0	21.5	17.6
197		23:00:00	41.6	32.6	62.5	35.2	47.7	50.2	53.7	47.2	35.9	35.1	27.5	15.9	15.8
198	2018/10/13	00:00:00	39.8	31.5	59.3	34.5	45.9	48.5	46.9	40.8	35.9	35.8	27.3	14.7	15.4
199		01:00:00	39.1	29.3	60.8	31.5	47.0	49.2	45.6	41.6	38.1	33.4	23.6	14.0	15.6
200		02:00:00	41.3	29.3	65.8	30.6	46.2	46.0	43.3	40.4	35.5	39.0	32.3	17.2	15.2
201		03:00:00	37.8	28.6	57.9	29.9	46.9	46.4	41.3	38.6	36.2	33.3	26.4	14.3	15.3
202		04:00:00	35.8	28.5	49.2	31.0	46.2	46.6	43.8	34.0	32.1	32.1	24.9	13.7	15.4
203		05:00:00	42.8	30.9	63.6	33.4	47.7	48.3	45.3	43.3	42.2	38.5	26.5	13.6	15.4
204		06:00:00	42.1	34.6	54.6	38.0	50.4	53.5	50.4	42.8	39.4	37.6	28.7	16.7	15.5
205		07:00:00	46.4	38.4	66.3	40.5	53.7	59.1	55.2	49.6	43.8	39.9	31.8	24.7	17.2
206		08:00:00	46.7	38.1	60.7	41.9	54.6	57.9	55.3	48.7	44.1	41.2	33.7	20.2	16.3
207		09:00:00	49.2	33.3	71.9	37.1	51.3	57.6	55.3	51.2	48.6	43.7	31.6	19.9	17.4
208		10:00:00	47.9	34.0	65.5	37.7	52.9	58.1	55.7	51.5	45.9	40.5	33.5	20.6	18.0
209		11:00:00	49.3	33.5	70.7	37.1	53.6	57.7	56.5	54.5	46.7	40.8	34.3	22.4	21.4
210		12:00:00	49.8	37.2	70.0	41.6	61.3	58.3	56.2	50.7	46.4	46.3	37.9	27.0	27.3

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Back 40	APPENDIX C1: HOURLY DATA FOR LOCATION 1													
2	Wave 1819														
3	Location 1						octave band center frequencies (Hz)								
4			dBA	dBA	dBA	dBA	octave band sound levels (dB)								
5	Date	Time	Leq	Lmin	Lmax	L90	31.5	63.0	125	250	500	1000	2000	4000	8000
211		13:00:00	52.8	37.8	74.9	42.8	66.8	58.8	58.5	54.7	51.7	46.9	39.6	31.6	31.9
212		14:00:00	49.9	39.7	69.6	43.7	67.6	60.2	56.8	49.8	46.0	45.7	39.9	31.7	31.9
213		15:00:00	52.7	38.8	70.1	44.8	67.9	68.3	59.1	50.6	48.8	48.2	43.5	37.8	36.8
214		16:00:00	55.7	39.5	77.1	44.7	61.0	74.3	62.2	51.7	46.9	46.1	45.7	48.5	48.9
215		17:00:00	55.5	38.0	79.1	43.1	60.9	58.2	57.8	57.2	54.3	51.3	42.1	27.5	26.5
216		18:00:00	46.2	36.2	59.2	41.2	51.9	53.7	52.9	45.1	41.1	43.0	37.1	20.2	17.2
217		19:00:00	45.7	37.7	56.8	40.9	49.1	52.4	52.6	41.5	40.4	43.0	36.9	20.3	15.5
218		20:00:00	47.0	34.6	58.8	40.7	61.5	54.2	50.1	45.1	42.8	44.1	37.9	27.2	27.5
219		21:00:00	49.5	39.4	60.4	44.8	69.9	60.4	53.0	48.4	43.5	46.0	41.2	34.0	32.9
220		22:00:00	54.5	39.2	71.7	44.0	72.0	62.5	53.9	50.2	53.5	51.4	42.8	35.6	33.0
221		23:00:00	47.5	35.8	60.7	41.2	68.6	58.9	51.1	47.7	41.6	43.7	38.9	32.3	30.1
222	2018/10/14	00:00:00	47.5	34.8	59.8	40.4	69.5	59.1	51.5	49.5	41.8	42.6	39.2	33.4	31.4
223		01:00:00	46.3	30.5	60.9	35.4	68.5	58.2	50.2	47.9	40.6	41.4	38.3	31.6	28.7
224		02:00:00	41.1	29.9	59.0	32.4	61.5	51.2	45.6	41.7	36.3	37.6	30.8	24.0	24.1
225		03:00:00	40.6	29.5	55.0	32.2	61.6	52.0	45.9	42.0	36.1	36.3	30.0	23.5	24.3
226		04:00:00	43.3	29.9	56.8	33.9	64.7	54.5	48.5	44.6	38.7	39.5	32.1	26.1	25.4
227		05:00:00	40.8	29.7	54.7	32.0	58.2	49.2	43.4	39.4	35.3	38.4	29.9	21.2	21.0
228		06:00:00	42.5	30.2	61.9	35.6	61.2	51.9	46.2	42.9	39.0	39.3	30.7	23.1	23.4
229		07:00:00	43.4	32.6	57.2	36.0	58.5	50.9	45.7	41.3	38.8	41.1	32.0	22.4	20.9
230		08:00:00	50.7	34.4	65.7	39.0	57.6	53.2	52.5	51.7	50.2	46.1	33.9	23.2	19.7
231		09:00:00	47.2	36.2	63.3	41.4	56.7	51.8	48.2	46.7	44.5	44.3	35.1	25.2	19.5
232		10:00:00	50.4	39.6	63.9	44.4	62.7	55.5	51.7	50.1	47.8	47.4	38.1	27.9	21.7
233		11:00:00	47.5	37.6	60.2	42.1	56.8	53.2	49.0	45.6	43.0	45.3	36.3	24.7	18.8
234		12:00:00	45.8	37.6	61.1	40.5	54.3	52.0	49.2	47.2	43.6	42.0	32.9	19.9	17.0
235		13:00:00	45.7	34.9	61.6	39.0	53.3	52.4	51.0	46.0	44.1	41.7	32.1	19.1	17.6
236		14:00:00	45.6	33.8	61.4	37.9	52.2	54.1	50.5	47.9	43.7	40.5	33.0	24.0	16.8
237		15:00:00	45.5	30.9	61.2	34.8	52.9	53.5	52.9	50.2	44.3	35.7	27.4	18.5	15.3
238		16:00:00	46.6	31.8	63.8	34.7	50.6	52.4	51.2	50.4	46.1	39.7	25.9	15.0	15.2
239		17:00:00	43.0	32.1	60.7	34.6	50.9	52.3	50.0	45.9	41.6	36.7	27.6	15.6	15.3
240		18:00:00	47.6	31.0	63.3	36.6	51.7	54.5	52.7	50.4	45.9	42.4	34.4	17.5	15.4
241		19:00:00	47.5	30.5	70.0	33.9	50.1	52.2	51.6	48.4	46.1	43.5	33.7	16.4	15.3
242		20:00:00	53.3	30.5	74.4	33.1	49.9	49.8	48.1	43.3	52.3	51.4	38.8	20.5	16.5
243		21:00:00	37.1	31.2	51.7	32.8	49.4	49.4	45.2	39.9	35.1	31.0	21.7	13.4	15.2
244		22:00:00	50.5	30.8	72.9	32.0	50.8	50.9	47.5	46.1	51.0	47.3	32.8	19.0	16.0
245		23:00:00	36.1	29.1	53.7	30.2	47.1	47.6	42.8	39.3	34.0	30.0	20.4	13.1	15.2
246	2018/10/15	00:00:00	38.1	29.5	59.6	30.5	47.5	46.5	41.6	42.0	38.3	28.5	18.1	13.5	15.5
247		01:00:00	33.3	29.1	46.0	30.1	46.7	46.2	41.3	33.4	31.4	28.1	19.3	12.6	15.1
248		02:00:00	35.4	29.6	52.5	30.7	48.4	47.0	41.9	38.1	33.8	29.3	19.8	12.9	15.4
249		03:00:00	33.3	29.1	48.2	30.5	47.9	47.2	40.6	34.1	30.0	28.9	20.8	12.7	15.2
250		04:00:00	36.6	29.7	53.3	31.8	48.4	47.4	43.1	38.0	32.2	32.8	24.0	13.0	15.2
251		05:00:00	43.0	33.4	54.5	37.6	50.3	50.8	47.2	41.5	38.0	40.9	31.5	14.9	15.3

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Back 40	APPENDIX C1: HOURLY DATA FOR LOCATION 1													
2	Wave 1819														
3	Location 1						octave band center frequencies (Hz)								
4			dBA	dBA	dBA	dBA		octave band sound levels (dB)							
5	Date	Time	Leq	Lmin	Lmax	L90	31.5	63.0	125	250	500	1000	2000	4000	8000
252		06:00:00	45.0	37.8	61.8	40.4	54.4	56.9	51.4	42.9	40.3	42.4	33.2	25.9	20.2
253		07:00:00	52.3	39.8	74.1	43.3	55.6	57.6	52.2	46.7	53.3	47.8	36.5	21.4	16.2
254		08:00:00	45.5	36.6	62.6	40.1	55.8	55.9	53.1	45.7	41.2	42.1	33.2	24.9	18.6
255		09:00:00	52.9	35.4	75.2	39.4	55.0	56.7	58.8	56.4	50.6	48.2	35.6	21.2	17.4
256		10:00:00	49.5	34.2	80.4	37.9	55.9	53.7	52.0	48.8	43.0	42.6	40.4	40.9	41.3
257		11:00:00	47.3	35.7	65.0	38.1	55.9	51.8	47.9	43.5	40.5	42.8	38.3	37.8	34.3

Appendix C2

Hourly Data from Location 2

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Back 40	APPENDIX C2: HOURLY DATA FOR LOCATION 2													
2	Wave 1819														
3	Location 2						octave band center frequencies (Hz)								
4			dBA	dBA	dBA	dBA	octave band sound levels (dB)								
5	Date	Time	Leq	Lmin	Lmax	L90	31.5	63.0	125	250	500	1000	2000	4000	8000
6	10/5/2018	00:00:00													
7		01:00:00													
8		02:00:00													
9		03:00:00													
10		04:00:00													
11		05:00:00													
12		06:00:00													
13		07:00:00													
14		08:00:00													
15		09:00:00													
16		10:00:00													
17		11:00:00													
18		12:00:00													
19		13:00:00													
20		14:00:00													
21		15:00:00													
22		16:00:00													
23	10/5/2018	17:00:00	55.1	43.9	67.6	49.6	63.9	61.8	58.3	52.1	50.7	51.9	47.1	36.3	34.0
24		18:00:00	54.4	43.4	70.3	48.2	59.4	59.2	57.0	52.6	52.1	50.9	44.7	32.1	29.3
25		19:00:00	51.1	35.2	63.0	44.4	55.0	59.1	55.8	48.4	47.3	48.1	41.7	26.8	17.0
26		20:00:00	49.0	35.3	65.8	42.4	52.3	54.9	54.1	46.3	45.2	45.9	40.1	25.0	16.6
27		21:00:00	48.7	34.8	59.8	40.4	51.7	54.9	51.6	46.2	44.5	45.9	40.1	24.9	15.8
28		22:00:00	49.1	32.1	66.6	41.3	48.2	53.3	53.5	46.0	45.1	45.2	41.6	35.5	31.4
29		23:00:00	49.0	38.0	63.4	41.6	46.4	53.2	53.7	44.8	43.8	44.0	42.4	38.1	33.1
30	10/6/2018	00:00:00	46.0	29.6	59.7	35.8	45.1	48.0	45.6	40.8	40.3	42.2	39.6	34.3	28.6
31		01:00:00	42.1	31.1	58.0	32.4	42.6	47.0	44.7	38.6	35.9	37.3	36.0	31.1	26.6
32		02:00:00	39.8	28.1	58.3	29.7	43.0	46.9	44.2	38.2	35.3	36.0	31.8	23.9	18.2
33		03:00:00	43.7	25.9	62.4	27.4	44.5	44.9	43.3	40.9	39.3	40.9	35.4	24.2	16.4
34		04:00:00	44.4	25.9	62.2	27.5	44.8	46.2	49.1	40.4	38.4	41.5	37.0	24.2	15.5
35		05:00:00	51.5	29.0	77.1	32.0	47.4	49.8	46.4	46.8	46.4	49.7	42.4	27.0	14.7
36		06:00:00	52.8	28.6	70.9	38.0	51.5	55.1	54.1	50.3	48.6	50.1	44.0	31.0	18.7
37		07:00:00	55.9	36.2	75.8	43.0	55.7	57.8	57.0	52.3	52.0	53.3	46.9	31.8	19.5
38		08:00:00	56.6	42.0	69.7	47.8	61.9	62.2	60.0	53.1	51.6	54.0	48.2	34.6	21.8
39		09:00:00	58.1	43.4	74.0	49.8	67.9	65.4	61.4	57.2	53.6	55.0	48.9	35.2	22.7
40		10:00:00	58.5	46.2	70.5	51.7	73.0	65.9	62.1	58.0	54.2	55.3	49.5	36.6	25.2
41		11:00:00	60.5	43.9	83.4	51.0	71.7	64.9	62.2	61.2	59.1	56.1	48.6	35.8	25.0
42		12:00:00	57.0	41.9	71.6	48.9	67.4	62.0	59.5	56.0	53.0	54.2	47.7	34.5	22.8
43		13:00:00	56.3	39.2	71.9	47.8	64.1	62.2	60.9	55.9	53.2	52.8	46.3	32.6	20.4
44		14:00:00	55.5	40.0	71.6	47.8	67.4	61.4	58.8	54.5	51.6	52.5	45.9	32.3	20.7
45		15:00:00	56.8	42.7	77.4	49.1	70.0	63.1	61.7	56.8	53.6	53.1	47.0	34.5	23.2
46		16:00:00	56.9	43.0	73.3	49.5	67.3	62.8	60.3	55.7	52.8	53.7	47.9	35.0	22.8

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Back 40	APPENDIX C2: HOURLY DATA FOR LOCATION 2													
2	Wave 1819														
3	Location 2						octave band center frequencies (Hz)								
4			dBA	dBA	dBA	dBA	octave band sound levels (dB)								
5	Date	Time	Leq	Lmin	Lmax	L90	31.5	63.0	125	250	500	1000	2000	4000	8000
47		17:00:00	56.4	43.5	72.6	49.3	65.9	62.6	60.8	54.8	52.0	53.4	47.4	35.5	24.1
48		18:00:00	55.4	41.7	69.8	47.6	59.9	60.6	59.9	53.7	50.9	52.4	46.3	32.7	19.3
49		19:00:00	56.3	40.9	82.2	46.8	59.7	59.4	57.9	53.1	49.6	53.0	50.1	36.0	21.6
50		20:00:00	53.2	40.6	66.5	45.2	58.9	60.2	60.2	53.0	49.7	49.5	43.4	30.3	17.1
51		21:00:00	53.6	39.5	69.7	45.2	58.2	60.2	57.6	52.9	50.0	50.3	44.0	30.4	17.8
52		22:00:00	51.7	36.4	64.9	43.3	58.9	58.4	55.7	49.9	47.8	48.5	42.7	30.0	18.8
53		23:00:00	50.2	35.8	65.0	40.4	64.5	57.5	55.9	48.4	45.1	47.0	42.0	29.4	18.5
54	10/7/2018	00:00:00	47.7	32.4	62.9	37.5	61.9	55.3	52.1	47.1	43.0	44.2	39.4	27.7	17.6
55		01:00:00	42.7	28.8	56.8	30.6	55.8	50.2	49.0	40.3	37.4	39.3	35.1	23.2	15.5
56		02:00:00	40.7	25.7	57.9	28.2	47.2	46.6	43.5	39.0	36.1	37.6	32.3	20.4	14.6
57		03:00:00	43.2	28.1	61.5	30.2	49.8	52.5	48.8	41.6	38.1	39.7	34.6	22.9	15.8
58		04:00:00	44.8	24.6	62.3	28.9	46.1	46.5	46.7	40.8	39.6	42.1	36.9	22.9	14.7
59		05:00:00	46.3	25.9	63.2	29.0	45.4	47.0	49.0	42.0	41.6	44.1	37.1	22.6	11.7
60		06:00:00	49.4	32.0	65.7	36.4	48.4	49.6	47.8	46.7	45.9	47.0	39.2	24.2	12.5
61		07:00:00	52.0	29.1	75.3	35.7	48.7	56.9	52.6	50.3	48.4	49.6	41.1	28.8	16.8
62		08:00:00	53.7	29.9	70.7	39.4	51.9	54.9	55.8	51.5	50.8	50.7	44.2	29.3	14.2
63		09:00:00	53.4	35.3	64.0	44.0	52.7	54.7	54.2	51.3	50.0	50.9	43.3	28.6	15.0
64		10:00:00	55.2	37.7	71.1	46.4	54.6	60.1	58.4	54.8	51.8	52.3	44.4	30.0	19.3
65		11:00:00	53.2	35.9	66.4	44.3	54.1	57.6	54.7	52.0	49.7	50.6	42.7	27.1	14.2
66		12:00:00	52.9	35.6	66.2	43.5	54.5	57.2	57.6	52.1	49.6	49.8	42.1	29.0	15.8
67		13:00:00	51.7	35.0	65.9	43.4	53.7	56.7	55.1	50.9	48.2	48.8	41.1	25.7	14.9
68		14:00:00	53.0	38.3	73.8	44.6	54.5	57.0	57.7	51.9	50.1	49.8	42.4	27.2	16.0
69		15:00:00	51.9	34.4	64.6	43.8	53.8	56.2	54.3	50.3	47.7	49.3	42.4	27.7	17.7
70		16:00:00	55.1	37.8	76.4	45.4	54.3	58.3	58.8	56.6	51.5	51.5	45.1	31.1	19.8
71		17:00:00	54.7	40.4	70.5	46.9	55.6	56.2	57.4	51.5	50.1	51.3	47.3	39.1	31.1
72		18:00:00	55.4	40.5	69.0	46.0	55.2	60.1	56.7	52.5	51.0	51.2	48.2	43.6	34.4
73		19:00:00	56.2	39.8	83.6	44.6	58.2	60.2	56.3	54.4	52.0	52.5	48.5	42.6	33.6
74		20:00:00	51.8	35.0	66.3	41.0	56.4	55.1	53.5	48.3	46.6	47.7	45.1	40.1	31.1
75		21:00:00	51.2	36.0	66.6	40.8	54.7	57.8	54.2	48.6	46.0	46.7	44.4	39.3	30.9
76		22:00:00	48.2	33.4	64.6	37.7	50.6	52.0	49.6	45.3	43.2	44.3	41.3	35.2	26.1
77		23:00:00	46.2	31.3	63.8	33.9	48.3	50.2	52.6	46.1	43.3	42.1	36.9	28.8	21.7
78	10/8/2018	00:00:00	42.2	29.4	62.3	32.3	46.3	47.1	43.8	40.4	37.3	38.7	34.5	27.2	20.2
79		01:00:00	41.2	31.3	58.0	32.7	42.6	43.4	40.7	38.0	36.0	37.6	34.1	28.4	22.5
80		02:00:00	43.0	30.5	66.5	32.2	43.3	47.9	41.9	36.6	38.3	40.1	35.3	29.7	23.4
81		03:00:00	43.3	30.5	60.8	32.0	46.6	45.5	42.7	39.0	37.9	40.2	36.1	29.4	21.6
82		04:00:00	50.8	33.0	74.7	35.6	50.1	57.3	53.3	51.2	46.5	46.5	42.6	36.7	27.1
83		05:00:00	54.4	36.2	65.5	43.7	52.0	55.4	53.4	49.5	49.3	51.6	46.8	39.1	27.0
84		06:00:00	58.0	43.4	73.7	50.6	56.0	59.9	57.6	53.2	53.6	55.5	49.6	39.4	27.5
85		07:00:00	58.1	43.3	67.4	51.1	56.5	61.7	59.7	54.5	53.2	55.6	49.2	38.0	27.7
86		08:00:00	57.6	40.4	68.5	49.7	56.1	60.0	59.4	55.4	53.3	55.0	48.2	35.3	22.5
87		09:00:00	56.2	41.9	70.4	47.8	55.2	61.7	58.3	53.9	52.4	53.5	46.5	35.6	24.9

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Back 40	APPENDIX C2: HOURLY DATA FOR LOCATION 2													
2	Wave 1819														
3	Location 2						octave band center frequencies (Hz)								
4			dBA	dBA	dBA	dBA	octave band sound levels (dB)								
5	Date	Time	Leq	Lmin	Lmax	L90	31.5	63.0	125	250	500	1000	2000	4000	8000
88		10:00:00	55.5	41.0	72.6	46.8	56.3	62.2	57.3	53.9	52.5	52.5	45.4	35.4	26.7
89		11:00:00	54.8	40.1	72.4	46.6	56.3	63.7	57.1	53.2	51.9	51.3	45.5	37.1	26.9
90		12:00:00	54.3	37.9	70.4	45.1	55.6	60.2	54.9	51.5	51.0	51.2	45.5	36.7	25.4
91		13:00:00	55.1	41.3	73.2	47.0	54.9	66.7	59.3	54.4	51.9	51.1	45.1	39.2	29.7
92		14:00:00	54.5	41.7	72.6	46.8	55.0	64.2	57.5	53.7	51.9	50.7	44.7	36.3	26.3
93		15:00:00	56.1	40.3	77.7	47.5	55.1	63.7	59.5	54.0	51.9	53.2	46.8	34.7	24.1
94		16:00:00	55.5	43.3	68.7	49.1	55.8	61.1	59.2	54.3	51.8	52.7	45.5	30.0	15.8
95		17:00:00	55.2	41.4	67.4	48.7	55.1	60.6	59.1	54.0	51.3	52.3	45.5	30.5	17.3
96		18:00:00	54.4	42.0	67.9	48.0	54.2	60.1	57.9	53.0	50.5	51.6	44.5	28.6	14.6
97		19:00:00	52.1	35.2	64.0	44.9	52.5	57.7	56.0	50.3	48.3	49.3	42.3	27.3	14.7
98		20:00:00	50.5	34.2	62.7	42.7	50.5	56.9	55.3	49.6	46.7	47.0	41.6	31.6	24.5
99		21:00:00	48.1	30.9	61.5	39.4	48.6	53.0	49.8	44.7	43.2	45.2	40.3	30.0	20.0
100		22:00:00	47.3	27.2	67.2	32.1	47.7	51.3	50.4	47.3	43.8	44.1	37.5	25.3	16.2
101		23:00:00	44.0	26.3	60.3	29.3	45.0	48.0	48.0	43.5	39.3	40.9	35.3	22.8	15.1
102	10/9/2018	00:00:00	39.8	23.6	58.5	26.7	42.7	44.3	42.6	37.7	35.3	36.9	31.5	18.5	12.6
103		01:00:00	38.8	24.5	61.4	28.4	42.9	44.3	39.3	35.8	35.1	35.9	30.0	16.9	10.7
104		02:00:00	41.4	24.9	64.8	26.1	43.0	44.8	43.7	37.5	37.4	38.7	32.3	21.1	13.3
105		03:00:00	42.8	25.0	60.9	28.8	44.7	44.2	39.1	37.0	37.4	40.4	35.0	24.1	19.8
106		04:00:00	48.3	29.6	63.0	32.3	46.7	50.6	47.0	43.1	43.0	45.7	40.4	30.6	22.8
107		05:00:00	55.5	35.3	67.4	44.5	53.1	57.4	53.8	50.6	50.4	53.0	47.5	36.5	24.8
108		06:00:00	58.7	40.0	80.5	49.4	57.7	65.0	62.2	58.3	54.5	55.6	49.2	36.8	24.0
109		07:00:00	57.5	44.7	73.4	49.7	58.4	63.9	60.4	55.1	53.1	54.9	48.2	36.8	28.1
110		08:00:00	58.5	43.4	73.4	49.6	59.5	67.1	62.9	57.7	55.0	55.3	48.3	38.6	30.3
111		09:00:00	57.7	42.2	76.7	49.0	58.3	64.2	60.4	56.3	55.0	54.2	48.0	39.1	28.1
112		10:00:00	56.1	40.0	71.6	47.3	56.4	65.0	59.2	55.1	53.1	52.8	45.5	35.0	25.8
113		11:00:00	55.9	42.2	72.8	48.0	57.6	64.4	57.9	53.5	52.2	52.7	47.1	39.1	27.5
114		12:00:00	57.2	41.1	76.4	48.0	56.8	64.7	61.0	57.9	54.0	52.9	47.8	40.4	29.5
115		13:00:00	57.1	41.3	74.6	48.7	57.7	67.4	59.6	56.0	53.8	53.1	48.3	42.0	31.0
116		14:00:00	56.1	42.7	72.1	48.7	56.3	63.8	61.0	54.1	52.0	52.2	47.8	41.5	29.6
117		15:00:00	56.3	40.4	68.1	49.0	56.0	62.4	59.6	53.9	51.7	53.0	48.4	39.5	27.4
118		16:00:00	56.8	44.6	68.8	50.3	55.8	60.1	58.8	54.4	53.1	53.9	48.1	35.8	23.5
119		17:00:00	56.1	44.9	67.1	50.2	55.8	61.1	60.7	53.9	51.6	53.3	47.0	32.9	20.3
120		18:00:00	54.5	40.2	66.9	47.9	54.1	60.7	58.7	54.0	50.7	51.5	44.3	28.6	15.2
121		19:00:00	52.7	38.6	70.8	44.2	52.0	59.3	58.3	53.1	49.4	49.3	41.9	25.5	12.4
122		20:00:00	51.0	33.2	69.8	41.9	50.7	56.2	54.8	49.2	46.8	48.6	40.8	25.1	14.2
123		21:00:00	49.2	33.4	63.2	40.3	49.6	54.0	52.4	47.4	45.1	46.6	39.3	23.2	13.4
124		22:00:00	47.0	28.9	66.1	34.1	47.0	51.4	51.1	45.7	42.4	44.5	37.2	20.8	11.8
125		23:00:00	44.9	26.2	62.9	31.2	44.2	49.8	54.1	44.8	39.2	41.7	35.6	20.5	13.9
126	10/10/2018	00:00:00	43.2	31.2	60.7	33.6	43.6	46.6	48.2	39.4	37.8	39.9	35.6	27.8	27.6
127		01:00:00	40.5	34.4	59.4	36.2	42.7	42.8	41.7	35.9	36.5	35.9	30.8	31.3	32.0
128		02:00:00	40.7	34.6	61.2	35.2	41.2	42.7	43.4	36.9	34.6	36.7	32.3	30.1	31.3

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Back 40	APPENDIX C2: HOURLY DATA FOR LOCATION 2													
2	Wave 1819														
3	Location 2						octave band center frequencies (Hz)								
4			dBA	dBA	dBA	dBA	octave band sound levels (dB)								
5	Date	Time	Leq	Lmin	Lmax	L90	31.5	63.0	125	250	500	1000	2000	4000	8000
129		03:00:00	43.8	32.8	59.3	34.1	43.5	44.2	41.8	40.3	38.8	41.0	35.2	29.1	29.4
130		04:00:00	48.9	31.9	67.4	33.6	46.9	52.4	50.5	45.1	43.9	46.5	40.1	30.4	27.3
131		05:00:00	55.2	36.1	75.8	43.8	52.5	55.3	52.5	50.9	50.6	53.1	45.8	31.9	25.1
132		06:00:00	58.0	42.9	70.4	49.3	56.2	61.5	59.7	54.5	53.5	55.8	48.2	33.4	23.4
133		07:00:00	57.6	42.6	74.2	50.1	57.4	63.4	60.1	55.9	53.2	55.0	47.7	34.0	25.9
134		08:00:00	59.0	43.7	83.2	50.0	58.8	63.9	62.9	59.6	55.3	55.5	48.7	35.5	25.6
135		09:00:00	57.1	38.6	75.6	47.7	57.4	61.6	60.3	56.9	53.6	53.9	47.3	36.1	24.2
136		10:00:00	57.0	41.0	76.7	47.4	56.5	62.8	61.7	57.6	54.3	52.8	47.0	36.7	29.8
137		11:00:00	59.4	42.9	87.0	48.7	59.3	64.5	62.5	60.9	57.8	55.2	47.4	37.1	26.1
138		12:00:00	55.3	40.7	72.9	46.6	57.0	63.3	60.3	55.1	52.4	51.0	45.7	38.3	28.7
139		13:00:00	54.3	38.5	71.0	44.7	56.3	60.1	59.2	53.5	50.8	50.7	45.0	35.6	23.4
140		14:00:00	56.8	41.5	78.3	47.5	57.1	64.0	65.1	57.5	53.6	52.3	47.0	38.9	26.9
141		15:00:00	55.9	43.6	69.7	49.5	55.4	60.8	59.0	54.0	51.7	52.6	47.8	39.5	27.3
142		16:00:00	56.7	41.8	68.0	51.0	55.8	61.7	61.6	56.2	53.3	53.2	47.3	35.7	21.9
143		17:00:00	56.1	43.8	68.5	49.7	56.2	61.7	60.0	54.4	51.9	53.2	47.0	34.3	20.4
144		18:00:00	55.5	43.1	72.2	47.9	54.7	60.7	59.7	55.1	51.9	52.3	45.9	34.1	21.1
145		19:00:00	53.5	37.1	66.8	45.1	53.0	58.0	55.8	51.2	48.9	50.7	45.0	30.0	15.8
146		20:00:00	52.3	34.9	69.3	43.3	51.7	57.2	56.6	50.6	47.5	49.3	43.9	28.6	15.0
147		21:00:00	50.7	33.9	62.7	40.6	50.4	56.2	53.8	48.7	45.3	47.8	42.5	27.4	14.5
148		22:00:00	47.5	28.0	63.2	34.4	49.0	53.2	51.7	45.0	42.7	44.6	39.3	24.9	13.9
149		23:00:00	45.0	27.2	58.6	31.0	46.6	50.4	47.2	42.0	39.8	42.3	36.8	21.9	11.1
150	10/11/2018	00:00:00	43.4	28.5	61.8	30.2	46.8	50.3	46.0	40.5	39.5	40.5	34.2	18.6	9.9
151		01:00:00	42.4	25.6	63.0	29.6	45.5	46.0	43.7	40.9	39.1	39.6	31.7	17.8	12.5
152		02:00:00	37.3	25.7	58.1	27.0	44.4	44.3	41.9	36.8	32.4	34.3	27.8	15.3	10.2
153		03:00:00	44.9	26.3	64.4	29.2	46.6	48.3	44.2	40.4	40.4	42.8	35.3	20.0	10.4
154		04:00:00	49.9	28.6	68.7	31.0	48.1	50.9	51.7	45.6	44.8	47.7	40.4	24.9	12.4
155		05:00:00	56.0	33.4	70.5	41.6	52.6	57.3	55.4	50.7	51.1	54.0	46.8	31.0	16.1
156		06:00:00	58.9	41.7	70.8	49.4	56.0	64.4	59.5	54.8	54.0	56.8	49.7	34.0	17.9
157		07:00:00	58.6	43.2	73.3	49.6	57.1	62.5	63.7	57.0	54.0	56.0	48.8	34.1	20.0
158		08:00:00	59.6	44.6	78.1	50.6	58.7	64.2	63.0	59.0	56.3	56.4	49.4	37.3	22.9
159		09:00:00	57.5	43.4	72.9	49.5	57.4	65.5	60.4	56.8	53.5	54.5	47.7	36.6	21.4
160		10:00:00	59.3	37.6	86.0	47.8	58.2	63.0	63.1	60.1	58.4	54.5	47.2	35.3	19.6
161		11:00:00	57.5	37.0	77.7	43.9	57.4	65.5	62.7	57.5	54.3	53.5	46.8	35.9	19.8
162		12:00:00	57.3	37.9	81.4	41.9	58.1	63.9	62.8	57.2	52.8	53.9	47.0	35.9	21.6
163		13:00:00	55.4	36.0	74.1	43.0	56.5	60.6	60.6	56.6	53.1	51.2	43.2	32.6	17.5
164		14:00:00	53.8	36.2	69.7	42.5	55.6	61.9	61.1	53.9	51.3	49.9	42.0	28.1	16.5
165		15:00:00	55.5	41.4	76.9	46.3	57.6	61.4	60.5	54.3	51.5	52.5	45.5	30.1	15.9
166		16:00:00	58.7	45.0	72.4	51.3	63.5	63.1	62.7	59.5	55.7	54.8	49.0	39.4	27.0
167		17:00:00	57.7	43.2	75.3	50.7	65.6	67.0	63.5	57.1	55.2	53.7	47.6	34.6	23.6
168		18:00:00	56.2	41.7	67.8	48.8	55.5	61.3	61.0	55.3	52.5	53.0	46.8	32.1	18.0
169		19:00:00	53.9	41.8	71.5	47.4	54.7	61.2	58.5	52.4	50.1	50.8	44.4	29.4	15.4

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Back 40		APPENDIX C2: HOURLY DATA FOR LOCATION 2												
2	Wave 1819														
3	Location 2						octave band center frequencies (Hz)								
4			dBA	dBA	dBA	dBA	octave band sound levels (dB)								
5	Date	Time	Leq	Lmin	Lmax	L90	31.5	63.0	125	250	500	1000	2000	4000	8000
170		20:00:00	53.2	40.0	66.7	45.4	55.1	59.1	58.1	53.2	49.9	49.9	42.8	28.0	13.9
171		21:00:00	52.2	40.5	65.2	45.9	53.7	59.8	57.2	50.8	47.7	49.3	42.9	28.6	14.4
172		22:00:00	47.5	32.4	61.0	36.3	51.4	53.8	51.1	45.7	43.3	44.6	38.5	24.4	13.1
173		23:00:00	44.3	30.1	65.9	32.5	49.7	52.8	48.5	44.9	40.5	40.9	34.8	21.3	11.7
174	10/12/2018	00:00:00	43.0	30.0	58.6	33.0	47.2	51.2	48.8	43.0	39.3	39.5	32.9	18.7	10.6
175		01:00:00	38.7	25.4	57.9	27.8	44.7	48.4	46.9	36.8	34.2	35.0	29.4	16.6	10.3
176		02:00:00	42.0	24.3	64.2	26.8	45.6	46.7	44.5	40.4	39.5	38.9	30.8	19.3	10.9
177		03:00:00	44.5	31.2	61.1	32.7	48.2	49.7	48.1	40.4	40.1	42.0	35.2	20.0	10.9
178		04:00:00	49.1	32.8	65.4	34.8	51.2	52.6	50.9	45.1	44.3	46.6	40.4	25.4	13.4
179		05:00:00	55.9	36.8	68.9	43.4	55.2	63.0	56.2	52.0	51.1	53.5	47.1	32.7	19.0
180		06:00:00	59.5	46.5	69.9	51.4	58.0	61.8	60.7	54.7	54.2	57.2	50.9	36.5	23.0
181		07:00:00	59.8	46.2	77.4	51.7	60.3	65.1	61.5	56.7	55.8	57.0	50.8	36.3	21.9
182		08:00:00	57.9	43.5	72.4	48.3	59.9	66.4	60.7	56.5	53.7	54.9	48.7	35.2	20.5
183		09:00:00	57.1	42.8	69.7	47.8	60.2	62.3	60.4	55.5	52.8	54.4	47.8	34.8	19.8
184		10:00:00	56.6	43.1	73.2	48.3	60.0	62.3	60.4	55.4	53.0	53.6	46.7	32.8	19.6
185		11:00:00	56.1	40.3	78.4	45.7	58.2	62.8	61.0	56.6	52.9	52.3	46.0	34.8	22.0
186		12:00:00	56.5	37.1	80.2	43.2	57.8	64.6	61.9	58.0	54.7	51.7	44.0	31.4	16.0
187		13:00:00	56.7	38.6	78.2	44.2	56.8	61.0	60.0	57.0	54.7	53.2	42.5	27.6	14.6
188		14:00:00	55.3	38.5	71.9	45.3	57.8	63.3	62.3	56.9	53.2	50.8	42.6	28.9	15.9
189		15:00:00	54.7	37.5	71.5	44.8	57.9	62.9	60.8	55.3	51.6	51.1	43.0	29.1	15.8
190		16:00:00	56.6	39.4	72.9	47.9	59.5	63.3	62.7	56.3	53.2	53.2	46.5	33.5	20.5
191		17:00:00	57.4	42.2	73.7	48.9	59.1	64.7	63.2	57.2	53.9	53.9	47.4	34.2	20.7
192		18:00:00	56.3	42.6	71.5	49.5	58.4	62.6	61.5	55.3	52.2	53.1	46.9	35.0	24.4
193		19:00:00	54.6	41.5	70.1	47.3	56.2	61.0	58.5	52.6	50.5	51.7	45.4	31.6	17.7
194		20:00:00	53.0	41.2	67.9	46.6	53.9	59.1	57.5	50.5	48.7	50.0	44.3	30.7	17.0
195		21:00:00	54.6	41.9	74.8	47.3	55.7	63.8	63.5	54.0	50.8	50.6	44.2	30.5	18.6
196		22:00:00	50.1	34.5	67.5	40.0	51.1	55.6	53.7	48.4	45.5	47.3	41.3	27.1	14.5
197		23:00:00	49.6	31.9	69.1	38.4	49.4	55.3	61.9	50.8	44.0	45.1	39.5	26.4	14.7
198	10/13/2018	00:00:00	46.5	31.7	64.0	36.2	47.2	52.5	51.1	44.8	41.9	43.8	37.0	23.4	13.2
199		01:00:00	45.3	27.9	62.8	31.1	46.6	54.5	52.5	44.9	41.6	41.7	35.7	22.3	13.0
200		02:00:00	47.5	27.7	68.7	29.7	46.5	48.5	48.0	44.0	42.7	45.1	38.8	23.5	12.3
201		03:00:00	45.4	27.4	65.1	29.4	46.2	50.1	48.6	42.5	41.4	42.7	36.3	23.8	13.4
202		04:00:00	46.1	27.7	67.8	30.7	47.0	50.8	50.3	42.9	41.6	43.3	36.8	22.1	13.7
203		05:00:00	49.4	29.7	66.5	35.6	48.5	51.2	48.8	46.7	46.0	46.8	39.6	24.9	14.2
204		06:00:00	53.5	37.2	67.8	42.0	51.9	58.6	57.5	51.8	49.1	50.8	43.8	30.1	17.5
205		07:00:00	57.7	39.5	76.6	46.9	56.7	68.8	66.0	58.3	53.4	53.4	47.4	38.1	25.6
206		08:00:00	56.5	42.3	75.1	47.9	57.9	61.7	59.6	54.8	52.7	53.5	46.9	40.7	24.2
207		09:00:00	56.0	37.3	71.7	44.3	55.6	64.3	60.4	56.5	53.2	52.3	44.7	32.7	18.0
208		10:00:00	56.2	37.3	76.7	44.4	58.2	62.2	61.5	57.9	53.1	52.0	46.1	35.5	20.7
209		11:00:00	55.6	36.2	72.4	43.5	57.7	63.7	61.9	57.4	53.2	51.1	42.9	30.5	17.5
210		12:00:00	55.1	37.0	70.7	44.4	60.0	63.3	60.9	56.3	52.2	51.1	43.8	30.4	17.3

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Back 40	APPENDIX C2: HOURLY DATA FOR LOCATION 2													
2	Wave 1819														
3	Location 2						octave band center frequencies (Hz)								
4			dBA	dBA	dBA	dBA	octave band sound levels (dB)								
5	Date	Time	Leq	Lmin	Lmax	L90	31.5	63.0	125	250	500	1000	2000	4000	8000
211		13:00:00	56.5	40.3	78.1	46.4	63.9	61.9	62.8	57.7	54.0	52.0	45.6	33.4	19.7
212		14:00:00	55.5	40.3	72.1	46.7	64.0	63.7	61.5	55.1	51.9	51.7	46.2	35.3	22.7
213		15:00:00	56.1	42.5	74.3	47.5	65.2	62.9	61.1	55.6	52.4	52.8	46.4	32.7	19.9
214		16:00:00	55.7	41.1	74.9	46.8	59.4	60.3	60.6	55.5	52.3	52.4	45.6	30.9	16.7
215		17:00:00	58.7	41.2	82.1	47.9	58.2	60.8	62.1	59.2	57.0	54.6	47.3	32.1	17.8
216		18:00:00	54.5	41.6	69.7	47.2	54.8	59.2	59.1	53.2	50.3	51.7	44.7	30.4	18.4
217		19:00:00	54.1	37.4	72.6	46.1	52.6	57.9	57.7	51.2	50.2	51.6	43.8	29.1	15.0
218		20:00:00	52.9	35.3	75.8	42.8	62.5	57.8	57.3	52.9	48.8	49.3	43.7	29.9	20.7
219		21:00:00	52.9	40.2	65.4	45.8	70.5	61.8	57.5	52.9	48.2	49.2	44.4	32.8	24.2
220		22:00:00	52.6	37.2	69.6	44.5	73.1	64.2	56.9	55.0	49.1	47.5	43.2	33.6	26.5
221		23:00:00	49.5	35.7	65.0	41.3	68.2	58.7	52.9	47.8	44.3	45.9	42.0	33.8	26.2
222	10/14/2018	00:00:00	47.8	33.7	62.5	38.3	69.1	58.8	52.3	45.9	42.6	43.1	40.9	35.3	27.1
223		01:00:00	46.8	30.7	61.3	35.8	69.9	59.3	49.8	44.8	41.7	42.2	40.1	31.7	24.1
224		02:00:00	44.3	29.9	66.6	32.4	63.1	52.7	45.8	42.1	41.7	40.9	34.8	25.9	20.3
225		03:00:00	43.9	28.6	63.7	32.2	61.4	52.1	46.9	41.3	40.2	40.9	34.1	25.4	19.8
226		04:00:00	46.9	30.1	63.6	34.8	65.8	55.7	51.5	45.3	43.6	43.7	36.2	28.3	22.4
227		05:00:00	48.1	30.5	70.5	34.2	60.3	51.8	46.9	45.6	44.2	45.8	36.5	26.7	18.8
228		06:00:00	48.4	31.4	66.3	36.5	62.2	53.9	48.8	44.9	44.6	46.2	37.1	27.3	19.8
229		07:00:00	49.3	34.8	69.9	38.3	60.8	54.5	49.2	48.7	46.8	46.3	37.3	30.2	21.6
230		08:00:00	52.5	37.0	67.1	42.0	59.4	55.8	54.3	52.5	51.3	48.8	38.9	30.8	23.6
231		09:00:00	51.9	36.7	69.7	43.7	60.4	59.7	53.2	50.1	48.5	49.1	40.6	33.6	23.5
232		10:00:00	54.7	39.2	69.6	47.3	63.6	60.7	56.2	52.7	51.8	52.0	43.5	34.8	24.3
233		11:00:00	53.3	39.8	65.7	45.7	60.5	58.5	56.1	50.1	49.1	51.1	42.3	31.6	21.3
234		12:00:00	53.2	41.1	66.7	45.2	56.5	56.4	55.5	50.6	48.9	51.2	41.6	28.4	21.0
235		13:00:00	52.0	38.3	65.4	43.3	56.3	56.7	56.3	50.1	48.6	49.6	39.6	25.6	19.3
236		14:00:00	52.4	37.3	66.1	43.3	54.5	58.7	55.9	51.0	48.3	49.9	40.8	31.6	21.1
237		15:00:00	51.9	32.5	67.3	41.9	54.6	58.3	56.5	52.0	47.9	49.2	39.7	28.3	16.3
238		16:00:00	53.8	35.2	68.4	43.2	53.1	57.2	57.4	53.1	49.9	51.4	41.2	25.2	13.9
239		17:00:00	52.9	32.4	74.7	42.3	53.4	57.5	56.4	52.0	48.5	50.6	41.0	24.1	12.6
240		18:00:00	53.7	34.6	67.6	43.9	53.8	61.3	58.4	53.6	49.2	51.1	42.5	26.3	13.5
241		19:00:00	52.6	31.8	68.1	40.8	52.0	60.3	55.0	51.0	48.1	50.3	41.8	24.7	11.2
242		20:00:00	48.8	30.6	64.7	37.0	50.8	54.2	53.2	46.9	43.4	46.5	37.8	20.1	10.2
243		21:00:00	48.0	31.3	67.2	36.2	49.9	52.8	50.6	44.6	43.5	45.9	36.7	20.4	11.3
244		22:00:00	52.4	29.8	70.0	33.9	50.1	52.9	51.8	55.0	52.2	46.3	36.5	19.3	10.4
245		23:00:00	44.3	29.1	59.7	33.0	46.8	49.5	45.3	42.4	39.6	42.2	32.8	17.2	10.1
246	10/15/2018	00:00:00	41.7	29.2	59.8	30.9	50.6	48.8	43.8	42.6	39.0	38.3	29.8	17.2	11.3
247		01:00:00	41.5	26.4	61.7	30.1	47.4	49.7	47.0	40.1	37.3	38.7	30.6	16.8	10.1
248		02:00:00	41.1	30.3	61.6	32.2	50.4	47.9	42.9	39.8	37.6	38.4	30.4	17.2	10.9
249		03:00:00	46.3	29.1	69.8	31.2	48.9	51.1	46.8	41.0	41.2	44.3	36.2	25.0	15.7
250		04:00:00	50.9	31.3	66.7	33.8	49.3	51.1	49.6	43.7	44.5	49.2	41.7	27.2	13.7
251		05:00:00	56.8	36.1	71.9	43.8	54.4	56.0	53.9	49.5	50.8	55.2	47.2	33.8	19.5

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Back 40	APPENDIX C2: HOURLY DATA FOR LOCATION 2													
2	Wave 1819														
3	Location 2						octave band center frequencies (Hz)								
4			dBA	dBA	dBA	dBA	octave band sound levels (dB)								
5	Date	Time	Leq	Lmin	Lmax	L90	31.5	63.0	125	250	500	1000	2000	4000	8000
252		06:00:00	59.7	42.3	72.4	50.4	58.5	63.8	59.3	53.6	53.8	58.1	49.7	36.5	22.5
253		07:00:00	59.7	44.2	73.8	51.2	59.3	63.6	60.5	55.1	54.0	57.9	49.4	35.7	21.5
254		08:00:00	59.2	41.7	74.6	49.3	59.1	61.6	59.7	54.3	53.7	57.5	48.9	35.2	24.1
255		09:00:00	57.5	40.9	73.6	47.0	58.2	61.2	61.2	57.1	52.8	54.9	46.6	32.7	19.5
256		10:00:00	56.3	35.4	72.3	45.0	59.1	59.6	59.1	53.5	51.7	54.1	45.8	31.9	19.2
257		11:00:00	56.4	37.7	70.9	45.2	58.8	64.0	61.1	54.0	51.6	54.0	45.8	30.9	17.7

Appendix D

Echopark Stadium Schedule

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Revised
12/12/18

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Small Arms Range Ventilation Standards

Carey's Heating & Air Conditioning, Inc. has designed and built hundreds of small arms range ventilation systems since 1995. There are three main purposes for properly ventilating a small arms range.

1. The primary purpose for the ventilation of an indoor firing range is to remove from the respiratory zone of the occupants harmful contaminants created during the firing of a weapon. Exploding primers containing lead styphnate and friction from the lead slug against the gun barrel create airborne lead. There is also carbon monoxide as well as other contaminants created during the firing of a weapon.
2. The second and equally important reason for the properly designed and installed ventilation and control system is to keep the range at a negative pressure to the surrounding base building space. Contaminates created on a small arms range need to be contained within the range space. This will prevent the ingestion of contaminants as well as keeping the surfaces free of contaminants in non-range spaces of the base building.
3. The final purpose is to remove the smoke from the range for properly seeing the targets.

The following is a summary of the EPA, NIOSH and OSHA standards as they apply to small arms range ventilation.

EPA:

TITLE 40--PROTECTION OF ENVIRONMENT CHAPTER I--ENVIRONMENTAL PROTECTION AGENCY PART 50--NATIONAL PRIMARY AND SECONDARY AMBIENT AIR QUALITY STANDARDS--Table of Contents Sec. 50.12 National primary and secondary ambient air quality standards for lead. National primary and secondary ambient air quality standards for lead and its compounds, measured as elemental lead by a reference method based on appendix G to this part, or by an equivalent method, are: 1.5 micrograms per cubic meter, maximum arithmetic mean averaged over a calendar quarter. (Secs. 109, 301(a) Clean Air Act as amended (42 U.S.C. 7409, 7601(a)))

NIOSH and OSHA:

Established by NIOSH, the performance intent for firing range ventilation systems shall meet all the requirements outlined as recommendations and design considerations in HEW publication no. (NIOSH) 76-130, dated December, 1975, entitled "Lead Exposure Design Considerations for Indoor Firing Ranges". This design standard prefers an air flow velocity of 75 feet per minute average on the empty range. This design has consistently provided for the compliance within the established federal standards for airborne inorganic lead concentration limits.

When properly executed, lead concentrations are consistently maintained below the action level of 30 micrograms per cubic meter (30ug/m³) in an area where the limit shall not exceed 50 micrograms of lead per cubic meter (50ug/m³) of air over a time weighted average of eight hours as measured at the respiration zone of the shooters and the range officer when firing from the firing booths per OSHA 29 CFR. 1910.1025 and 1926.62.

Revised
12/12/18



Carey's has designed and installed over 800 small arms range ventilation systems. All of the systems that our team has designed and/or installed use both 30% pre-filters and 99.97% HEPA filters. The dual set of filters are installed to maintain an exhaust air that is cleaner than the outside air. The Small Arms Range will exhaust an average of 93.3% less than the allowable limit per the EPA Lead emission rates, see calculations below.

High-Efficiency Particulate Air or HEPA is a type of air filter. The filter must satisfy certain standards of efficiency such as those set by the United States Department of Energy (DOE). To qualify as HEPA by US government standards, an air filter must remove 99.97% of all particles greater than 0.3 micrometers from the air that passes through. (Note: HEPA filters are used to filter surgical rooms to provide an environment with no contaminate to protect the patient. Using HEPA filters will provide an exhaust air cleaner than the outside air.)

1. The primary purpose for the ventilation of an indoor firing range is to remove particulate matter created during the discharge of a firearm from the respiratory zone of the occupants. Discharging a firearm's primer containing lead styphnate and friction from the lead round against the gun barrel create airborne lead. Carbon monoxide and other firearm particulate will be removed by our system.
2. The second and equally important reason for the properly designed and installed ventilation and control system is to keep the range at a negative pressure to the surrounding base building space. Contaminates created on a small arms range need to be contained in the range space. This will prevent the ingestion of contaminants as well as keeping the surfaces free of contaminants in non-range spaces of the base building.
3. The final purpose is to remove the smoke from the range for properly seeing the targets.

The following is a summary of the EPA, NIOSH and OSHA standards as they apply to small arms range ventilation:

EPA:

TITLE 40--PROTECTION OF ENVIRONMENT CHAPTER I--ENVIRONMENTAL PROTECTION AGENCY
PART 50--NATIONAL PRIMARY AND SECONDARY AMBIENT AIR QUALITY STANDARDS--Table of Contents Sec. 50.12 National primary and secondary ambient air quality standards for lead. National primary and secondary ambient air quality standards for lead and its compounds, measured as elemental lead by a reference method based on appendix G to this part, or by an equivalent method, are: 1.5 micrograms per cubic meter, maximum arithmetic mean averaged over a calendar quarter. (Secs. 109, 301(a) Clean Air Act as amended (42 U.S.C. 7409, 7601(a)))

On November 12, 2008, the EPA revised the National Ambient Air Quality Standards (NAAQS) for lead and associated ambient air lead monitoring requirements. The previous standard for lead was a calendar quarter (three month) average concentration not to exceed 1.5 micrograms per cubic meter. The new standard is 0.15 micrograms per cubic meter as total suspended particles

(TSP), measured as a three month rolling average. The revision also required agencies to monitor near lead sources that emit 1.0 ton per year (tpy) or more. Since 2008, the monitoring requirements have been since strengthened in 2010 to require monitoring near lead sources that emit 0.5 tpy.

NIOSH and OSHA:

Established by NIOSH, the performance intent for firing range ventilation systems shall meet all the requirements outlined as recommendations and design considerations in HEW publication no. (NIOSH) 76-130, dated December, 1975, entitled "Lead Exposure Design Considerations for Indoor Firing Ranges". This design standard prefers an air flow velocity of 75 feet per minute average on the empty range. This design has consistently provided for the compliance within the established federal standards for airborne inorganic lead concentration limits.

When properly executed, lead concentrations are consistently maintained below the action level of 30 micrograms per cubic meter (30ug/m³) in an area where the limit shall not exceed 50 micrograms of lead per cubic meter (50ug/m³) of air over a time weighted average of eight hours as measured at the respiration zone of the shooters and the range officer when firing from the firing booths per OSHA 29 CFR. 1910.1025 and 1926.62.

The following is an example of a range using over 6 million rounds per year. The point is to provide an example of a worst case range. This range is cooling and will recirculate 75% of the air back to the range. The readings below would be 25% of the stated readings.

The Range estimates that there will be approximately 100-110 users per day. Users shoot on average 150 rounds each and the average round fired is a 9mm based on the following data collected for the following rounds: .22lr, .223, .308, 7.62, 9mm, .40 s&w, and .45acp.

According to the EPA, the 9mm round has an AP-42 emissions factor of 0.0000068 of lead.

What Is An AP-42 Emission Factor?

An emission factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. These factors are usually expressed as the weight of pollutant divided by a unit weight, volume, distance, or duration of the activity emitting the pollutant (e. g., kilograms of particulate emitted per megagram of coal burned). Such factors facilitate estimation of emissions from various sources of air pollution. In most cases, these factors are simply averages of all available data of acceptable quality, and are generally assumed to be representative of long-term averages for all facilities in the source category (i. e., a population average).

The general equation for emission estimation is:

$$E = A \times EF \times (1-ER/100)$$

where:

E = emissions,

A = activity rate,

EF = emission factor, and

ER = overall emission reduction efficiency, %.

- 365 days per year x 110 users on average per day = 40,150 users per year
- 150 rounds on average fired per user x 40,150 users per year = 6,022,500 rounds fired per year
- 6,022,500 rounds fired per year x 0.0000068 pounds per 9mm round = 40.93 pounds of lead per year
- 40.93 pounds of lead per year x emissions reduction of 0.0003 = 0.012279 pounds of lead per year.

Using 99.97% HEPA filtration, the Small Arms Range will exhaust approximately 0.012279 pounds of lead per year.

According to the EPA, Lead monitoring is only required for facilities that are producing at least 0.5 tpy or 1,000 lbs per year, therefore, lead monitoring at the Small Arms Range is not required.

The 2008 EPA revision to the NAAQS states that the allowable limit is 0.15 micrograms per cubic meter as total suspended particles (TSP), measured as a three month rolling average. These are area samples and not at the exhaust of the range. If the exhaust was monitored, the following would be the sample readings:

Micrograms (ug) Cubic feet (ft3) Cubic meters (m3) Minutes (min) Year (yr) Pound (lb)

There are 35.3146670 cubic feet per cubic meter.

There are 525,600 minutes in a year.

There are 453,592,370 micrograms in one pound.

The Small Arms Range exhaust airflow rate is 36,300 cubic feet per minutes.

The Small Arms Range will exhaust approximately 0.012279 pounds of lead per year

- 0.012279 lbs/yr = 5,569,660.7 ug/yr
- 5,569,660.7 ug/yr = 10.5968 ug/min
- 10.5968 ug/min divided by 36,300 ft3/min = 0.000291921 ug/ft3
- 0.000291921 ug/ft3 = 0.010309 ug/m3

The Small Arms Range will exhaust on average 0.01 micrograms of lead per cubic meter of air which is approximately less than 6.7% of the allowable area limits. The EPA allowable limit of 0.15 ug/m3 applies to ambient air in the area.



NEIGHBORHOOD-LEVEL ECONOMIC ACTIVITY AND CRIME

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ABSTRACT: *Theories of criminology suggest that neighborhood-level economic activity affects the conditions that make crime more likely. However, most studies on neighborhoods and crime focus solely on residential characteristics and ignore the commercial ones. In this article, we estimate the effect of neighborhood-level economic activity on crime holding residential characteristics constant. To do so, we use crime and census data combined with a detailed data set on establishments in Washington, DC from 2000 to 2010 to create a comprehensive measure of neighborhood-level economic activity. We exploit the panel nature of the data to identify the directionality of the results by removing unobserved heterogeneity and estimating lags and leads of economic activity. Results indicate that increases in economic activity are associated with reductions in property crime, but that the reduction in property crime occurs before the growth in economic activity and rises afterward. Violent crime declines the same year as growth in economic activity.*

Economic activity¹ is desirable for many neighborhoods because it often carries with it job opportunities and access to amenities and services. As such, federal, state, and local governments in the United States have poured billions of dollars into economic development projects with the aim of sparking activity within neighborhoods (Oakley & Tsao, 2006; Prophet, 2012).

However, economic activity may affect the level of crime in a neighborhood both positively and negatively. Growth in economic activity may cause an increase in crime by altering the potential gains from committing a crime and by bringing together potential offenders and targets. Additionally, economic activity may bring strangers into a neighborhood, preventing trust and social networks from developing.

Alternatively, economic activity may cause a reduction in crime by increasing the chance of being caught and thereby reducing the potential benefit cost tradeoff of committing a crime. Economic activity may also bolster social control both formally and informally. Business owners may invest resources in surveillance and other sources of formal control to protect their property, and the additional “eyes on the street” may bolster informal social control by increasing the presence of potential guardians.

Most of the studies that have examined the relationship between neighborhood level economic variables and crime have focused on residential unemployment rates rather than on commercial

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*Correction added on 7 November 2016, after first online publication: Author Helen Ho’s affiliation has been corrected to Urban Institute.

JOURNAL OF URBAN AFFAIRS, Volume 00, Number 0, pages 1–16.

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ISSN: 0735-2166.

DOI: 10.1111/juaf.12314

aspects of the neighborhood such as business sales, number of customers, or business turnover rates. Of the few that have examined these measures, most have focused on specific types of economic activity such as alcohol outlets or coffee shops (Bowes, 2007; Galster & Raleigh, 2014; Papachristos, Smith, Scherer, & Fugiero, 2011; Smith, 2014; Wo, 2014) and have found that some types of businesses are associated with increases in crime and other types are associated with reductions in crime. Other studies have examined the cross sectional relationship between economic activity and crime using differing measures such as land use or people on the street (Anderson, MacDonald, Bluthenthal, & Ashwood, 2013; Browning et al., 2010; Stucky & Ottensmann, 2009; Wilcox, Quisenberry, Cabrera, & Jones, 2004) and have generally found that higher economic activity is associated with elevated levels of crime, sometimes property and sometimes violent.

Our article extends the work of previous studies by estimating the effect of overall economic activity on crime at a micro level, holding residential activity constant. To do so, we use a detailed data set on establishments (for-profit, non-profit, and public entities) in Washington, DC from 2000 to 2010 combined with demographic data from the Decennial Census and the American Community Survey (ACS), as well as crime data from the Metropolitan Police Department, to examine changes at a small geography over a decade. This allows us to observe both immediate and lagged effects, as well as changes in crime prior to changes in economic activity. We use principal components analysis to create a comprehensive conceptualization of neighborhood economic activity, rather than exploring the effect of individual types of businesses on crime. This component includes information on the number of establishments, establishment births, establishment deaths, total sales, and number of employees. We also control for residential characteristics including income, unemployment rate, race, family structure, education level, and total population.

The panel nature of our data set allows us to control for unobserved neighborhood characteristics using a fixed effects model. This, combined with lags and leads of economic activity, allows us to identify the directionality of the change by removing all unobserved heterogeneity within a block group and estimating the timing of effects. Therefore, the coefficient on economic activity is the direct relationship between economic activity and crime, since demographic and unobserved time-invariant characteristics such as proximity to the city center are controlled for.

We also estimate the cross-sectional relationship between economic activity and crime in order to tell the geographic narrative of the city and to compare our results to those of other papers. We report the relationship between individual variables and crime in addition to principal components and crime, also for comparability to previous studies.

Results indicate that, cross-sectionally, economic activity is located in areas with higher levels of crime, but that over time increases in economic activity are associated with reductions in crime. Results from a dynamic model with lags and leads show that the reduction in property crime occurs before the growth in economic activity, and that crime increases afterwards. Specifically, an increase in economic activity is associated with a decrease in violent crime the year of the growth in activity, but total and property crime are lower in the year prior to the economic growth and higher in the year following it. This implies that reductions in property crime cause increases in economic activity rather than vice versa. These results suggest that policies aimed at reducing property crime may be successful at increasing economic activity in a neighborhood.

ECONOMIC ACTIVITY AND CRIME

Although economic activity is highly sought after, it may affect the level of crime within a neighborhood (Bowes, 2007; Galster & Raleigh, 2014; Papachristos et al., 2011; Smith, 2014; Wo, 2014). Economic and criminological theories suggest that this relationship could be both positive and negative.

The rational choice theory of crime hypothesizes that individuals maximize their economic well-being by comparing the benefits and costs of crime such as fines, imprisonment, and social stigmatism (Becker, 1968, 1994; Ehrlich, 1973, 1975; Fleisher, 1963, 1966a, 1966b). The theory states that if the potential gains from committing a crime are sufficiently greater than the combined risk of being caught and the size of the punishment, then the individual chooses to commit the crime.

Rational choice theory suggests that growth in economic activity in a neighborhood may induce a change in the probability of being caught committing a crime due to the increased number of “eyes on the street.” This, therefore, should reduce the likelihood that an individual commits a crime. However, the theory also suggests that crime could increase after a change in economic activity because of enhanced potential gain due to the elevated value of property that could be stolen both from businesses and from customers and employees. Therefore, according to this theory, whether crime increases or decreases in a neighborhood as a result of increased economic activity depends upon the relative change in the likelihood of being caught versus the change in the value of the property able to be stolen.

Unlike the rational choice theory of crime, the routine activities theory emphasizes the circumstances in which crimes occur rather than the characteristics and tradeoffs faced by offenders. This theory states that structural changes in routine activity patterns can influence crime rates by affecting the convergence in space and time of the three minimal elements of direct-contact predatory violations: (1) motivated offenders, (2) suitable targets, and (3) the absence of capable guardians against a violation (Cohen & Felson, 1979). This theory suggests that increases in economic activity could be associated with an elevated level of crime, since it alters the “routine activities” of everyday life and brings together potential offenders and targets. However, the theory also suggests that increases in economic activity could cause a reduction in crime, since it increases the number of capable guardians in the form of business owners, employees, and clients. Again, whether economic activity increases or decreases crime depends upon which of these factors is stronger.

Taylor’s territoriality theory also helps to predict the relationship between increases in economic activity and crime by informing the relationship between economic activity and guardianship. In Taylor’s model, residents monitor (or guard) spaces around their properties, and business owners and employees monitor areas around their establishments during business hours (Taylor, 1988). However, there may be regulatory voids when establishments are closed.

Additionally, changes in economic activity may disrupt the social fabric within a neighborhood, thus reducing guardianship. According to social disorganization theory, when social capital and cohesion are disrupted, the social controls that limit criminal activity deteriorate (Bursik & Grasmick, 1993; Kubrin & Weitzer, 2003; Sampson & Groves, 1989; Shaw & McKay, 1942). Economic activity could, then, disrupt guardianship, social cohesion, and collective efficacy and allow crime to proliferate. However, the negative effects of new neighborhood actors may only be temporary if these actors are incorporated into the neighborhood’s social fabric in the long term. Although this has not been studied in the realm of economic activity, one study of residential changes suggest that there are differential short- and long-term effects from social disruption (Kreager, Lyons, & Hays, 2011).

Alternatively, economic activity may be accompanied by resources or guardians that bolster social control, both formally and informally. Business owners may invest resources in surveillance and other sources of formal control to protect their property and attract customers (Hoyt, 2005). And while visitors from economic activity can bring together more potential targets and offenders, surveillance from active streets may be effective at deterring violent crimes, which tend to be overt (Browning & Jackson, 2013). Economic activity may also bolster informal social control. Jane Jacobs’s “eyes on the street” theory (Jacobs, 1961) predicts that economic activity serves a dual purpose in crime control. First, the presence of business owners creates an expectation of intervention if a crime occurs. Second, economic activity can create opportunities for residents and regular visitors to develop trust and social networks through repeated interactions.

Taken together, the above theories suggest that there is a complex relationship between economic activity and crime and that this relationship may be both negative and positive. There may also be differential relationships between economic activity and crime in the short and long term, as neighborhoods stabilize and social cohesion develops.

PREVIOUS RESEARCH

Many prior studies have examined the relationship between residential unemployment rates and crime (e.g., Carmichael & Ward, 2001; Chiricos, 1987; Nilsson & Agell, 2003; Raphael &

Winter-Ebmer, 2001; Saridakis & Spengler, 2012; Witt, Clarke, & Fielding, 1999), but few have examined the relationship between crime and nonresidential characteristics of economic activity such as the number of businesses within a neighborhood or their economic health.

Of the few studies that have examined this relationship, most have focused on very specific types of establishments and their relationship with crime, such as alcohol outlets (Block & Block, 1995; Galster & Raleigh, 2014; Toomey et al., 2012), coffee shops (Papachristos et al., 2011; Smith, 2014), or places that serve as a social space outside of one's home and workplace, such as banks and civic organizations (Wo, 2014). These studies have generally found that alcohol vendors and even banks are associated with elevated levels of crime, whereas coffee shops and cafes are associated with lower levels. Using these narrow types of establishments, however, may not capture overall changes in the economic activity in a neighborhood.

Additionally, many of these previous studies have relied on cross-sectional data to estimate these effects (Anderson et al., 2013; Browning et al., 2010; Stucky & Ottensmann, 2009; Wilcox et al., 2004). Cross sectional data can provide insights on correlations, but without additional techniques they do not allow for analysis of the directionality of effects since they are often biased by omitted, unobserved variables. For example, where establishments decide to locate is likely related to other characteristics that are also related to crime: establishments may prefer to locate in areas with higher levels of activity, which also happen to have higher levels of crime. There may also be bidirectionality in the effect. Economic activity may affect crime, but crime likely also affects where business owners decide to locate due to fears that crime will damage their property and reduce business (Abadie & Dermisi, 2008; Greenbaum & Tita, 2004; Rosenthal & Ross, 2009). Analyses of longitudinal data are more able to disentangle these effects than analyses of cross-sectional data.

Two studies have attempted to address these limitations. Bowes (2007) used a two-stage random effects panel model of the relationship between business development and crime to attempt to disentangle the potentially conflicting relationships between retail and crime. He found that increases in retail employment were related to increases in property and violent crime. However, his model examines only employment rather than overall activity, and controls only for manufacturing employment but not other types of commercial activity. Anderson et al. (2013) compared crime changes in neighborhoods before and after a zoning change to crime changes in neighborhoods that did not experience zoning changes but had similar crime trajectories before the zoning change. They found that neighborhoods that experienced zoning changes (which were mostly from commercial to residential parcels) experienced declines in vehicle theft and theft from vehicles, but not assaults, robberies, or burglaries. However, zoning changes are likely not exogenous to crime levels: neighborhoods with greater collective efficacy can more effectively lobby to prevent commercial zoning and exercise informal crime control. Therefore, it is unclear whether crime reductions induced the zoning changes or vice versa.

Our article extends the work of these previous studies by using detailed panel data on establishments in Washington, DC over a 10-year period to estimate the relationship between overall economic activity within a neighborhood and crime, controlling for residential characteristics. The longitudinal nature of our data allows us to remove any time-invariant neighborhood characteristics that may be related to crime, such as proximity to the city center or consistent collective efficacy. Time varying characteristics are captured by a comprehensive measure of residential status as well as by our measure of overall economic activity. The relatively long time span within our data allows us to further explore the directionality of the relationship by including lags and leads of economic activity in our model.

DATA AND MEASURES

In this study, we use block group level crime, establishment, and residential data for Washington, DC (hereafter DC) from 2000 to 2010 to estimate the effect of economic activity on crime, described below.

Crime Data

Our crime data come from the DC Metropolitan Police Department and include the type, date, and location of Uniform Crime Report Part I offenses reported within DC from 2000 through 2010. For each year, we aggregate the number of total crimes, property crimes, and violent crimes reported to the block group level. Property crimes include theft from automobile, automobile theft, burglary, and larceny. Violent crimes include homicide, sexual assault, aggravated assault, and robbery.

Establishment Data

We construct economic activity variables from data on establishments in DC from 2000 to 2010 from the National Establishment Time Series Database, which is an annual snapshot of Dun and Bradstreet's data on establishments (Walls & Associates, 2012). We use the term *establishment* to describe entities at a unique location in the National Establishment Time Series, which includes government, private, and nonprofit establishments.

We geocode each establishment in these data and calculate each establishment's first and last year of existence in a block group to count the number of establishment births and deaths. We convert sales for each year into 2010 dollars using Consumer Price Index conversion factors. We then aggregate the data to 2010 census block group boundaries. For each block group we calculate the total number of establishments, the number of establishment births and deaths, total employment for all establishments, and total sales for all establishments. We then create z-scores for all of the establishment-related variables so that they can be turned into principal components (see principal components analysis subsection below).

Residential Data

We use residential data from the 2000 Census, the 2010 Census, and the 5-year 2008–2012 American Community Survey to measure the residential characteristics of each block group (Minnesota Population Center, 2013). Because the census block group boundaries changed between 2000 and 2010, we reweight data from the 2000 Census to 2010 boundaries. To do this, we overlaid the 2000 and 2010 boundaries in ArcMap and calculated how much of each 2010 block group overlapped with each 2000 block group and vice versa. We then use these area proportions to reweight the 2000 data to 2010 geographies.

To measure residential demographics, we include data on total population, median family income, unemployment rate, percent black, percent Hispanic, percent of persons 25 years or older with a bachelor's degree or more, and percent of households that are female-headed. We use population and race/ethnicity data from the 2000 and 2010 decennial censuses. We used the 2000 decennial census to collect data on income, unemployment, family structure, and education, and the 2008–2012 American Community Survey to approximate these measures for 2010 because they are not available in the 2010 decennial census. We convert dollar amounts in the 2000 Census data to 2010 dollars using Consumer Price Index conversion factors. We exclude from the analyses four block groups that were missing income or population data in one or both years. We then take the natural log of median income and calculate the z-scores for the residential variables so that they can be turned into principal components (see principal components analysis subsection below).

Principal Components Analysis

In the interest of creating a parsimonious model, and since our establishment variables are highly correlated with one another (Table 1), we create principal components from these measures using principal component analysis (PCA) and estimate models using these components as regressors.

When we run PCA for all of the variables combined, we find that three components capture the majority of the variance amongst all of the variables. One component largely captures the

TABLE 1**Correlations Between Variables of Interest**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Establishments	1											
(2) Establishment births	0.97	1										
(3) Establishment deaths	0.98	0.98	1									
(4) Sales	0.47	0.45	0.45	1								
(5) Employees	0.89	0.83	0.84	0.55	1							
(6) Median income	0.13	0.14	0.13	0.28	0.06	1						
(7) Unemployment	-0.11	-0.10	-0.11	-0.21	-0.06	-0.63	1					
(8) Percent black population	-0.21	-0.19	-0.20	-0.44	-0.17	-0.71	0.57	1				
(9) Percent female-headed households	-0.15	-0.15	-0.15	-0.33	-0.13	-0.72	0.57	0.65	1			
(10) Percent bachelor's degree or above	0.18	0.18	0.18	0.40	0.13	0.81	-0.59	-0.90	-0.68	1		
(11) Percent Hispanic population	0.01	0.01	0.01	0.04	-0.02	-0.03	-0.19	-0.29	-0.21	0.04	1	
(12) Population	0.02	0.03	0.02	0.24	0.06	-0.10	0.11	-0.09	0.08	0.00	0.14	1

TABLE 2**Component Loadings**

	Loading
Economic activity component	
Establishments	0.49
Establishment births	0.48
Establishment deaths	0.46
Sales	0.31
Employees	0.47
Socioeconomic status component	
Median income	0.46
Unemployment	-0.39
Percent black population	-0.46
Percent female-headed households	-0.43
Percent bachelor's degree or above	0.48

variance in the standardized economic activity variables (establishments, births, deaths, sales, and employment), while another captures the variance in the standardized residential socioeconomic status (SES) variables (median income, unemployment rate, percent black, percent female-headed households, and percent with a bachelor's degree or more). A third component is a linear combination of population and percent Hispanic.

Because the first two components have theoretical value, we conduct PCA separately for the two sets of variables, economic activity and residential socioeconomic status. We keep total population and percent Hispanic as separate variables since there is no theoretical reason why they should be combined, and because they do not load onto either of the other two components. Table 2 shows the loadings for each of the components. We create the residential activity component with Census 2000, Census 2010, and 5-year ACS 2008–2012 data, resulting in component scores for 2000 and 2010. We then interpolate the residential activity component scores and the standardized population and percent Hispanic variables for the years 2001 to 2009.

Summary Statistics

Table 3 displays the summary statistics for DC block groups in 2000 and 2010. Economic activity increased between 2000 and 2010 as can be seen in Figure 1; the average number of establishments on

TABLE 3

Summary Statistics for DC Block Groups, 2000 and 2010

	2000			2010		
	Mean	Min	Max	Mean	Min	Max
Crime	87.60 (110.43)	4	1,343	68.67 (65.02)	2	704
Property crime	68.52 (97.74)	3	1236	53.12 (54.26)	2	627
Violent crime	19.09 (19.20)	0	163	15.55 (15.01)	0	85
Establishments	91.68 (335.03)	1	6,169	135.75 (402.45)	1	7,164
Employees	2,206.27 (11,179.33)	1	172,439	2,045.83 (10,269.27)	1	173,867
Establishment births	11.01 (41.08)	0	754	28.10 (71.54)	0	1,155
Establishment deaths	8.28 (32.30)	0	585	17.34 (53.36)	0	960
Sales (thousands)	\$211,879 (\$1,208,499)	\$114	\$19,009,194	\$152,153 (\$769,911)	\$60	\$11,608,476
Economic activity component	-0.09 (1.85)	-2	31	0.22 (2.34)	-1	37
Median family income	\$78,884 (\$55,960)	\$2,880	\$253,166	\$96,754 (\$65,666)	\$8,151	\$237,418
Unemployment	0.11 (0.11)	0	1	0.12 (0.10)	0	1
Percent black residents	0.61 (0.38)	0	1	0.52 (0.36)	0	1
Percent female-headed households	0.11 (0.11)	0	1	0.09 (0.10)	0	1
Percent residents with bachelor's degrees	0.37 (0.30)	0	1	0.49 (0.30)	0	1
Socioeconomic status component	-0.24 (1.91)	-6	3	0.24 (1.93)	-4	3
Percent Hispanic residents	0.07 (0.10)	0	1	0.09 (0.09)	0	1
Population	1,263.49 (571.94)	329	5135	1,328.92 (565.78)	388	4,112
Observations	446					

Note: We removed four block groups from the analysis that had median family income values of \$0 in 2000 or 2010.

a block group increased by 48%.² However, average sales and number of employees per block group declined during this period. The number of establishment births and deaths also increased over this period, indicating an increasing rate of turnover over time. Overall, the economic activity component score increased 332% over the study period, with dips during economic downturns, which can be seen in Figure 2.

Block group-level residential characteristics in DC also changed between 2000 and 2010. Average block group median household income increased 22% between 2000 and 2010. Similarly, the average residential socioeconomic component score (consisting of logged median income, percent black, percent female-headed households, and percent bachelor's degree) increased 200% between 2000 and 2010.

As the average number of establishments and the average socioeconomic status of residents increased per block group, the average number of annual crimes per block group declined 22% between 2000 and 2010, as can be seen in Figure 3. There were slight increases in the average number of crimes between 2005 and 2008, but even at their highest points these levels were still well below their decadal peak.

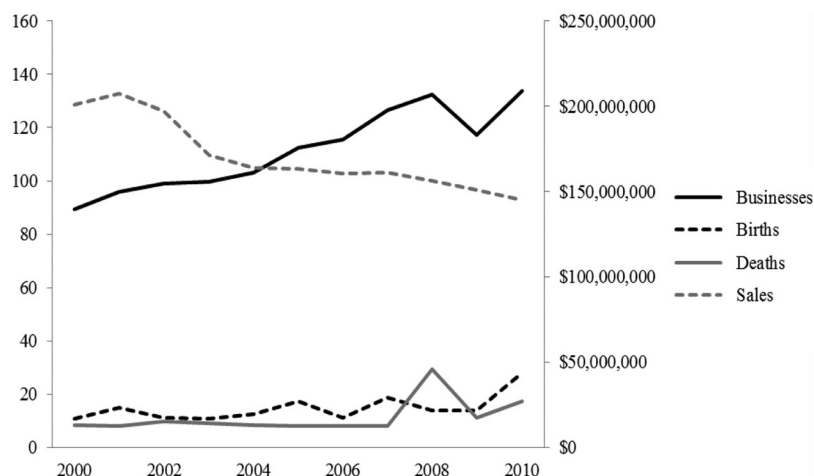


FIGURE 1

Average Number of Establishments, Establishment Births, Establishment Deaths, and Sales Revenue per DC Block Group, 2000–2010

Source: National Establishment Time Series Data

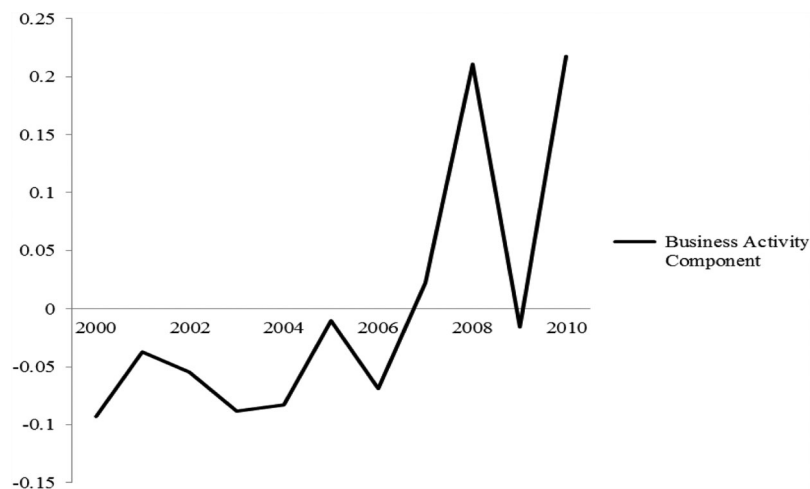


FIGURE 2

Average Economic Activity Component Score per DC Block Group, 2000–2010

Source: National Establishment Time Series Data

METHODOLOGY

To examine the relationship between economic activity and crime, we estimate both cross-sectional and time series models while controlling for residential demographics. We conduct the cross-sectional analysis using pooled data between 2000 and 2010, and the time series analyses using annual data from 2000 to 2010, with the residential variables interpolated.³

The base model is specified as follows⁴:

$$Crime_i = \alpha_0 + \beta_1 BUSINESS_i + \beta_3 SES_i + \beta_4 HISP_i + \beta_5 POP_i + \mu_i,$$

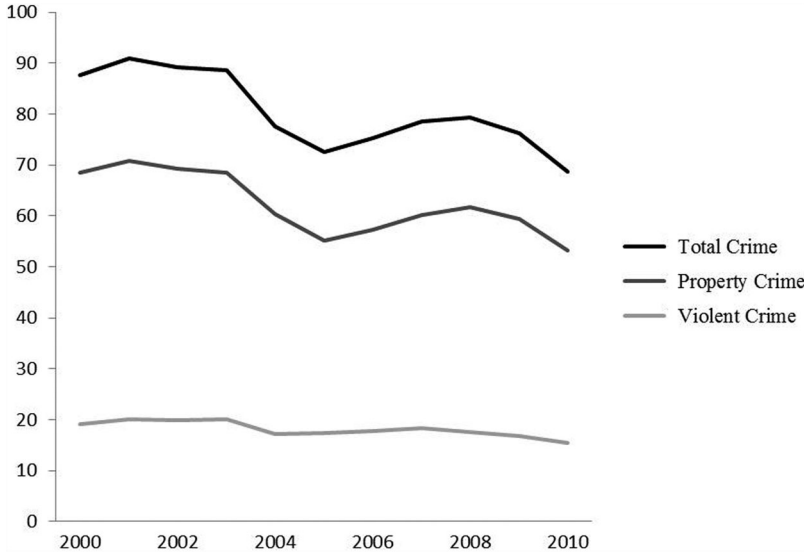


FIGURE 3

Average Number of All Crime, Property Crime, and Violent Crime per Block Group in DC, 2000–2010

Source: Washington, DC Metropolitan Police Department

where α_0 is the intercept, $BUSINESS_i$ is the principal component for economic activity on block group i (based on establishments, births, deaths, total sales, and total employment), SES_i is the principal component for socioeconomic status on block group i (based on median income, percent unemployment, percent black, percent female-headed households, and percent with a bachelor's degree or more), $HISP_i$ is the percent Hispanic on block group i , POP_i is the total population on block group i , and μ_i is the error term. We estimate standard errors that are robust to heteroskedasticity. This model helps us to examine the relationship between economic activity and residential characteristics comparing block groups to each other over space.

To explore how changes in economic activity and residential activity relate to crime over time, and to account for the many unobservable characteristics of each block group as well as city-wide effects for each year, we then estimate a fixed effects panel model using the same method as above, but exploiting the panel nature of our data and adding in block group and year fixed effects as follows:

$$Crime_{it} = \alpha_0 + \beta_1 BUSINESS_{i,t} + \beta_2 SES_{i,t} + \beta_3 HISP_{i,t} + \beta_4 POP_{i,t} + \theta_i + \lambda_t + \mu_{i,t},$$

where each variable is indexed at both the block group and year level, and block group and year fixed effects are represented by θ_i and λ_t , respectively. We use standard errors clustered at the block group-level that are robust to heteroskedasticity and arbitrary forms of error correlation within each block group. Whereas the cross-sectional model compares one block group to another, the fixed effects model compares a block group to itself over time while also controlling for city-wide trends.

In order to explore the relationship between changes in crime before and after changes in economic activity, we estimate a dynamic model by including one time lead and one time lag of the economic activity component in the model to see whether changes in economic activity have a leading or lagged correlation with crime, and whether crime may be affecting economic activity rather than vice versa.⁵

TABLE 4

Cross Sectional Estimates of the Relationship Between Economic Activity, Socioeconomic Status, and Crime

	(1) All Crime	(2) Property Crime	(3) Violent Crime
Economic activity	29.02*** (2.50)	26.00*** (2.23)	3.02*** (0.32)
Residential SES	-10.43*** (0.53)	-5.54*** (0.46)	-4.89*** (0.11)
Percent Hispanic	2.08*** (0.63)	0.53 (0.51)	1.55*** (0.19)
Total population	17.05*** (1.33)	11.54*** (1.06)	5.51*** (0.34)
Observations	4,908	4,908	4,908
Number of block groups	446	446	446

Note: Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. Sample is all block groups in Washington, DC, from 2000 to 2010.

RESULTS

Cross-Sectional Results

Cross-sectional results, though not causal, help to tell us the geographical story of crime within a city and explain the correlational relationship between economic activity and crime. These results show that block groups with higher levels of economic activity tend to have more crime incidents: a block group with a one-unit higher level of economic activity on average has 29 more total crimes per year. For property and violent crime, the difference in crime is 26 and 3 crimes, respectively, for a one-unit greater level of economic activity. These results are displayed in Table 4.

Results for the residential component correspond to those of previous studies: for block groups with higher levels of SES, crime is lower. A block group with a one-unit higher level of SES has, on average, 10 fewer total crimes, 6 fewer property crimes, and 5 fewer violent crimes. Percent Hispanic and total population are both associated with higher levels of crime across space.

Panel Results

The cross-sectional analysis only tells part of the story and does not allow for causal identification of effects because many of the unobserved characteristics of the block groups are likely correlated with crime and are therefore captured in the error term. To correct for this bias and to identify the directionality of the effect, we estimate a fixed effects panel model in which the unobserved heterogeneity is averaged out of the equation.

These results, displayed in Table 5, show that increases in economic activity are associated with *decreases* in total, property, and violent crime. An increase in economic activity of one unit is associated with a mean decrease of 10 crimes overall. For property and violent crime, these reductions are 8 and 2, respectively, per block group.

Residential SES is still associated with fewer crimes; specifically, a one-unit increase in the residential SES factor is associated with a reduction of 11 crimes overall—8 property crimes and 3 violent crimes. Changes in the percent of the population that is Hispanic are not statistically correlated with changes in crime levels, nor are changes in residential population once other residential and economic characteristics are accounted for.

Results may suggest that changes in economic activity actually induce a reduction in crime. However, there may be concern that there is a dip in crime prior to economic activity growth that encourages establishments to locate on that block group or customers/employees to partake in that establishment that may be biasing the results. If this is true, our estimates may be picking up a

TABLE 5

Fixed Effects Estimates of the Relationship Between Economic Activity, Socioeconomic Status, and Crime

	(1) All Crime	(2) Property Crime	(3) Violent Crime
Economic activity	-9.83*** (3.58)	-8.07*** (3.00)	-1.76*** (0.66)
Residential SES	-11.07*** (4.05)	-8.05** (3.27)	-3.03*** (0.93)
Percent Hispanic	-1.75 (2.80)	-2.52 (2.52)	0.78 (0.56)
Population	-5.64 (5.19)	-5.45 (4.69)	-0.19 (0.93)
Block group fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	4,908	4,908	4,908
Number of block groups	446	446	446

Note: Robust standard errors in parentheses, clustered at the block group level. *significant at 10%; **significant at 5%; ***significant at 1%. Sample is a panel of all block groups in Washington, DC, from 2000 to 2010.

TABLE 6

Dynamic Fixed Effects Estimates of the Relationship Between Economic Activity, Socioeconomic Status, and Crime

	(1) All Crime	(2) Property Crime	(3) Violent Crime
Economic activity lead 1 year	-14.33*** (1.47)	-13.66*** (1.39)	-0.67 (0.89)
Economic activity	-0.25 (2.18)	0.96 (2.01)	-1.21*** (0.29)
Economic activity lag 1 year	5.96*** (1.66)	5.84*** (1.88)	0.12 (0.40)
Residential SES	-9.02** (4.50)	-5.98* (3.47)	-3.04** (1.19)
Percent Hispanic	-4.90 (3.17)	-5.80** (2.73)	0.90 (0.78)
Population	-1.54 (5.47)	-1.81 (4.64)	0.27 (1.30)
Block group fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	3,568	3,568	3,568
Number of block groups	446	446	446

Note: Robust standard errors in parentheses, clustered at the block group level. *significant at 10%; **significant at 5%; ***significant at 1%. Sample is a panel of all block groups in Washington, DC, from 2001 to 2008.

reversion back to the mean level of crime on the block group, rather than a true relationship between economic activity and crime. This is similar to the effects of an Ashenfelter Dip found in labor studies (Ashenfelter & Card, 1985).⁶

In order to test for this mean reversion, we estimate a dynamic model that includes leads and lags of the economic activity component, to determine whether crime is indeed lower the year before economic activity growth occurs and higher during or after. Table 6 displays these results.

These results indeed show that, once leads and lags are controlled for, increases in economic activity are no longer significantly associated with total crime in the year of increase. Rather, total crime is lower in the year prior to economic activity growth and higher in the year after. Specifically, there are 14 fewer total crimes in the year prior to economic activity growth, and 6 *greater* crimes the year after.

TABLE 7

Fixed Effects Estimates of the Relationship Between Number of Establishments, Socioeconomic Status Variables, and Crime

	(1) All Crime	(2) Property Crime	(3) Violent Crime
Number of establishments	−0.26*** (0.01)	−0.23*** (0.01)	−0.02** (0.01)
Median income	−0.12 (0.07)	−0.10 (0.06)	−0.01 (0.01)
Unemployment	36.69** (18.30)	24.68 (15.21)	12.01** (5.05)
Percent black	10.35 (33.36)	0.08 (28.86)	10.27 (6.98)
Percent female-headed households	6.40 (28.40)	−4.26 (23.30)	10.67 (6.94)
Percent bachelor's degree	−22.57 (26.06)	−20.89 (24.00)	−1.68 (4.31)
Percent Hispanic	−52.57 (36.73)	−64.17** (32.46)	11.60 (7.56)
Population	−0.72 (0.81)	−0.69 (0.72)	−0.03 (0.17)
Observations	4,906	4,906	4,906
Number of block groups	446	446	446

Note: Robust standard errors in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%. Sample is all block groups in Washington, DC, from 2000 to 2010.

The associations between economic activity and property crime changes are similar to those of total crime. On the other hand, increases in economic activity are significantly associated with decreases in violent crime the year the economic activity growth occurred: there is one fewer violent crime the year of a one-unit growth in economic activity. Although the time lead and lag for violent crime are not statistically significant, the signs are similar to those of property and total crime: violent crime is lower the year before and during the economic activity growth, and higher the year after.

Additional Models and Robustness Checks

We perform a number of robustness checks in order to confirm that our results hold under varying assumptions.

First, in order to test whether our results are robust to the inclusion or exclusion of principal components and to report some measures that are more directly interpretable, we estimate a model with each variable included as an individual regressor rather than as part of a component. Since our economic variables are closely correlated, and because we are interested in a counterfactual that does not control for other economic measures, we include only one measure of economic activity at a time. Table 7 displays the results of the model that includes the number of establishments as the economic activity variable of interest and each of the SES measures as control variables. We choose to report the results of the model with establishments as the proxy for economic activity because that measure is more accurate than total sales or number of employees (which sometimes pick up sales or employees for all offices if it is a headquarters) and is a broader measure than births or deaths.

The results from this model are similar to those of the PCA model in that increases in economic activity, as measured by the number of establishments on a block group each year, are associated with a reduction in total crime, property crime, and violent crime. Specifically, for every additional establishment added to the block group, total crimes on average decline by 0.26, property crimes decline by 0.23, and violent crimes decline by 0.02. An increase in the unemployment rate is associated with an increase in total crime and violent crime, and an increase in the percent of the population who are Hispanic is associated with a reduction in property crime. However, again,

TABLE 8

Dynamic Fixed Effects Estimates of the Relationship Between Number of Establishments, Socioeconomic Status Variables, and Crime

	(1) All Crime	(2) Property Crime	(3) Violent Crime
Number of establishments lead 1 year	−0.18*** (0.02)	−0.18*** (0.02)	−0.01 (0.01)
Number of establishments	0.00 (0.02)	0.01 (0.02)	−0.01*** (0.00)
Number of establishments lag 1 year	−0.04 (0.03)	−0.04 (0.04)	0.00 (0.01)
Median income (thousands)	−0.05 (0.07)	−0.04 (0.06)	−0.01 (0.02)
Unemployment	39.78* (21.17)	27.06 (17.01)	12.72** (6.33)
Percent black	30.52 (32.49)	17.02 (26.34)	13.50 (8.41)
Percent female-headed households	11.05 (33.84)	−2.61 (27.00)	13.66 (9.20)
Percent bachelor's degree	−0.06 (21.89)	−1.70 (19.63)	1.64 (4.85)
Percent Hispanic	−54.13 (37.40)	−70.63** (32.12)	16.50* (9.26)
Population (hundreds)	−0.12 (0.92)	−0.16 (0.77)	0.04 (0.22)
Observations	4,014	4,014	4,014
Number of block groups	446	446	446

Note: Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. Sample is all block groups in Washington, DC, from 2000 to 2010.

these demographic measures are controlling for all other socioeconomic measures and are meant to be interpreted as control variables rather than as causal effects. Additionally, a 1% change in the unemployment rate and the percent Hispanic are large changes compared to what regularly occurs in a year.

Next, we estimate this model with a lag and a lead on the number of establishments, in order to compare the results to those of the same model using the principal components. Table 8 displays these results. Similar to the PCA model, a reduction in crime occurs the year before growth in economic activity for total crime and property crime, and the same year for violent crime. Unlike the PCA model, the year after economic activity growth is not associated with a change in any type of crime. This implies that it is the overall health of businesses (including their total sales, number of employees, and turnover rates) that is affecting crime after economic activity growth, rather than simply the number of establishments. This is indicative of why looking at a comprehensive model of economic activity is crucial for understanding its overall effect on crime.

Results from the main models are also robust to being modeled using a Poisson distribution (since the crime variables are count data), using crime per capita as the left hand variable rather than crime levels, and using various numbers of lags and leads in the dynamic model.⁷ We chose to include population on the right hand side of the model rather than as a denominator on the left hand side (to create crime per capita) because we do not have an accurate, time-varying measure for population at the block-group level. The measure that we use for population is interpolated, and therefore better suited as a control variable than as part of the dependent variable. Additionally, the population measure of interest for our economic activity model is not the “nighttime” residential population, but rather the “daytime” commercial population, for which no block-group level yearly measure exists. However, changes in residential population are controlled for on the right hand side of the equation, so the effect can still be interpreted as controlling for block-group level residential population.

DISCUSSION AND CONCLUSIONS

This study highlights the importance of examining both residential and economic activity when considering changes in neighborhood crime. Holding residential characteristics constant, economic activity has a separate and significant relationship with crime. Moreover, although increases in economic activity are associated with reductions in crime overall, these reductions occur prior to increases in economic activity rather than after.

Reductions in crime may induce an increase in economic activity because business owners take crime into account when choosing their locations (Greenbaum & Tita, 2004; Rosenthal & Ross, 2009). Additionally, customers may be more willing to patronize a business if their perceived chance of becoming victim to a crime in that area is lower.

Even though crime rises again after economic activity increases, the subsequent level of crime is still lower than it was prior to the increase in economic activity (as evidenced by the overall negative relationship between crime and economic activity in the contemporaneous model) and crime may conceivably even be lower on a daytime population per capita basis because there are likely more people in an area after economic activity expands. This implies that the increases in property crime after economic activity growth may be a reversion to the mean rather than a true causal effect. The statistically significant negative relationship between economic activity and violent crime in the same year suggests that economic activity may bring a net increase in guardianship from active streets, preventing violent crimes from occurring.

Our results build upon those of previous studies. Browning et al. (2010) also found that more commercial density was related to elevated levels of crime in a cross-sectional model as we did in ours. However, results from our contemporaneous fixed effects model show that increases in economic activity are associated with decreases in crime overall, suggesting that endogeneity is biasing results in the cross-sectional models. Similar to our panel results, Bowes (2007) found that decreases in crime lead to increases in economic activity, though his results showed that decreases in violent crime rather than property crime were related to increases in economic activity. Discrepancies in results may be due to the inclusion of different types of businesses. Different types of businesses may have heterogeneous effects on crime, such as retail versus manufacturing, public versus private, and nonprofit versus for-profit. Our data did not allow us to estimate these varying effects, but future research should do so.

Our results suggest that policies aimed at reducing crime, particularly property crime, could be successful at bringing economic activity and opportunities into a neighborhood. There may be a spike in crime after this growth in economic activity, but it is likely temporary and outweighed by the benefits overall.

ENDNOTES

- 1 We define economic activity as any transactions or conduct for the purposes of selling, buying, or producing goods and/or services.
- 2 On a year-over-year basis, the number of establishments declined severely in 2009 due to the great recession, but then bounced back afterward. This increase was driven mostly by new small establishments with fewer than five employees.
- 3 Yearly statistics for residential characteristics at the block group level are not available. Therefore, we linearly interpolate the 2000 Census and the 2008–2012 ACS and 2010 Census for the years 2001–2009. We ran robustness checks for the model by including only 2000 and 2010 in the panel model without interpolated variables, and the results were similar. These results are available upon request from the authors.
- 4 Results are robust to estimation using a Poisson distribution.
- 5 We also performed robustness checks that included spatial lags of crimes on neighboring block groups. Significant spatially lagged coefficients were all of the same sign as the unlagged coefficients, indicating spillovers onto nearby block groups.

6 An Ashenfelter dip refers to the decline in mean earnings of participants in employment and training programs during the period just prior to participation. This dip causes bias if this period is used as a baseline because of mean reversion after the dip. This is similar to the decrease in crime immediately prior to an increase in economic activity. If used as a baseline, the effects of economic activity on crime may appear to be larger than they actually are because they are being compared to a lower level of crime before the activity increase.

7 For the sake of brevity, we do not show these results here. Results can be obtained upon request from the authors.

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Research article

Open Access

Homicide and geographic access to gun dealers in the United States

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Published: 23 June 2009

Received: 1 May 2008

BMC Public Health 2009, 9:199 doi:10.1186/1471-2458-9-199

Accepted: 23 June 2009

This article is available from: <http://www.biomedcentral.com/1471-2458/9/199>

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Abstract

Background: Firearms are the most commonly used weapon to commit homicide in the U.S. Virtually all firearms enter the public marketplace through a federal firearms licensee (FFL): a store or individual licensed by the federal government to sell firearms. Whether FFLs contribute to gun-related homicide in areas where they are located, in which case FFLs may be a homicide risk factor that can be modified, is not known.

Methods: Annual county-level data (1993–1999) on gun homicide rates and rates of FFLs per capita were analyzed using negative binomial regression controlling for socio-demographic characteristics. Models were run to evaluate whether the relation between rates of FFLs and rates of gun homicide varied over the study period and across counties according to their level of urbanism (defined by four groupings, as below). Also, rates of FFLs were compared against FS/S – which is the proportion of suicides committed by firearm and is thought to be a good proxy for firearm availability in a region – to help evaluate how well the FFL variable is serving as a way to proxy firearm availability in each of the county types of interest.

Results: In major cities, gun homicide rates were higher where FFLs were more prevalent (rate ratio [RR] = 1.70, 95% CI 1.03–2.81). This association increased ($p < 0.01$) from 1993 (RR = 1.69) to 1999 (RR = 12.72), due likely to federal reforms that eliminated low-volume dealers, making FFL prevalence a more accurate exposure measure over time. No association was found in small towns. In other cities and in suburbs, gun homicide rates were significantly lower where FFLs were more prevalent, with associations that did not change over the years of the study period. FFL prevalence was correlated strongly (positively) with FS/S in major cities only, suggesting that the findings for how FFL prevalence relates to gun homicide may be valid for the findings pertaining to major cities but not to counties of other types.

Conclusion: Modification of FFLs through federal, state, and local regulation may be a feasible intervention to reduce gun homicide in major cities.

Background

Homicide is a major cause of death in the U.S. and the second leading cause of death among 15–34 year-olds.[1] During each year of the past quarter century (1980–2005), more homicides were committed with firearms than with all other weapon types combined.[2] Firearms accounted for 331,270 homicides over this period.[2]

A correspondingly large firearm manufacturing and dealer distribution system exists in the U.S. and is thought to contribute to the incidence of firearm homicide. [3–5] The number of federally-licensed firearm dealers (FFLs), which include gun stores and individuals that are licensed by the federal government to ship, transport, and receive firearms in interstate commerce and engage in retail sales, may play a major role. There were 104,840 FFLs in the U.S. in 2001.[6] No publicly available data report the number of guns sold by FFLs. However, data on gun purchases and on guns seized and guns recovered by police indicate that firearms flow through FFLs into U.S. communities at a rate that sums into the millions each year. [7–9] A state-level study, using self-reports of household firearm ownership as a proxy for gun availability, found that the states where guns were most common experienced the highest rates of gun homicide.[10] Similarly, it is possible that a greater number of FFLs is associated with greater gun availability and ultimately, increased gun homicide rates.

Although the federal government is responsible for regulating which individuals or businesses are issued an FFL, the decision about where an FFL can operate is a local matter. Therefore, it is helpful to adopt an urban planning perspective when considering the possibility that FFLs could be impacting local homicide rates.[11,12] Like other businesses, FFLs are subject to regulations including zoning laws which dictate how land parcels can be used. In addition to zoning laws, state-level legislation, although currently in place in only a minority of states, can mandate additional licensing requirements and periodic inspection of gun dealer records.[13] Therefore, if FFLs do act as a spigot through which firearms flow into a community and thereby contribute to homicide, it is possible that regulating the locations and activities of stores where firearms are sold is a way to curb homicide. With this in mind, we considered whether licensed gun dealers function as a proxy for gun availability in counties in the U.S., and studied whether having a disproportionately high number of FFLs in a county was associated an elevated rate of homicide committed with guns. Other studies examining mortality as a function of gun availability have used FS/S – the proportion of suicides that were committed with firearms as opposed to other methods – as a way to measure by proxy the extent of gun availability in a geographic area. Whereas FS/S appears to serve well as

a proxy for gun availability, FS/S is not a risk factor that is modifiable.[10,14,15] FFLs are modifiable, in contrast, in terms of their locations and retail practices, and thus in this way this analysis is investigating a public health issue with direct policy relevance.

Methods

Data and Variables

Our dataset consisted of seven separate, year-specific entries for 3,112 counties (including the District of Columbia and county equivalents such as boroughs and independent cities), totaling 21,784 observations of county-level data for the U.S. from 1993 to 1999. The outcome measure was annual firearm homicide rates per 100,000 population in U.S. counties for the years 1993 through 1999. The rates were calculated with firearm homicide data from the National Center for Health Statistics' (NCHS) Multiple Cause of Death files (defined as International Classification of Diseases-Ninth Revision [ICD-9] codes E965.0–E965.4 for 1993–1998 and ICD-10 codes X93–X95 for 1999) and population data from U.S. Census data. Permission to include counties with fewer than 100,000 persons was obtained from the NCHS Division of Vital Statistics. We calculated this outcome measure separately by year for each U.S. county. Our primary predictor measure was the annual per capita prevalence of "type one" (firearm dealer) and "type two" (pawnbroker) FFLs (per 1,000 population) in counties for the years 1993 through 1999. The FFL data were obtained from Basic Information Systems, Inc. (Wheaton, Maryland), which provided data from the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) on the annual number and type of FFLs in the U.S. by county for the study period. FFL data were not available for counties in Alaska and therefore Alaska was not included in the analysis. FFL data for years after 1999 were not available.

Covariates were used to control for several county-level factors thought to be potential confounders of the association between FFL rates and homicide rates being studied (e.g., [10]): percent of population 15–29 years old, percent male, percent African American, percent Native American, percent Hispanic, percent married, percent living alone, percent female headed households, average per capita income, percent of persons below the poverty level, percent of the civilian labor force unemployed, percent over age 25 who were college educated, hospital beds per capita, and percent of arrests that were drug-related. Each of these variables was obtained from the U.S. Census Bureau and the Area Resource File[16] with the exception of drug-related arrests, which was obtained from the Federal Bureau of Investigation's county-level Uniform Crime Reports (UCR),[17] and was incorporated given evidence that drug arrests may be feasible as an indicator of drug activity.[18,19] Because the UCR arrest data are derived

from police jurisdictions, which do not correspond exactly with county boundaries, a second variable that adjusted for the discrepancy by distance-based weighting between police jurisdiction centroids and county centroids was included in the model. Also, the covariates included a variable for urbanization defined according to a modification of the rural-urban continuum classification (mRUC) scheme [20-22] designed by the U.S. Department of Agriculture.[23] This variable initially included 11 categories that were collapsed to four categories for parsimony during preliminary analyses: major cities (mRUC 1: central counties of one million population or more); other cities (mRUC 2: central counties of metropolitan areas of one million population or more); suburbs (mRUC 3-5: fringe counties of metropolitan areas of one million population or more, ranging to counties in metropolitan areas of fewer than 250,000 population); and small towns (mRUC 6-11: urban counties with a population of 20,000 or more adjacent to a metropolitan area, ranging to completely rural counties of less than 2,500 urban population not adjacent to a metro area). Each variable was measured annually except for urbanization, persons below the poverty level, female-headed households, persons living alone, persons married, and persons college-educated. These variables were based on data available either decennially and/or for certain intercensal years. Intercensal years without data were linearly interpolated or forecast based on known values. Additionally, a linear trend for year was included to account for temporal variability.

Given that the availability of firearms in one county may depend on how many FFLs exist in surrounding counties, a variable was included to reflect the prevalence of FFLs in counties surrounding the index county, weighted by the inverse of the squared rectilinear distance between county population-weighted centroids. The leniency of state firearm laws in each county was controlled for as well. This was done by coding each county according to a classification scheme published annually since 1997. [24-29] The scheme uses an integer scale ranging from 0 to 100, with 0 representing maximum restrictiveness and 100 representing maximum leniency, to reflect state laws pertaining to the acquisition, ownership, and transportation of firearms and ammunition. Leniency scores were assigned separately to each county for each year. The leniency scores used for 1997 through 1999 were taken directly from published information. We linearly extrapolated leniency scores for the years 1993 through 1996 based on the values published for the period 1997 through 2002. Finally, a variable containing county-level annual nongun homicide rates (defined as ICD-9 codes E960-E964 and E965.5-E967.9 for 1993-1998 and ICD-10 codes X85-X92 and X96-Y08 for 1999) was derived for inclusion in the final statistical model. This was done to explore the

possibility that such an adjustment could help control for a latent homicidal tendency at the county level and isolate the contribution of FFLs to gun homicide.

Statistical Analysis

Plots were generated to assess annual prevalence rates of FFLs and rates of homicide in the U.S. Negative binomial generalized linear regression conducted at the county level was used to estimate the association between the prevalence of FFLs and rates of gun homicide in U.S. counties during the 1993-1999 study period. Model coefficients were converted into incidence rate ratios (RR), and the result of the final statistical model are presented. Correlation stemming from use of multiple data years was accounted for with generalized estimating equations under a working independence correlation matrix. Spearman correlation coefficients and variance inflation factors were used to identify multicollinearity and for diagnostic purposes. Also, variation by year and urbanization, for reasons discussed below, was then investigated by restricting analyses to individual data years and using interaction terms to permit the relation between the prevalence of FFLs and rates of gun homicide to vary across counties according to their size (i.e., on the rural-urban continuum). The variable used to represent a linear trend for year was excluded from the year-specific models. The adjusted RR estimates derived from these models are presented in a summary table.

To gain insight into how well the FFL prevalence variable may be serving as a way to proxy gun availability in counties of each grouping, the proportion of suicides committed with firearms (FS/S) – which is considered an accurate proxy for household gun availability and has been studied in state-level and region-level analyses [10,14,15] – was computed within each county by year and modeled in place of our FFL variable. Spearman correlation coefficients were also calculated to determine how well FS/S was correlated with the FFL prevalence rate within counties of each grouping.

Results

In 1993, 17,984 gun homicides and 6,141 nongun homicides occurred in the U.S. At that time a total of 253,314 gun manufacturers, gun stores and individuals held active licenses to sell firearms (i.e., FFLs). The annual incidence rates of gun and nongun homicide and the annual prevalence rates of FFLs in the U.S. from 1993 to 1999 are shown in Figure 1. Rates of gun homicide dropped considerably over this period, ranging from 3.98 per 100,000 in 1993 to 2.55 per 100,000 in 1999. By contrast, rates of nongun homicide fluctuated little, ranging from a high in 1993 of 1.52 per 100,000 to a low in 1999 of 1.11 per 100,000. The prevalence of FFLs decreased even more dramatically than did gun homicide, ranging from 1.99 per

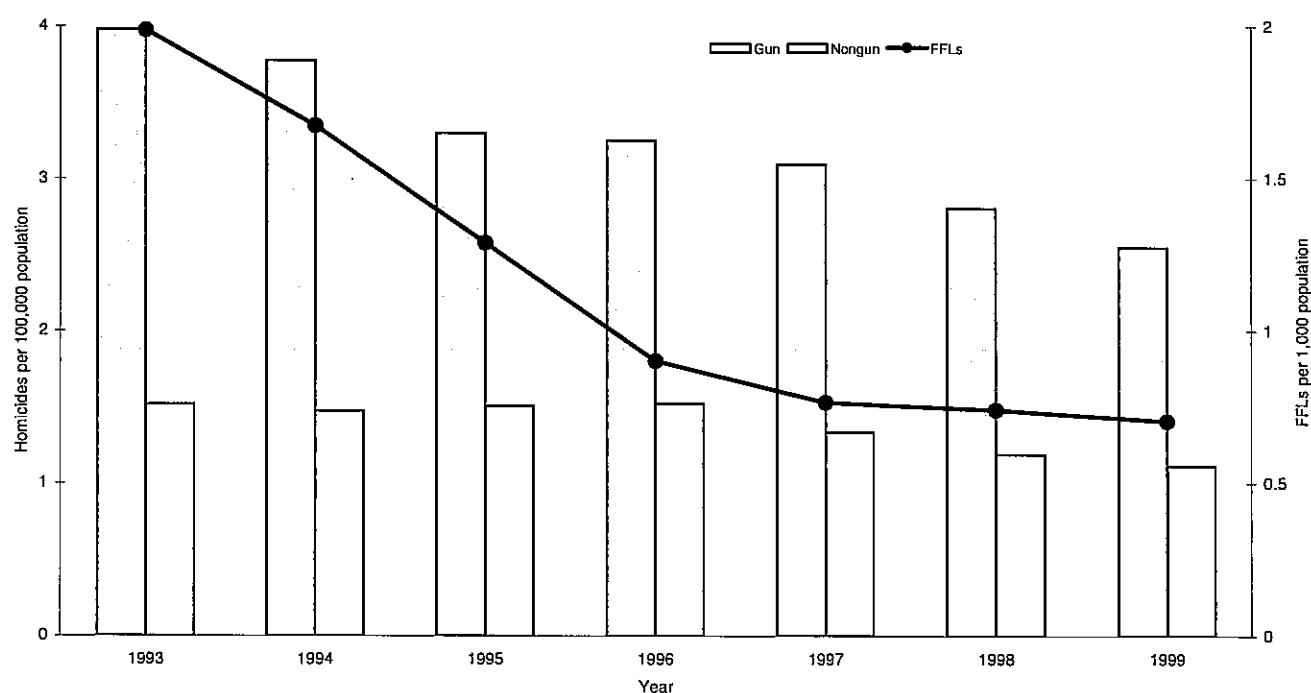


Figure 1
Homicide incidence rate and federal firearms licensee (FFL) prevalence rate in the U.S., 1993–1999.

Table 1: Characteristics of U.S. counties, 1993–1999

	Mean	Standard deviation	Minimum	Maximum
Homicide rate (per 100,000)	4.63	7.87	0.00	187.27
Gun	3.25	6.53	0.00	187.27
Non-gun	1.38	3.54	0.00	97.75
Federal firearms licensees (FFL) (per 1,000)	1.15	1.10	0.001	30.93
% of population age 15–29 years	0.31	0.36	0.09	0.81
% male	49.32	1.95	43.86	82.20
% African American	9.20	15.00	0.00	86.76
% Native American	1.18	7.42	0.00	97.69
% Hispanic	5.21	11.81	0.00	99.41
% married	44.96	5.04	18.50	58.60
% living alone	24.67	3.83	7.91	77.51
% of female headed households	10.17	3.98	0.78	36.07
% of persons below poverty level	15.22	6.58	0.00	55.27
% of adult population college educated	24.23	7.06	8.41	64.36
% of arrests that were drug related	7.29	4.96	0.00	100.00
Average per capita income (%)	19347	4985	1185	75702
Unemployment rate	5.87	3.04	0.00	37.90
Hospital beds per 1,000 population	2.85	3.98	0.00	7.41
Urbanization (11-code mRUC)	8.00	2.74	1	11
Urbanization (collapsed mRUC)	3.67	0.61	1	4
Leniency of state gun laws	75.71	17.21	3	100

mRUC denotes modified rural-urban continuum codes. 11 codes were collapsed into 4 groups for analysis.
Data exclude Alaska due to lack of FFL information.

1,000 in 1993 to 0.70 per 1,000 in 1999. The average amount by which gun homicide rates and FFL prevalence rates decreased over the seven-year period was approximately equal (23% and 22%, respectively).

Table 1 shows characteristics of U.S. counties. The rate of gun homicide ranged from 0.00 per 100,000 to 187.27 per 100,000 and the rate of nongun homicide ranged from 0.00 per 100,000 to 97.75 per 100,000, with average gun and nongun homicide rates of 3.25 per 100,000 and 1.38 per 100,000, respectively. The number of FFLs ranged from 0.001 per 1,000 to 30.93 per 1,000 with an average of 1.15 per 1,000. There were no counties without FFLs; each county had at least one FFL active during each study year.

Table 2 shows results of the overall statistical model, which adjusted for covariates using regression but did not permit for the possibility that the relation between the prevalence of FFLs and gun homicide rates could vary over the years of the study period and according to county type (i.e., urbanization). The variable for percent of female headed households was excluded during the model building process due to multicollinearity. The results based on this overall model suggested that the prevalence of FFLs in U.S. counties was not associated with the rate of gun homicide in the county (RR = 0.98, 95% confidence interval [CI] 0.93 to 1.04) (Table 2). However, inclusion of an

interaction term revealed that the relation between FFLs and gun homicide was found to vary significantly by urbanization ($p < 0.01$). The subsequent modeling revealed that in major cities, a disproportionately high prevalence of FFLs was associated with significantly higher gun homicide rates (RR = 1.70, 95% CI 1.03 to 2.81) (Table 3). Additionally, the magnitude of this association increased significantly over the study period with an average increase of 90% per year ($p < 0.001$) (Figure 2). By contrast, in other cities and in suburbs a disproportionately high prevalence of FFLs was associated with significantly lower gun homicide rates (RR = 0.73, 95% CI 0.57 to 0.93; RR = 0.87, 95% CI 0.77 to 0.97, respectively), and the magnitude of these associations did not change when tested for trend over the study period. The prevalence of FFLs was not associated with gun homicide rates in small towns. Inclusion of the covariate representing county-level rates of nongun homicide did not substantively change the results. Also, the results did not change substantively when the variable that was used to adjust for the impact of the prevalence of FFLs in surrounding counties was excluded from the models.

The results of the models run with FS/S used in place of the FFL prevalence variable (not presented) were generally consistent with our findings, although the link between gun availability and gun homicide appeared to be even stronger (positive) and more widespread than seen in the

Table 2: Gun homicide rates as a function of the number of federal firearms licensees in U.S. counties

	Incident rate ratio	SE	P-value	95% CI
FFLs	0.98	0.027	0.482	0.93, 1.04
FFLs in surrounding counties	1.03	0.009	0.001	1.01, 1.05
Year	0.96	0.009	0.000	0.95, 0.98
% poverty	1.05	0.004	0.000	1.05, 1.06
% married	1.04	0.005	0.000	1.03, 1.05
% college educated	1.00	0.003	0.699	0.99, 1.01
% African American	1.03	0.001	0.000	1.03, 1.03
% Native American	1.01	0.003	0.006	1.00, 1.01
% Hispanic	1.01	0.002	0.000	1.00, 1.01
% 15–24 years old	0.95	0.432	0.913	0.39, 2.32
% male	1.02	0.009	0.075	1.00, 1.03
% living alone	1.02	0.006	0.000	1.01, 1.04
% of arrests that were drug related	1.02	0.003	0.000	1.01, 1.02
Drug arrest jurisdiction adjustment	0.92	0.037	0.030	0.85, 0.99
Hospital beds	1.00	0.000	0.000	1.00, 1.00
Average per capita income	1.00	0.000	0.096	1.00, 1.00
Unemployment rate	1.01	0.006	0.331	0.99, 1.02
Leniency of state gun laws	1.01	0.001	0.000	1.01, 1.01
Major cities	1.97	0.226	0.000	1.57, 2.46
Other cities	1.39	0.117	0.000	1.17, 1.63
Suburbs	1.27	0.045	0.000	1.19, 1.37
Small towns (reference)	--			

Results of generalized linear negative binomial regression.

SE denotes standard error.

CI denotes confidence interval.

Table 3: Gun homicide rates (per 100,000 population) as a function of the prevalence of federal firearms licensees (FFLs) (per 1,000 population) in U.S. counties, by county type and year, 1993–1999

	Incident rate ratio (95% CI)		Incident rate ratio (95% CI)		
	All counties	Major cities	Other cities	Suburbs	Small towns
1993–1999	0.98 (0.93, 1.04)	1.70 (1.03, 2.81)	0.73 (0.57, 0.93)	0.87 (0.77, 0.97)	1.00 (0.95, 1.05)
1993	1.09 (1.02, 1.16)	1.69 (0.98, 2.90)	0.86 (0.67, 1.11)	0.99 (0.84, 1.18)	1.11 (1.04, 1.18)
1993	1.03 (0.91, 1.15)	1.65 (0.72, 3.77)	0.62 (0.42, 0.92)	0.78 (0.63, 0.96)	1.07 (0.96, 1.19)
1995	0.84 (0.73, 0.94)	2.16 (0.65, 7.20)	0.30 (0.17, 0.53)	0.65 (0.52, 0.82)	0.87 (0.77, 0.98)
1996	0.95 (0.80, 1.13)	2.58 (0.33, 19.99)	0.64 (0.08, 5.10)	0.71 (0.47, 1.08)	0.99 (0.83, 1.17)
1997	0.96 (0.80, 1.15)	3.12 (0.22, 44.78)	0.28 (0.08, 0.96)	0.48 (0.30, 0.76)	1.03 (0.87, 1.13)
1998	0.92 (0.73, 1.15)	11.24 (0.46, 277.38)	0.29 (0.10, 0.87)	0.48 (0.31, 0.72)	0.98 (0.79, 1.22)
1999	0.85 (0.67, 1.07)	12.72 (0.64, 253.19)	0.51 (0.13, 2.00)	0.62 (0.38, 1.01)	0.89 (0.70, 1.12)

Results of generalized linear negative binomial regression models adjusted for covariates.
CI indicates confidence interval.

analysis presented here. Importantly though, FS/S was strongly (positively) correlated with FFL prevalence in major cities (Spearman correlation coefficient = 0.67) but was weakly correlated and not correlated with FS/S in other cities (0.32), suburbs (0.16), or small towns (0.07), respectively. From this evidence it appears that FFL prevalence is a good proxy for firearm availability in major cities only, suggesting that the findings for how FFL prevalence relates to gun homicide may be valid for the findings pertaining to major cities but not to counties of other types.

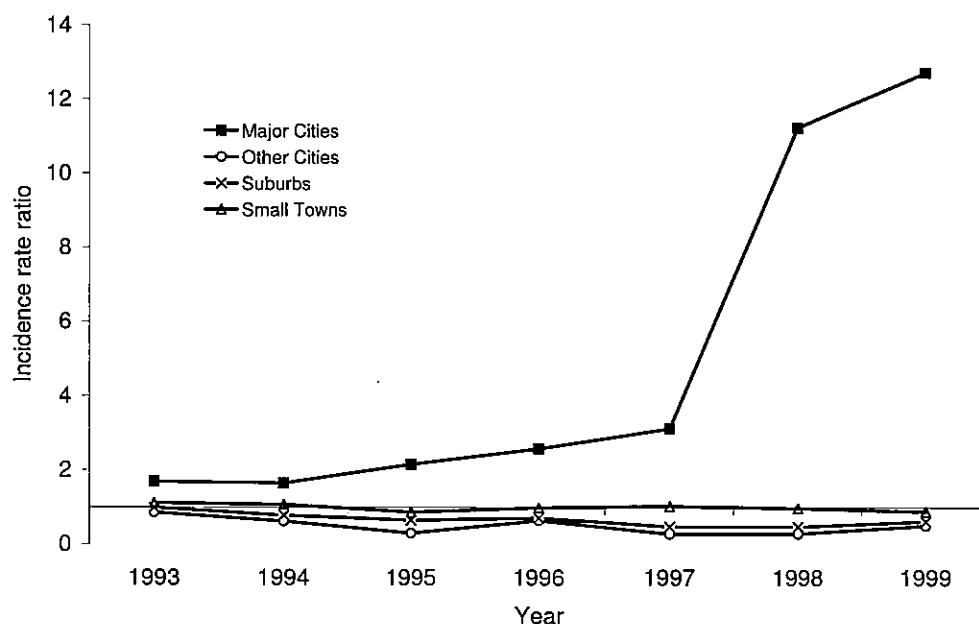
Discussion

Our analyses provide evidence of an association between the per capita rate of licensed firearm dealers in a county and its rate of firearm homicide. In particular, we found that having a disproportionately high number FFLs was associated with significantly higher rates of firearm homicide in major cities. As such, FFLs may represent a risk factor for gun homicide that is modifiable. To the best of our knowledge, the association between licensed gun dealers and homicide rates has not previously been estimated. We also found more FFLs to be associated with significantly lower firearm homicide rates in other cities and in suburbs. Possible explanations for both findings are discussed below.

Our evaluation strategy followed the assumption that the number of FFLs in a county gives some indication of the prevalence of firearms (i.e., a proxy of gun availability). Although no available data report the number of guns

sold per dealer, the basic finding that major cities having the most FFLs per capita also have the highest rates of gun homicide is consistent with what is known about how FFLs and communities relate in terms of gun availability. Data from gun traces (a determination of the chain of ownership, usually conducted in connection with a criminal investigation) conducted by the ATF may provide the best insight. Between July 1996 and December 1998, the ATF conducted 1,530 trace investigations to determine whether guns used during crimes were trafficked from an FFL into the illegal gun market and to determine the point of first purchase.[8] FFLs accounted for less than 10 percent of the 1,530 trace investigations but for nearly half (40,000) of all firearms involved in these traces. The average number of firearms trafficked by the FFLs under investigation was 350, which far exceeds the average number of firearms trafficked by other means including gun shows (130 guns), unlicensed gun dealers (75 guns), and straw purchasers (37 guns). The large volume of firearms that can be obtained by FFLs is possibly what underlies this discrepancy and why FFLs may figure prominently as a risk factor. In addition, a study where researchers telephoned FFLs and posed as customers provides additional evidence of how FFLs can facilitate the flow of guns to criminals. Gun dealers were generally willing to sell a handgun even when the buyer indicated an intention to purchase the gun illegally on behalf of someone else.[30]

Other ATF data provide additional support for the possibility that gun homicide is a function of local FFLs. Guns are often found to have been used for criminal purposes

**Figure 2**

Annual gun homicide rates as a function of the prevalence of federal firearms licensees (FFLs) in U.S. counties, by county type, 1993–1999.

not far from the gun dealer where they were first obtained. Approximately 62 percent of crime guns traced by the ATF were first purchased from FFLs in the state where they were recovered by police, one-quarter (25.9%) of crime guns were recovered in the county where they were purchased, and 10.5 percent were recovered in a county adjacent to the county of purchase, almost all of which were in the same state (9.5%).[6] Moreover, almost one-third (32.2%) of traced crime guns are recovered by police within 10 miles of the FFL where they were first purchased, and over one-third (34.3%) are recovered between 11 and 250 miles of the FFL where they were first purchased.[6,8] Thus, an FFL appears most likely to have an effect in the home or surrounding counties.

A recent study showing that gun dealers in or near major cities are at substantially elevated risk of selling guns used in crime may help to explain the strong positive association found here between FFL prevalence and gun homicide in major cities specifically.[31] Also, we found that the association between FFLs and gun homicides in major cities grew stronger from 1993 to 1999. This finding is consistent with what resulted when in the 1990s the federal government took steps to regulate FFLs more closely. Before this time, the process to obtain a license to sell firearms was appreciably simpler.[4] The Gun Control Act of 1968 required the ATF to issue a license to any applicant who was at least 21 years old, had premises from which they intended to conduct business, and who otherwise

was not prohibited by law from purchasing a firearm.[4] At the time, the fee to obtain or annually renew an FFL was \$10. The ATF received an average of 33,000 applications for FFLs each year over the decade that followed. Fully 169,052 FFLs were active by 1978. That number increased steadily thereafter and by 1992 reached a national peak of 284,117 FFLs. Not all FFLs were legitimate businesses, however. Any FFL enabled the holder to purchase large numbers of firearms, often at wholesale prices, and to buy from sellers in other states.[6] Many of these dealers made few if any registered sales, suggesting they were not truly engaged in the business of firearms dealing as required by federal law, and a substantial proportion of the extant FFLs were not in compliance with applicable federal, state, and local laws.[4]

With the system becoming increasingly difficult for the ATF to monitor, Congress acted and in 1993 and 1994 increased the FFL application fee 20-fold to \$200 and imposed new laws intended to shut down inactive or corrupt FFLs.[4] In the years that followed, the number of FFLs nationally dropped from about 260,000 in 1993 to 80,000 in 1999. Our effect estimates suggest that the association between FFL prevalence and homicide may have been weaker in the early 1990s than in later years because there existed a large number of low volume dealers who contributed less to the supply of firearms.[4] Hence, with FFLs over time becoming a better measure of the exposure under study, the actual magnitude of the association

between FFLs and gun homicide may be more accurately portrayed in the last few years of our study.

In contrast to what was observed for major cities, we found a negative association between gun homicide and FFL prevalence in other cities and suburbs. When considered in conjunction with the finding that FFL prevalence and FS/S are correlated strongly in major cities but correlated weakly in other cities and suburbs, this suggests that FFL prevalence is not a good proxy for gun availability in other cities and suburbs and hence the models based on those areas should not be interpreted as providing valid estimates of the relation between gun availability and gun homicide. We can consider these findings in light of our understanding of how the relation between FFLs and gun homicide may vary across counties of different urbanization types. In major city areas with higher crime rates, there will be greater criminal demand for guns and, hence, a larger illegal market for guns. It thus seems more likely that a weapon sold in a major city, as compared to one sold in another county type, will end up in the hands of a criminal user through theft, straw purchase, gun trafficking, or some other kind of transaction in the secondhand market. Also, it is possible that handguns rather than long guns account for a higher share of guns sold in major cities. Further, it would also stand to reason that an "average" gun possessor has a greater chance of using a gun criminally in an area with higher rates of gun violence. Also, gun culture and the roles of guns in peoples' lives vary dramatically across urban-rural continuum. Firearm ownership is more widespread in rural areas than urban areas, so the need to purchase a firearm from an FFL may be less necessary in rural than urban areas. The role of firearms certainly varies by county type in terms of firearm mortality, in that rates of firearm-related mortality in the U.S. are equally high in both the most urban and the most rural counties, with the nuance being that it is the gun homicide rate that is high in the most urban counties and it is the gun suicide rate that is high in the most rural counties.[20] Each of these points highlights the importance of stratifying analyses by county type and identifying variables that measure firearm availability accurately in the county type at the focus of a particular study, an important point that has been made previously.[32] The FS/S comparisons suggest that the FFL variable used here provides an adequate proxy in major city counties alone.

If the FFL variable is not a good proxy for gun availability in counties we have defined as other cities and suburbs, our analyses cannot inform the issue of how gun availability relates to gun homicide in counties of these types. It may be the case that the impact of guns on a community may vary by community type and may be protective in other cities and suburbs. In one study of 170 U.S. cities with a population of at least 100,000, however, rates of

homicide and of gun-related assault were found to be positively associated with the prevalence of firearms.[33] Even so, it is possible that the mixing in that study of what we have termed major cities, other cities and suburbs may have prevented the authors from detecting modification of this effect across area type. Another study of counties in Illinois initially found that the rate of firearm ownership was negatively associated with all measures of violent crime, including homicide, but had failed to control for urbanization.[34] Subsequent multivariate analyses with control for urbanization found no significant association between the rate of firearm ownership and homicide. A number of ecologic studies conducted at the state level [10,14] and individual-level studies [35-37] alike have found firearm availability to be a risk factor for homicide rather than a protective factor, yet other studies have not found clear effects of the relation between gun availability and homicide, e.g.,[34,38] and a recent National Academy of Sciences report concluded that the body of research on this topic is inconclusive.[39] Our findings highlight the need to account for urbanization in the studies that will follow.

Our analysis had several strengths. First, it was conducted at the county level to account for within-state variability in homicide rates and FFL prevalence. This also allowed us to control for the possibilities that the homicide rate in a county was influenced by FFLs in surrounding counties and by the leniency or permissiveness of neighboring state firearm laws. Second, our analysis examined the link between FFLs and homicide over county urbanization type. Third, the study years coincided with a period when changes to federal firearm licensing regulations produced a change in the composition of the pool of FFLs nationally. As FFLs became fewer the pool became more homogenous, and hence may have provided an exposure variable that became a better measure of gun availability over time. The finding that the association between FFLs and gun homicide in major cities grew stronger over time adds support to our interpretation of the results, as does the finding based on our comparison with FS/S that FFL prevalence appears to be a good proxy for gun availability in counties defined as major cities but not in other county types.

Also, two aspects of the present study are unique and have implications for how firearm homicide is studied and how the incidence of firearm homicide may be reduced. First, because the link between gun homicide and gun availability (as measured by the prevalence of FFLs) was found to vary significantly within states according to the urbanization levels of counties, it appears that studies conducted using broader geographic units of analysis (states, census divisions, etc.) may fail to detect important nuances in the nature of gun availability.

Second, to the best of our knowledge, our study, in focusing on gun dealers as a potential risk factor for homicide, is the first to assess a tangible measure of gun availability that can be modified as part of prevention activities. Law enforcement, city planners, and legal strategists in cities with high gun homicide rates can concretely focus in on excessive or problem gun dealers as opposed to the more nebulous issue of "gun availability." Moreover, local efforts to close down illegal gun commerce have already shown the potential to be effective.[33,40,41] As one example, zoning laws, which control the location and operation of stores and individual dealers licensed to sell firearms, have been used to regulate locations of FFLs in several U.S. communities.[11,12,42] An attempt to launch a coordinated effort to identify and act on problematic gun dealers will surely face challenges, however. For one, a key component of such efforts will be the policing activities of the ATF which, in having inspected fewer than 10% of FFLs in each year since 1979 and fewer than 5% of FFLs in most of those years, may have resources insufficient for the task.[6]

Our analysis also had limitations. As discussed, we could not account for the actual volume of firearms introduced by each FFL into the community. Although gun sales data are not currently available for a more focused test, the recent National Academy of Sciences report called for better information on FFLs to be collected and made available for research.[39] Additionally, we did not explicitly accommodate spatial autocorrelation in the estimation of the FFL effect estimates. Refitting the models presented in Table 2 and Table 3 including a simultaneous autoregressive (SAR) structure,[43] assuming that correlation declined in proportion to the square of the distance between counties, generally changed coefficients by less than 5%. Also, data for FFLs for years after 1999 were not available. Thus we could not analyze a more recent period. Nevertheless, we do not anticipate that the relation observed here between FFLs and homicide would have changed since the study period and thus this characteristic of the data should not be interpreted as devaluing the findings. Finally, it may be that high rates of homicide may lead to increased demand for firearms and hence additional FFLs, in which case the results of the "FFL as risk factor" hypothesis that our models have been designed to test would be spurious. A stronger analytic approach would be to test whether within-county increases in FFL prevalence were followed by increases in the rate of gun homicide. We considered that approach, but found many instances in which a county experienced no gun homicides in certain years but some homicides in the subsequent year, which prevents an annual change in homicide rate from being calculated. Also, as discussed above, we found evidence that FFL prevalence became a better proxy for firearm availability over time, which led

to our preference for the 1999 models and our judgment to refrain from including change models in the current manuscript. An instrumental variable approach could be pursued as well, to attempt to remove from the models the influence of circularity that may exist. We hope this manuscript will inform how such design alternatives may be approached, and acknowledge their need given the cross-sectional nature of the present study.

Conclusion

If locations of retailers licensed to sell firearms are indeed functioning as a spigot through which deadly firearms flow into criminal hands, then communities with greater geographic access to these dealers should ostensibly experience more firearm homicides. Our findings are consistent with the hypothesis that this is occurring in major U.S. cities. The modification of FFLs, as tangible entities that are tracked and overseen at the national level and, in some cases, at the state and local levels, may be a feasible intervention to reduce firearm homicide.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

CB, MN and ME conceived of the study and supervised all aspects of its implementation. ME and RK computed variables involved in the spatial component of the analysis and DW and ME conducted the statistical analysis. DW and CB drafted the manuscript. All authors helped to conceptualize ideas, interpret findings, and revise drafts of the manuscript.

Acknowledgements

Funded through grants from the National Institute on Alcohol Abuse and Alcoholism (R01 AA013119), the National Institute of Justice (Project Safe Neighborhoods), and the Joyce Foundation.

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Pre-publication history

The pre-publication history for this paper can be accessed here:

<http://www.biomedcentral.com/1471-2458/9/199/prepub>

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Workman, Paul

From: venkat r <venkaattt@gmail.com>
Sent: Wednesday, March 07, 2018 3:23 PM
To: bmathews@parkeronline.org; Workman, Paul; Mayor, Council, and TA
Subject: Re: Objection to Back 40 shooting range

Dear Messrs. Matthews and Workman,

I am writing to express my objection to the proposed location of the Back 40 Shooting Range, which as been designated as the intersection of Chambers Road and Double Angel Road (the "Location") in Parker. I am a resident of the Heirloom neighborhood, which is adjacent to the Location. I understand that development of a facility like Back 40 is subject to Use by Special Review, and the Town Council may only approve such projects if nine enumerated criteria are met. I, and many other Parker residents, believe the development of Back 40 at the Location would violate all three of the following three criteria:

Criteria 1: Will be in harmony and compatible with the character of the surrounding areas and neighborhood.

Back 40 is in no way in harmony with, or compatible with, the character of the Location's surrounding area or neighborhood. The Location is directly across the street from The Church of Latter Day Saints, within blocks of multiple schools, one block from youth sporting facilities, and just beyond the backyards of several Heirloom and Parker Homestead residents.

- The Church of Latter Day Saints celebrates the Ten Commandments. See: <https://www.lds.org/topics/ten-commandments?lang=eng>. The sixth commandment reads, "Thou Shalt Not Kill". Guns, however, are designed to do exactly that.
- School shootings are an epidemic in this country, which you may recall sadly began here in Colorado with the "Columbine Killers". As a result, the idea of Back 40 selling guns and ammunition this close to schools and youth facilities is frightening to many local children and parents. Some of these individuals will be voicing this sentiment at the upcoming DCSD meeting.
- If Back 40 is built in the Location, it will undoubtedly detract from the "quiet enjoyment" that Heirloom and Parker Homestead residents have the right to experience in their own backyards. Thousands of people have moved to Parker's newly developed neighborhoods to create a better life for themselves and their families. Placing Back 40 in a residential versus commercial neighborhood severely threatens the peaceful lifestyle local residents have envisioned.

Criteria 7: Will not cause significant air, water or noise pollution.

Air and Water Pollution

- The U.S. Environmental Protection Agency does not certify or approve shooting ranges, range design or lead management practices. Rather, "scientists, engineers, attorneys, and other appropriate professionals must be called upon to make specific recommendations for individual range design and lead management". In attending the developer's meeting last week, it became apparent that neither the developer, builder nor owner of Back 40 have enlisted any scientists as it relates to studying lead as "an environmental, public and regulatory concern". See: https://www.epa.gov/sites/production/files/documents/epa_bmp.pdf.
- The meta analysis of 36 studies conducted between 1975 and 2016, published in the journal *Environmental Health*, examined the ways firing range patrons, employees and their families are exposed to lead. It found that individuals who patronize or work at gun ranges had blood lead levels from between two and eight times the level of exposure deemed cause for serious concern by the federal Centers for Disease Control and Prevention. The review's authors concluded that firing ranges, regardless of type and user classification, "currently constitute a significant and unmanaged public health problem." See: <https://ehjournal.biomedcentral.com/articles/10.1186/s12940-017-0246-0>.
- While the builder claimed during last week's meeting that Back 40 will have a "state of the art" air filtration system, he conceded that there will be no air quality gauge installed outside of the building to account for toxic air leakage. Likewise, there does not appear to be a plan in place to monitor for lead leaching. Notwithstanding the foregoing, exposure to lead is only mitigated, and not ceased, by good air and water filtration systems. In fact, workers at shooting ranges bring lead particles home on their skin and clothes. See: <https://www.atsdr.cdc.gov/PHS/PHS.asp?id=92&tid=22>.

Noise Pollution

- The discharge of firearms in an indoor firing range produces peak noise levels that exceed the occupational health limits. See: <https://blogs.cdc.gov/niosh-science-blog/2009/05/18/firingrange/>. Given this level of noise, gun shots within an indoor shooting range can be heard from the exterior of the building. Back 40 itself acknowledged this fact, and stated in its Project Narrative that "sound that emanates from the building will be muted and be comparable to the level of sound produced by car doors and trunks being shut and traffic on South Chambers Road". See: <https://lms.parkeronline.org/etrakit3/viewAttachment.aspx?Group=PROJECT&ActivityNo=Z18-004&key=PWOR%3a180125091358003>.
- I am curious to know how many shots are fired on a typical day at a shooting range, but I suspect it to be in the hundreds, if not thousands. Homeowners within earshot of hundreds or thousands of "car doors and trunks being shut" each day will most certainly be annoyed (at best) by the sound. This would particularly be the case in the early morning and late evening hours of Back 40's operation. Residents living near a Trussville, AL shooting range have repeatedly asserted this claim. See: <https://patch.com/alabama/trussville/noise-trussville-indoor-shooting-range-still-problem-despite-repeated-complaints>. Per Miriam-Webster, noise pollution is defined as "annoying or harmful noise...in an environment" (emphasis added). Therefore, the aforementioned noise emanating from Back 40 would by definition qualify as noise pollution.

Criteria 9: Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the town.

Health

- It is well established that suicides, accidental deaths and mass shootings have occurred within numerous shooting ranges across the country. Sirens from ambulances and fire trucks responding to any such incidents at the Location will most certainly add to the noise pollution highlighted above. It would also be a great distraction for those trying to worship in church and concentrate in school. Not to mention, witnessing the aftermath of a severe or even fatal injury could be traumatizing for onlookers in this residential area, thus compromising their mental health.

Safety

- It is also well established that facilities renting and/or selling firearms are often robbed or burgled. The Bureau of Alcohol, Tobacco, Firearms and Explosives has published statistics showing an alarming increase in such incidents since 2013. Specifically, robberies have increased 266.67%, and burglaries have increased 70.71%, during this time period. See: <https://www.atf.gov/firearms/federal-firearms-licensee-ffl-burglary-and-robbery-statistics-calendar-years-2013-2017>. Having a shooting range at the Location necessarily has the possibility of inviting crime to its surrounding area. This is exacerbated by the fact that home residences are popular targets for criminals prone to robberies and burglaries.

Welfare

- Again borrowing from Miriam-Webster, welfare is defined as “the state of doing well especially in respect to good fortune, happiness, well-being, or prosperity”. Prosperity is in turn defined as “the condition of being successful or thriving; especially: *economic well-being*” (emphasis added). According to [Realtor.com](https://www.realtor.com), “it’s not the guns or the people who shoot them that the neighbors of shooting ranges object to most; it’s more the *idea* of the places ... especially outdoor gun ranges”. As a result, the values for houses situated near shooting ranges drops 3.7% on average. See: <https://www.realtor.com/news/trends/things-that-affect-your-property-value/>. Such homes also take longer to sell or do not sell at all. See: <https://pocketsense.com/property-impacted-presence-gun-clubs-7464580.html>. Given these statistics, building Back 40 at the Location would most assuredly threaten the economic welfare of local residential property owners.

I would be happy to discuss my concerns with you in greater detail, via telephone or an in-person meeting. In any case, I hope you will seriously consider the objections raised above, and ultimately arrive at the conclusion that the Location is unsuitable for a shooting range. With the Location set at 360-400 feet from the nearest homes, the builder himself confirmed Back 40 would be built closer to residences than any other shooting range he built previously, making it an unfortunate anomaly. See: https://docs.google.com/spreadsheets/d/1PZdfTTn0EJfWa_FG97Sclmoz8hs8eP-BY97DqnoL1eU/edit#gid=0. I respectfully request that you, as members of the

Planning Commission, advise the Town Council that Back 40 should not be built at the Location. As a business owner, I do wish other business owners every success. Yet, such successes cannot reasonably be supported if they come at the expense of other people's livelihoods and well-being.

Thank you very much,
Venkata Rajasekar

Workman, Paul

From: siva mani <mansiva@gmail.com>
Sent: Wednesday, March 07, 2018 2:20 PM
To: Matthews, Bryce; Workman, Paul; Mayor, Council, and TA
Subject: RE: Back 40

Dear Messrs. Matthews and Workman,

I am writing to express my objection to the proposed location of the Back 40 Shooting Range, which as been designated as the intersection of Chambers Road and Double Angel Road (the "Location") in Parker. I am a resident of the Heirloom neighborhood, which is adjacent to the Location. I understand that development of a facility like Back 40 is subject to Use by Special Review, and the Town Council may only approve such projects if nine enumerated criteria are met. I, and many other Parker residents believe the development of Back 40 at the Location would violate all three of the following three criteria:

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Thank you very much,
Sivakumar Mani

Workman, Paul

From: Latha Balakrishnan <lathanaval@gmail.com>
Sent: Wednesday, March 07, 2018 11:38 AM
To: bmathews@parkeronline.org; Workman, Paul; Mayor, Council, and TA; Waid, Mike
Subject: Objection to proposed location of Back 40 Shooting Range(Chambers Rd/DoubleAngel Rd)

Dear Mayor & Concerned people,

I want to express my objection to the proposed location of the Back 40 shooting range(Chambers Rd/ Double Angel Rd).

Besides the known risks of noise and environmental pollution and that this proposal is not in line with the harmony of a neighborhood, I have some very personal concerns.

I live in the Heirloom community. This news of the proposed gun range came as a shock to me being a parent of 2 young children. After very many years we were starting to feel settled finally in a quiet town. With all the recent things happening around guns we are in a state of panic mode already.

Here are my reasons that this proposal SHOULD NOT be approved:

- To think we 'may' have to sleep everyday listening to the dull sound of guns is not appealing at all.
- Every siren or cop car is going to spin us into imaginations around what happened in this place.
- The increased crowd of people who want to do target practice doesn't give any comfort to let the kids play outside the home or in the backyard.
- Every loud noise will make us think if its from a gun bought or stolen from this shooting range and in the hands of a bad person.

Please find some other place far away from us and from any neighborhood. Life is not easy as such. Please don't take away everyday peace from us.

Please, please reject the Back40 application .

Thanks,
Latha

Workman, Paul

From: Saranya Jambunathan <saranyajambunathan.ks@gmail.com>
Sent: Wednesday, March 07, 2018 11:09 AM
To: Matthews, Bryce; Workman, Paul; Mayor, Council, and TA
Subject: Reg: Objection to Back 40 shooting range

Dear Messrs. Matthews and Workman,

I am writing to express my objection to the proposed location of the Back 40 Shooting Range, which as been designated as the intersection of Chambers Road and Double Angel Road (the "Location") in Parker. I am a resident of the Heirloom neighborhood, which is adjacent to the Location. I understand that development of a facility like Back 40 is subject to Use by Special Review, and the Town Council may only approve such projects if nine enumerated criteria are met. I, and many other Parker residents, believe the development of Back 40 at the Location would violate all three of the following three criteria:

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- The Church of Latter Day Saints celebrates the Ten Commandments. See: <https://www.lds.org/topics/ten-commandments?lang=eng>. The sixth commandment reads, "Thou Shalt Not Kill". Guns, however, are designed to do exactly that.
- School shootings are an epidemic in this country, which you may recall sadly began here in Colorado with the "Columbine Killers". As a result, the idea of Back 40 selling guns and ammunition this close to schools and youth facilities is frightening to many local children and parents. Some of these individuals will be voicing this sentiment at the upcoming DCSD meeting.
- If Back 40 is built in the Location, it will undoubtedly detract from the "quiet enjoyment" that Heirloom and Parker Homestead residents have the right to experience in their own backyards. Thousands of people have moved to Parker's newly developed neighborhoods to create a better life for themselves and their families. Placing Back 40 in a residential versus commercial neighborhood severely threatens the peaceful lifestyle local residents have envisioned.

Criteria 7: Will not cause significant air, water or noise pollution.

Air and Water Pollution

- The U.S. Environmental Protection Agency does not certify or approve shooting ranges, range design or lead management practices. Rather, "scientists, engineers, attorneys, and other appropriate professionals

must be called upon to make specific recommendations for individual range design and lead management". In attending the developer's meeting last week, it became apparent that neither the developer, builder nor owner of Back 40 have enlisted any scientists as it relates to studying lead as "an environmental, public and regulatory concern". See: https://www.epa.gov/sites/production/files/documents/epa_bmp.pdf.

- The meta analysis of 36 studies conducted between 1975 and 2016, published in the journal *Environmental Health*, examined the ways firing range patrons, employees and their families are exposed to lead. It found that individuals who patronize or work at gun ranges had blood lead levels from between two and eight times the level of exposure deemed cause for serious concern by the federal Centers for Disease Control and Prevention. The review's authors concluded that firing ranges, regardless of type and user classification, "currently constitute a significant and unmanaged public health problem." See: <https://ehjournal.biomedcentral.com/articles/10.1186/s12940-017-0246-0>.

- While the builder claimed during last week's meeting that Back 40 will have a "state of the art" air filtration system, he conceded that there will be no air quality gauge installed outside of the building to account for toxic air leakage. Likewise, there does not appear to be a plan in place to monitor for lead leaching. Notwithstanding the foregoing, exposure to lead is only mitigated, and not ceased, by good air and water filtration systems. In fact, workers at shooting ranges bring lead particles home on their skin and clothes. See: <https://www.atsdr.cdc.gov/PHS/PHS.asp?id=92&tid=22>.

Noise Pollution

- The discharge of firearms in an indoor firing range produces peak noise levels that exceed the occupational health limits. See: <https://blogs.cdc.gov/niosh-science-blog/2009/05/18/firingrange/>. Given this level of noise, gun shots within an indoor shooting range can be heard from the exterior of the building. Back 40 itself acknowledged this fact, and stated in its Project Narrative that "sound that emanates from the building will be muted and be comparable to the level of sound produced by car doors and trunks being shut and traffic on South Chambers Road". See: <https://lms.parkeronline.org/etrakit3/viewAttachment.aspx?Group=PROJECT&ActivityNo=Z18-004&key=PWOR%3a180125091358003>.

- I am curious to know how many shots are fired on a typical day at a shooting range, but I suspect it to be in the hundreds, if not thousands. Homeowners within earshot of hundreds or thousands of "car doors and trunks being shut" each day will most certainly be annoyed (at best) by the sound. This would particularly be the case in the early morning and late evening hours of Back 40's operation. Residents living near a Trussville, AL shooting range have repeatedly asserted this claim. See: <https://patch.com/alabama/trussville/noise-trussville-indoor-shooting-range-still-problem-despite-repeated-complaints>. Per Miriam-Webster, noise pollution is defined as "annoying or harmful noise...in an environment" (emphasis added). Therefore, the aforementioned noise emanating from Back 40 would by definition qualify as noise pollution.

Criteria 9: Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the town.

Health

- It is well established that suicides, accidental deaths and mass shootings have occurred within numerous shooting ranges across the country. Sirens from ambulances and fire trucks responding to any such

incidents at the Location will most certainly add to the noise pollution highlighted above. It would also be a great distraction for those trying to worship in church and concentrate in school. Not to mention, witnessing the aftermath of a severe or even fatal injury could be traumatizing for onlookers in this residential area, thus compromising their mental health.

Safety

- It is also well established that facilities renting and/or selling firearms are often robbed or burgled. The Bureau of Alcohol, Tobacco, Firearms and Explosives has published statistics showing an alarming increase in such incidents since 2013. Specifically, robberies have increased 266.67%, and burglaries have increased 70.71%, during this time period. See: <https://www.atf.gov/firearms/federal-firearms-licensee-ffl-burglary-and-robbery-statistics-calendar-years-2013-2017>. Having a shooting range at the Location necessarily has the possibility of inviting crime to its surrounding area. This is exacerbated by the fact that home residences are popular targets for criminals prone to robberies and burglaries.

Welfare

- Again borrowing from Miriam-Webster, welfare is defined as “the state of doing well especially in respect to good fortune, happiness, well-being, or prosperity”. Prosperity is in turn defined as “the condition of being successful or thriving; especially: *economic well-being*” (emphasis added). According to [Realtor.com](https://www.realtor.com/news/trends/things-that-affect-your-property-value/), “it’s not the guns or the people who shoot them that the neighbors of shooting ranges object to most; it’s more the *idea* of the places ... especially outdoor gun ranges”. As a result, the values for houses situated near shooting ranges drops 3.7% on average. See: <https://www.realtor.com/news/trends/things-that-affect-your-property-value/>. Such homes also take longer to sell or do not sell at all. See: <https://pocketsense.com/property-impacted-presence-gun-clubs-7464580.html>. Given these statistics, building Back 40 at the Location would most assuredly threaten the economic welfare of local residential property owners.

I would be happy to discuss my concerns with you in greater detail, via telephone or an in-person meeting. In any case, I hope you will seriously consider the objections raised above, and ultimately arrive at the conclusion that the Location is unsuitable for a shooting range. With the Location set at 360-400 feet from the nearest homes, the builder himself confirmed Back 40 would be built closer to residences than any other shooting range he built previously, making it an unfortunate anomaly. See: https://docs.google.com/spreadsheets/d/1PZdfTTn0EJfWa_FG97ScImoz8hs8eP-BY97DqnoL1eU/edit#gid=0. I respectfully request that you, as members of the Planning Commission, advise the Town Council that Back 40 should not be built at the Location. As a business owner, I do wish other business owners every success. Yet, such successes cannot reasonably be supported if they come at the expense of other people’s livelihoods and well-being.

Thank you very much,

Saranya Jambunathan

Workman, Paul

From: Lynn Wolff <lcwolff@aol.com>
Sent: Tuesday, March 06, 2018 10:15 PM
To: Matthews, Bryce; Workman, Paul; Mayor, Council, and TA; Waid, Mike; Maloney, Jim; Fussa, John
Subject: STOP Back 40 Range

The Back 40 Range MUST be stopped, it does not belong in a residential neighborhood, close to houses, a church, schools, sports fields, families, etc... this is a wonderful area with walking paths, parks, recreation, families galore this is where families want to raise their children because Parker is known to have that small town feeling, planned communities and care what the home owners think.

The Back 40 Range should be built in an industrial park. Everyone knows we will hear the noise and smell gun powder ask any police department. Not to mention the safety, having people walking around with guns does not promote a sense of well being or happiness.

This has to be stopped, not only do I live in this neighborhood but my daughter, son-in-law and two grandchildren live here too. I don't want my grandchildren growing up thinking a gun range in their backyard and everything that goes with it is normal.

Thank you for your time.

Sincerely,

Lynn Wolff
14993 Rider Place

Workman, Paul

From: Shannon K. Fitzgerald <shannon.fitzgerald@regulatoryridge.com>
Sent: Tuesday, March 06, 2018 6:53 PM
To: Matthews, Bryce; Workman, Paul
Cc: Mayor, Council, and TA; Waid, Mike; Diak, John; Holland, Amy; Lewis, Debbie; Martin, Josh; Rivero, Joshua; Williams, Renee
Subject: Back 40 Shooting Range

Dear Messrs. Matthews and Workman,

I am writing to express my objection to the proposed location of the Back 40 Shooting Range, which as been designated as the intersection of Chambers Road and Double Angel Road (the "Location") in Parker. I am a resident of the Heirloom neighborhood, which is adjacent to the Location. I am an attorney, and part of a group of residents from numerous Parker neighborhoods, which has been compiled to formally (and if necessary, legally) oppose the Location. I understand that development of a facility like Back 40 is subject to Use by Special Review, and the Town Council may only approve such projects if nine enumerated criteria are met. I, and many other Parker residents, believe the development of Back 40 at the Location would violate all three of the following three criteria:

- **Criteria 1: Will be in harmony and compatible with the character of the surrounding areas and neighborhood.**
 - Back 40 is in no way in harmony with, or compatible with, the character of the Location's surrounding area or neighborhood. The Location is directly across the street from The Church of Latter Day Saints, within blocks of multiple schools, one block from youth sporting facilities, and just beyond the backyards of several Heirloom and Parker Homestead residents.
 - The Church of Latter Day Saints celebrates the Ten Commandments. See: <https://www.lds.org/topics/ten-commandments?lang=eng>. The sixth commandment reads, "Thou Shalt Not Kill". Guns, however, are designed to do exactly that.
 - School shootings are an epidemic in this country, which you may recall sadly began here in Colorado with the "Columbine Killers". As a result, the idea of Back 40 selling guns and ammunition this close to schools and youth facilities is frightening to many local children and parents. Some of these individuals will be voicing this sentiment at the upcoming DCSD meeting.
 - If Back 40 is built in the Location, it will undoubtedly detract from the "quiet enjoyment" that Heirloom and Parker Homestead residents have the right to experience in their own backyards. Thousands of people have moved to Parker's newly developed neighborhoods to create a better life for themselves and their families. Placing Back 40 in a residential versus commercial neighborhood severely threatens the peaceful lifestyle local residents have envisioned.
- **Criteria 7: Will not cause significant air, water or noise pollution.**
 - Air and Water Pollution
 - The U.S. Environmental Protection Agency does not certify or approve shooting ranges, range design or lead management practices. Rather, "scientists, engineers, attorneys, and other appropriate professionals must be called upon to make specific recommendations for individual range design and lead management". In attending the developer's meeting last week, it became apparent that neither the developer, builder nor owner of Back 40 have enlisted any scientists as it relates to studying lead as "an environmental, public and regulatory concern". See: https://www.epa.gov/sites/production/files/documents/epa_bmp.pdf.
 - The meta analysis of 36 studies conducted between 1975 and 2016, published in the journal *Environmental Health*, examined the ways firing range patrons, employees and their families are exposed to lead. It found that individuals who patronize or work at gun ranges had blood lead levels from between two and eight times the level of exposure deemed cause for serious concern by the federal Centers for Disease Control and Prevention. The review's authors concluded that firing

ranges, regardless of type and user classification, "currently constitute a significant and unmanaged public health problem." See: <https://ehjournal.biomedcentral.com/articles/10.1186/s12940-017-0246-0>.

- While the builder claimed during last week's meeting that Back 40 will have a "state of the art" air filtration system, he conceded that there will be no air quality gauge installed outside of the building to account for toxic air leakage. Likewise, there does not appear to be a plan in place to monitor for lead leaching. Notwithstanding the foregoing, exposure to lead is only mitigated, and not ceased, by good air and water filtration systems. In fact, workers at shooting ranges bring lead particles home on their skin and clothes. See: <https://www.atsdr.cdc.gov/PHS/PHS.asp?id=92&tid=22>.

- **Noise Pollution**

- The discharge of firearms in an indoor firing range produces peak noise levels that exceed the occupational health limits. See: <https://blogs.cdc.gov/niosh-science-blog/2009/05/18/firingrange/>. Given this level of noise, gun shots within an indoor shooting range can be heard from the exterior of the building. Back 40 itself acknowledged this fact, and stated in its Project Narrative that "sound that emanates from the building will be muted and be comparable to the level of sound produced by car doors and trunks being shut and traffic on South Chambers Road". See: <https://lms.parkeronline.org/etrakit3/viewAttachment.aspx?Group=PROJECT&ActivityNo=Z18-004&key=PWOR%3a180125091358003>.
- I am curious to know how many shots are fired on a typical day at a shooting range, but I suspect it to be in the hundreds, if not thousands. Homeowners within earshot of hundreds or thousands of "car doors and trunks being shut" each day will most certainly be annoyed (at best) by the sound. This would particularly be the case in the early morning and late evening hours of Back 40's operation. Residents living near a Trussville, AL shooting range have repeatedly asserted this claim. See: <https://patch.com/alabama/trussville/noise-trussville-indoor-shooting-range-still-problem-despite-repeated-complaints>. Per Miriam-Webster, noise pollution is defined as "*annoying or harmful noise...in an environment*" (emphasis added). Therefore, the aforementioned noise emanating from Back 40 would by definition qualify as noise pollution.

- **Criteria 9: Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the town.**

- **Health**

- It is well established that suicides, accidental deaths and mass shootings have occurred within numerous shooting ranges across the country. Sirens from ambulances and fire trucks responding to any such incidents at the Location will most certainly add to the noise pollution highlighted above. It would also be a great distraction for those trying to worship in church and concentrate in school. Not to mention, witnessing the aftermath of a severe or even fatal injury could be traumatizing for onlookers in this residential area, thus comprising their mental health.

- **Safety**

- It is also well established that facilities renting and/or selling firearms are often robbed or burgled. The Bureau of Alcohol, Tobacco, Firearms and Explosives has published statistics showing an alarming increase in such incidents since 2013. Specifically, hobbies have increased 266.67%, and burglaries have increased 70.71%, during this time period. See: <https://www.atf.gov/firearms/federal-firearms-licensee-ffl-burglary-and-robbery-statistics-calendar-years-2013-2017>. Having a shooting range at the Location necessarily has the possibility of inviting crime to its surrounding area. This is exacerbated by the fact that home residences are popular targets for criminals prone to robberies and burglaries.

- **Welfare**

- Again borrowing from Miriam-Webster, welfare is defined as "the state of doing well especially in respect to good fortune, happiness, well-being, or prosperity". Prosperity is in turn defined as "the condition of being successful or thriving; especially: *economic well-being*" (emphasis added). According to Realtor.com, "it's not the guns or the people who shoot them that the neighbors of shooting ranges object to most; it's more

the *idea* of the places ... especially outdoor gun ranges". As a result, the values for houses situated near shooting ranges drops 3.7% on average. See: <https://www.realtor.com/news/trends/things-that-affect-your-property-value/>. Such homes also take longer to sell or do not sell at all. See: <https://pocketsense.com/property-impacted-presence-gun-clubs-7464580.html>. Given these statistics, building Back 40 at the Location would most assuredly threaten the economic welfare of local residential property owners.

I would be happy to discuss my concerns with you in greater detail, via telephone or an in-person meeting. In any case, I hope you will seriously consider the objections raised above, and ultimately arrive at the conclusion that the Location is unsuitable for a shooting range. With the Location set at 360 – 400 feet from the nearest homes, the builder himself confirmed Back 40 would be built closer to residences than any other shooting range he built previously, making it an unfortunate anomaly. See: https://docs.google.com/spreadsheets/d/1PZdfTTn0EJfWa_FG97Sclmoz8hs8eP-BY97DqnoL1eU/edit#gid=0. I respectfully request that you, as members of the Planning Commission, advise the Town Council that Back 40 should not be built at the Location. As a business owner, I do wish other business owners every success. Yet, such success cannot reasonably be supported if they come at the expense of other people's livelihoods and well-being.

Thank you very much,
Shannon
c - (732) 921-2316

Shannon K. Fitzgerald, CAMS Founder & Managing Director

Regulatory Ridge, LLC | Regulatory Ridge, LLC | 17011 Lincoln Ave., #433 | Parker, CO
80134 | 732.921.2316 | <http://www.regulatoryridge.com>

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Workman, Paul

From: ERIKA <erikamonty@hotmail.com>
Sent: Monday, March 05, 2018 10:00 PM
To: Workman, Paul
Cc: Waid, Mike; Diak, John; Holland, Amy; Lewis, Debbie; Martin, Josh; Rivero, Joshua; Williams, Renee; Fussa, John; Rogers, Jason; Matthews, Bryce; Jeff Aelmore
Subject: Project Parker Homestead AMD1 - UbSR Indoor Archery & Gun Range Project #Z18-004

Good Evening,

I had an opportunity to review the documents for the Freedom Gun Range project from 2013. The Parker Records label it as Project #SP12-005 / 8036. I can see that the city of Parker, Town Council and Planning Commission have an established history of approving an indoor gun range to an industrial site location. I enthusiastically agree that an indoor gun range should solely be located on an industrial site as previously approved.

I hope you will continue with your set precedent during the review process for the ongoing Use by Special Review Project ("USBR") #Z18-004. The site for the proposed location in the open USBR is zoned "Mixed-Use Neighborhood Center." **As such, it is clear that the USBR should be denied by the Town Council and Planning Commission as it does not meet the zoning criteria of "Industrial" which was already established under Project #SP12-005/8036.**

Thank you for your review,

Erika Aelmore
Concerned resident and Parent

Workman, Paul

From: Chris Jackson <chris@madisonprops.com>
Sent: Monday, March 05, 2018 8:25 PM
To: elected@parkeroine.org; pmatthews@parkeronline.org; Workman, Paul
Subject: Shooting Range - Parker Homestead

Hello,

I am writing to express my concerns for the proposed shooting range near the Homestead community. As you know the proposed location is near a church, park, school and established neighborhoods. I have no issues with gun ranges and gun education, however the location is completely inappropriate and irresponsible. I have lived in Parker for over 15 years and if this is approved it will be heartbreaking! Parker stands for community, family, values; I strongly request that you deny this request/proposal! Also, please consider that a shooting range is subject to a "Special Use" permit, it must meet certain enumerated criteria for the Back40 application to be approved. It appears that building a shooting range in this particular location could violate the following three criteria: Criteria 1: Will be in harmony and compatible with the character of the surrounding areas and neighborhood. Criteria 7: Will not cause significant air, water or noise pollution. Criteria 9: Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the Town.

Thank you,

Chris Jackson

--

Chris Jackson
Managing Broker/Partner
Madison & Company Properties
Cell - 720-365-3707
Office - 303-771-3850
chris@madisonprops.com
www.jaxgroupRE.com

Workman, Paul

From: Michelle Jackson <micnic75@gmail.com>
Sent: Monday, March 05, 2018 8:18 PM
To: Matthews, Bryce; Workman, Paul; Mayor, Council, and TA
Cc: Chris Jackson
Subject: Shooting Range - Homestead Community

Hello,

I am writing to express my concerns for the proposed shooting range near the Homestead community. As you know the proposed location is near a church, park, school and established neighborhoods. I have no issues with gun ranges and gun education, however the location is completely inappropriate and irresponsible. I have lived in Parker for over 15 years and if this is approved it will be heartbreaking! Parker stands for community, family, values; I strongly request that you deny this request/proposal! Also, please consider that a shooting range is subject to a "Special Use" permit, it must meet certain enumerated criteria for the Back40 application to be approved. It appears that building a shooting range in this particular location could violate the following three criteria: Criteria 1: Will be in harmony and compatible with the character of the surrounding areas and neighborhood. Criteria 7: Will not cause significant air, water or noise pollution. Criteria 9: Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the Town.

Thank you,

Michelle Jackson

Workman, Paul

From: Jeff Aelmore <jeffaelmore@hotmail.com>
Sent: Sunday, March 04, 2018 9:52 PM
To: Workman, Paul; Waid, Mike; Diak, John; Holland, Amy; Lewis, Debbie; Martin, Josh; Rivero, Joshua; Williams, Renee; ICE - Erika Aelmore
Subject: Concerns on Project Parker Homestead AMD1 - UBSR Indoor Archery & Gun Range Project #Z18-004

Mr. Workman, Mr. Waid, and City Council of Parker,

As you evaluate the above request for Use By Special Review, I ask that you please deny as a result of the projects failure to meet the nine criteria for approval. Specifically, I write today to raise a documented concern for denial of Criteria 9.

(9) Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the Town.

This project will be detrimental to the health, safety and welfare of the present and future inhabitants of this town. I draw to your attention the below document from the Colorado Department of Health which highlights the health concerns regarding the exposure to lead in indoor shooting and firing ranges:

<https://drive.google.com/file/d/1Lj8sI5ZOdzmgadoPj21uDGCnIBhqhy8u/view>

<https://www.colorado.gov/pacific/cdphe/lead-working-with-or-around>

The communication from the health department of Colorado clearly details that lead poison from indoor shooting ranges is detrimental to the health, safety and welfare to those exposed to the poison. This alone warrants denial of the project as it does not meet criteria 9.

The Project proposes 'mitigating' this known detrimental health hazard by venting the poisonous air externally and exposing the residential neighborhood in addition to those inside the building. The fact that poisonous air must be vented evidences the project does not meet criteria 9 and is clearly hazardous to health. Further, this is clearly detrimental to the health of residents living near an indoor gun range and should be clear cause to deny this site for the proposed indoor shooting/firing range.

This type of project clearly should be limited to industrial zones within Parker which are intended to house businesses producing and venting poisonous air which is a health hazard to a residential community. Please deny the application and recommend this project be moved to an industrial zone within Parker.

Sincerely,

Jeff Aelmore
Newlin Meadows - Parker, CO

Workman, Paul

From: ERIKA <erikamonty@hotmail.com>
Sent: Sunday, March 04, 2018 9:30 PM
To: Workman, Paul; Waid, Mike; Diak, John; Holland, Amy; Lewis, Debbie; Martin, Josh; Rivero, Joshua; Williams, Renee
Cc: Jeff Aelmore
Subject: Concerned Parent - Parker Homestead AMD1 - Project #Z18-004

To Mayor Waid, the members of the Parker Town Council and Planning Commission,

I went to the Parker Website and found verbiage under the Vision, Mission and strategic plan. The statement was titled: "Promote a Safe and Healthy Community." I enjoyed reading it. It made me glad that I chose Parker as my home. I wanted a place for my family where we could walk out the garage with our bikes and stroller and walk down the street with no concerns. I've enjoyed that for 3 years. Now, I am afraid. I am afraid of the large "what-ifs" the Back 40 Gun Range is proposing.

I'm afraid of what we will be inhaling. They have no way to guarantee the safety of the residents, students and families outside of its doors. They have provided no details on how they plan to accomplish the safety of those INSIDE the facility. In the remainder of my letter all quotes taken directly from Parker's statement are in "quotes".

I want to clarify. I understand that training is critical to gun ownership. Too often gun owners do not know how to properly handle and store their weapons. I am a proponent of the BeSMART gun storage program. I think Parker should promote this program. I am a proponent of required training with all firearm purchases.

By allowing this gun range to be so close to residences, school property and serve as a flagship business for this commercial development, Parker is contradicting their own statements to protect the safety of its residents. Firearms will be sold and rented here. Will automatic weapons be allowed? I understand that at other facilities there are no background checks on rented weapons. "Having a Hometown feel means that our community looks out for one another as neighbors". "We support a stable and connected community by ensuring the safety and well-being of our residents". Currently neighbors are looking out for each other. We are working together to have this project denied in this location. Will the planning commission and Council look out for us?

I want to know how the Douglas County School District Security and Safety Directors plan to keep our students safe at the adjacent Echo Park Stadium. Actually, it is more than students. It is families, children, siblings that also attend events at Echo Park stadium. I have contacted them separately. The letter from the Douglas County School District stated that the project should be *"in harmony with the surrounding area."* This is a quiet part of Parker. Well, except for Friday nights during football season, but I love that sound! I think it is the harmony that we currently have that lead the BeeHive Assisted Living Facility to choose this location. At the developer's meeting this past Wednesday the Back 40 owner failed

to realize that Echo Park Stadium belonged to the district. He himself said he would not build by a school. Echo Park stadium is the location of high school graduations and youth gatherings – they should not be terrified by surrounding gun sounds, visions of folks transporting firearms in adjacent parking lots, and inhaling the fumes of the vented lead coming from the adjacent building.

The development mentions a convenience store. I would love being able to send my children to this store, when they're much older, for ice cream and drinks. My husband and I enjoyed doing that as youth ourselves. But with a gun range nearby and those possessing firearms in the parking lot, it is out of the question. Will the high-schoolers who attend events at Echo Park feel the same way? Will the surrounding businesses fail for this reason? Parker's statement says they will provide "vibrant pedestrian friendly activity zones". A gun range will negate that statement.

If Parker is going to take a "proactive focus" to protect residents, then you need to deny this gun range at this residential and school-friendly location. There are more locations off of Parker Road that are more suitable for this type of project. I applaud the town of Parker for establishing specific zoning needs and this project clearly needs to be moved to an Industrial zone of Parker due to the above factors. Has the planning commission provided you data for the "risk mitigation" that is a "top priority" for you? What are the statistics that you will review in regards to robbery, homicide and suicide for gun ranges? Are you willing to be the council that liked the odds and approved this location? Per the Safe wise article that named Parker one of the safest cities in Colorado *"a commitment to citizens' well-being"* is how we were able to achieve that honor. Please commit to me, the residents of Homestead, Heirloom and surrounding neighborhoods that you will "look out for" us.

Thank you for your time and review of this matter,

Erika Aelmore

Concerned Resident and Parent of Parker

Workman, Paul

From: Courtney Alberty <courtney_alberty@yahoo.com>
Sent: Sunday, March 04, 2018 6:48 PM
To: Workman, Paul
Subject: I am a citizen of Parker

Good evening~

I am writing to voice my concern about a proposed gun range near the Echo Park stadium in west Parker. I actually think a gun range is a great idea for Parker. However, this location is not good for it. The gun range is intending to sell guns. I do not believe guns should be sold so close to where high school students play athletics and graduate. My neighbors and I do not want this here. They cannot promise us that there will be no sound from the guns. They said it will be minimal. There are other commercial businesses that would be much better for this areas. Thank you for your time.

Sincerely,
Courtney Alberty

Workman, Paul

From: Jennifer Terrill <jterrill620@gmail.com>
Sent: Sunday, March 04, 2018 7:45 AM
To: Workman, Paul
Cc: Matthews, Bryce; Fussa, John
Subject: Proposed Indoor Gun Range - Does not meet Special Use Criteria
Attachments: Letter to Planning Committee.docx

Follow Up Flag: Follow up
Flag Status: Completed

Dear Planning Committee,

I have previously written about my concerns regarding the proposed indoor gun range; however, my letters to you were early on when I did not know much about the issue. After doing extensive research, going to the developer's meeting, gathering with neighbors to discuss and especially after seeing the Project Narrative from Back 40 to the Planning Committee, I have some points I would like to touch on for consideration to your decision on the location. I would appreciate you taking the time to read this all of the way through before you make this very important decision. I would like to specifically use points that Back 40 made to the Planning Committee, using their own words. I have attached the word document of this letter if that is easier to read.

1) Potential for Noise Pollution/Appeal to Residents

"Integrate different land uses and varied building types to create vibrant pedestrian friendly activity zones and to establish development patterns (and options) for future phase development."

"Provide variety in housing, shopping, recreation and transportation to appeal to residents and visitors in different stages of their lives and at different socio-economic levels."

- Within this section, Back 40 states that the location is on a site that is "truly buffered". This is not at all correct. Anyone who has been to this area, knows that the building will sit at the top of a hill with no trees or buffers to the homes directly behind it or surrounding it. I know that because I look at the top of the hill every day from my back patio. Below is a picture looking out of my patio door from INSIDE my house and this photo is not zoomed in. The landscape looks exactly the same to the neighborhood northwest of the hill (Heirloom). In fact, in that direction, there is an unfinished sidewalk that will be completed to eventually enter into the new commercial development and that is literally the only thing there. ***"It is nice to know we have incredible buffers."*** They are flat out lying. How can that statement even be taken seriously? This site doesn't even have the capability to add "incredible buffers" with the way the land is and the proximity to the homes. To be honest, even if there were 1,000 trees from the top of that hill to the bottom of my fence, with being 180 feet away, I do not even believe that would help. There is no way to solve this nonexistent buffering.
- At the developer meeting, a police officer (who lives in Heirloom, the neighborhood that's even further away) spoke and stated that he has been to "hundreds" of gun ranges, both in and out of Colorado and stated "you can hear gun noise outside at all of these facilities." He also stated "I hear enough gun shots every day at my job, I do not want to hear anymore at my own home." How does this appeal to our residents? This is how we are going to treat our law enforcement and/or our veterans with PTSD?

Finally, they state "sound is comparable to the level of sound produced by car doors and trunks being shut."

- The sounds of a car door slamming. Now, we know there will be 14 lanes of various gun firing with shots over and over. Therefore, imagine 14 car doors slamming over and over, 12 hours a day and 7 days per week. That can hardly be compared to the occasional car door slamming. When we called this out to the developer, he didn't have a response. That concerned everyone.

Photos referenced:





2) Criteria for Approval

- (1) Will be in harmony and compatible with the character of the surrounding areas and neighborhood
 - a. With the outcry of help from neighbors to stop building in this location, you cannot argue compatibility with the neighborhoods. As you already know, various concerns of property values, noise level, lead pollution and safety have all been raised. If this establishment was within the harmony and compatibility with our surrounding neighborhoods, people would not be opposed to it and trying everything they can get it denied. I do not care how "attractive" the building is. At the end of the day, its still a gun range and that does not change these concerns
- (2) Will be consistent with the Master Plan
 - a. "Excellent traffic circulation" will not be met. One of two main entrances and exits are via Pelican, which is a small residential road leading into the Parker Homestead subdivision. It is a tight squeeze to even turn left onto Pelican for an SUV or truck. Increased traffic on this road will increase the danger to our children who have a bus stop at the end of this road, cause damage to our landscape that we pay for through our HOA and will bring an extreme increase in car lights, noise, and congestion. It is a very poor plan for traffic. It is my belief that many people will exit the commercial site via Pelican because of the ability to turn left back onto Chambers at the stop light on Double Angel. If you leave via the "main" Chambers exit, you can only go right towards Hess with no place to U-turn.
- (3) Criteria 4: Will not have a material adverse effect on community capital improvement
 - a. What I want to point out here is the master developer contributing over \$1.8 million to the Town of Parker for widening Chambers, etc. Many people believe that has a factor as to why the developer is proposing establishments that are of special use not wanted by the local residents. It feels and sounds like bribery, in my and others opinions. How does that give anyone confidence in the city if the Planning Committee approves this?
- (4) Criteria 7: Will not cause significant air, water or noise pollution
 - a. That was discussed in the beginning of this letter in regards to noise.

(5) Criteria 9: Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the Town

- a. Douglas County may be in great need of more training and educational clubs related to the shooting sport. However, it is not needed in the middle of the neighborhood. You cannot say that Chambers and Double Angel will be a better footprint than some of the other commercial sites available within the City of Parker that I have seen. There is plenty of land in the business areas of the city. Just one example is next to Flat Acre Farms in Parker that even offers airsoft. That seems like a better location, right off of Parker Rd amongst popular shopping centers and restaurants and would be similar clientele to the airsoft activities. That is just one example of a better location for this type of business.
- b. Welfare: Residents are concerned about the ATF's warnings of increased crime in smash and grabs at indoor gun ranges as well as recent incidents in Centennial. Property values decrease a nationwide average of 3.7% when a gun range (indoor or out) is located near homes. Noise pollution. There are so many issues being raised that Back 40 cannot erase. These items would cause extreme detriment to the welfare of our residents
- c. One more item I would like to bring up about property values. A home in Parker Homestead went under contract before anyone knew about the gun range. When the news alerted people to this proposal, our neighbor expressed concern about his buyer backing out of the deal. A few days later, the buyer backed out of the contract right before closing and now the home is back up for sale. We were told that the realtor mentioned the potential buyers backed out because they did not want to live near a gun range. A realtor that lives in our neighborhood was showing homes to a family in nearby Stepping Stone. They refused to look at homes in Heirloom and Parker Homestead stating "Thank God we don't live there." If this is happening BEFORE the range is even approved, what is going to happen once it is? Those of us that need to sell our homes for unexpected job loss, job transfers, etc. could potentially be in devastating financial positions not able to sell our homes or taking loss. Residents that do not want to live near a gun range, cannot afford to move if it comes in. This does NOT speak to the welfare of our residents.

I understand this is a long email; however, this is my home, my family, my livelihood and I feel I deserve the time for someone to read it. I do appreciate your time in considering these factors. Back 40 violates MANY of these criteria points, not just one. To approve it beyond the stage its in now would be hard to defend. I urge you to deny the current location. The owner of Back 40 may say this has been years in the making and his livelihood, but so is it of those of us living in the homes nearby. The difference is, he can put his gun range in another location within Parker that is more appropriate. We cannot move our current homes to another site.

Thank you,

Jennifer Terrill

15141 Auklet St

Parker, CO 80134

Workman, Paul

From: Amy Camp <amygriff@yahoo.com>
Sent: Saturday, March 03, 2018 9:11 PM
To: Matthews, Bryce; Workman, Paul; Mayor, Council, and TA; Waid, Mike; Maloney, Jim; Fussa, John
Subject: Proposed Indoor Archery and Gun Range

Follow Up Flag: Follow up
Flag Status: Completed

Mr. Mayor Mike Waid, Mr. Bryce Matthews, Mr. Paul Workman, and the Town Council of Parker,

I am writing express my extreme opposition for the proposed indoor gun range at Chambers Road and Double Angel Road. As a resident in this area, I am struggling to find a reason why this is a good idea for this community. This type of business only brings major concerns to this area. Outlined below is my list of concerns. I hope that you will truly consider these concerns and say no to the proposed plan for the Back 40 gun range in this area.

Environmental Concerns- I am extremely concerned about the environmental effects a gun will have on our community. Gun Ranges can leave behind a lot of toxic lead behind from the ammunition. I understand that the building will include an HVAC system to help with the air of the interior of the building. However, I would like to know how will they dispose of the ammunition and other debris? How will they dispose of the filters? And what plan do they have in place for when the HVAC system fails or the power is out in the area? What effect will this have on the land, air and water in the area? There is water storage nearby as well as retention ponds and a reservoir. These areas are home to many different animals, I saw a blue herring on our neighbor's roof last year, we have an owl as a frequent visitor to our roof, and the nearby church had a nest of baby hawks in the summer of 2016. We do not need toxic levels of lead polluting our air, land and water for our citizens and wildlife. I also worry about the air quality after the lead is pushed out of that building. There are homes that are 180 FEET from this residence, we cannot afford to have lead leaking out into our area. Please see the following links for more information about the toxic dangers of gun ranges. ([Outdoor Gun Ranges Produce 80,000 Tons of Toxic Pollution a Year](#)) ([Take Aim at Protecting Yourself](#) | [Blogs](#) | [CDC](#))



Take Aim at Protecting Yourself | | Blogs | CDC

CDC - Blogs - NIOSH Science Blog – Take Aim at Protecting Yourself



at will be brought to the area, not only by the HVAC system that will be constantly humming, but also by the sound of gun shots. I will be living with this on a regular basis. The constant humming, along with the sound of gun shots, muffled or not, is not something any of us would like to hear on a regular basis. These sounds, the developer has said, will be muffled by the surrounding areas (i.e. low-lying retention ponds). Living in this area, I can tell you the areas listed in their statement are low lying areas. The retention ponds will not muffle the sound to my house or any of the other houses near my home. Currently we all can hear the sounds of the football games on the weekend and the some evenings. These are sounds that my family enjoys and loves to hear. They are the sounds of our community coming together. I will be honest the all day band competition can be a bit much. However, the constant humming that will come from this building and the sound of muffled gun shots is not something I want to get used to hearing. I do not, nor do I want my child, or students at the football stadium to begin to normalize the sounds of gun shots.

Increased Crime Rates- Another major concern is the increased possibility of crime. We have all seen on the news the stories of gun shops being victims of burglaries and theft. I remember recently the gun shop on Parker and Main falling victim to a "smash and grab". Just this week an air soft rifle was stolen from a local sporting goods store, I understand that is not a "real" gun, however it is related to a gun and can be made to look like a real gun. This facility, no matter how "safe" will be have vulnerabilities that thieves will find and take advantage. Even if this place has "top of the line" a security system, over time criminals will find a way in. It will need to be updated and how can we guarantee that will happen or will happen again when new owners come in and decide to take short cuts. Please see the attached article that states in 2016, there was a 51 percent increase in gun thefts from federally licensed gun dealers in the US. That is scary. Imagine this facility falls victim to a crime, the area is very closely surrounded by houses and a high school stadium. I can only imagine what could happen. Even if cops arrive quickly, were will the thieves run, hide, and who else will become their victims? This puts our neighborhoods and school children at risk. The closest home is only 180 FEET from this building.

[Solving gun store burglaries has become a top ATF priority in Colorado](#)



Solving gun store burglaries has become a top ATF priority in Colorado

Dragon Man Mel Bernstein believed his store — stocked with thousands of guns, including 200 machine guns — was ...

Property Values- I watch our property values closely here in Parker. I am concerned how our property values will be effected by this business. I believe there will be numerous businesses that do not want to be in the area of the gun range, for fear of crime and because they know customers will also be avoiding the area because of the gun range. I will be avoiding the area as a consumer if this proposed business is approved and so will many of my neighbors. The housing properties will also be effected. It has been stated that **housing properties go down on average of 3.7% nationwide near a gun store**. No one in Parker would like this to happen to their property. I doubt the rest of the commercial area will have as many businesses willing to go next to a gun range for the same reasons listed in this letter.

Nearby Community- The area surrounding this proposed gun range is filled with homes, families, and children. The area just to the south of the proposed site is a very active high school stadium, regularly filled with adolescence. The stadium holds many different sporting events, band competitions, graduations and proms. I am concerned about theft, gun accidents, and, sadly I must mention, school shootings. Having an increased amount of guns in and out of the facility and an area filled with families and adolescence only increases the chances of an accidental shooting. I fully understand that the patrons of this facility will, hopefully, be careful and safe and that part of the purpose of this facility is to educate people on gun safety. However, accidents happen. They happen to the most careful and highly trained people, I believe we have all seen the video of the cop who shoots himself while showing a classroom of students his gun. Accidents also happen to those that have not yet been trained, or to those that don't think they need to be trained, etc. The surrounding areas do not seem like an area we need to increase the number of guns. I understand that businesses serving alcohol are not allowed within 500 feet of school district property, shouldn't we also have the same cautions in place for guns and gun sales?

I do believe that the proposed gun range by Back 40 does NOT meet the requirements and criteria set up by the Town of Parker to use this area. This business WILL cause significant air, water, and noise pollution. This business WILL be detrimental to the health, safety and welfare of our community both now and in the future. I do not believe this facility should be near our homes nor near a school district facility. Please think carefully about this proposal, our concerns, and say no to this proposed business location.

Thank you for your time and attention to these concerns,

Amy Camp
Parker Resident

Workman, Paul

From: Lameier, Brandon, Mr, DCAA <Brandon.Lameier@dcaa.mil>
Sent: Friday, March 02, 2018 12:10 PM
To: Workman, Paul
Subject: Heirloom Home Owner in Opposition to the Back 40 Range

Mr. Paul Workman,

Hello, my name is Brandon Lameier, and I reside at 11554 Owensboro St. Parker, CO. 80134 in the Heirloom neighborhood. I am writing to you as a concerned citizen.

I am opposed to the new indoor shooting range (Back 40 Range) proposed for Parker Homestead at the corner of Chambers and Double Angels Field. DO NOT approve this shooting range. DO NOT issue a special use permit for the proposed shooting range. Building a shooting range in this location will violate the following special permit criteria:

Criteria 1. Will be in harmony and compatible with the character of the surround area and neighborhood. Putting a shooting range in the immediate vicinity of quiet neighborhoods, a church, two schools, and youth sporting facilities is a horrible idea and in violation of this criteria.

Criteria 7. Will not cause significant air, water or noise pollution. Even an indoor range is noisy not to mention the very real potential of lead getting into the local water supply and the additional light pollution.

Criteria 9. Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the Town. Having the range in this location (in my back yard) will cause angst and anxiety for both homeowners and parents alike. Several studies have found close proximity of shooting ranges to neighborhoods bring down home values and property taxes. I've listed several links below.

Overall, I am opposed the Back 40 Range being built in this location. It would be better to build it in an industrial or commercial section of Parker, like along Twenty Mile or Dransfield. DO NOT allow this shooting range to be built in the immediate vicinity of quiet neighborhoods, a church, a school, and youth sporting facilities . DO NOT allow this shooting range to be built in my back yard!

Thank you,

Brandon Lameier
Auditor, Team E
Colorado Springs Branch Office
Defense Contract Audit Agency
Littleton, CO 80124
(303) 969-5000 Ext. 246

Study Links:

<https://www.realtor.com/news/trends/things-that-affect-your-property-value/>

<https://pocketsense.com/property-impacted-presence-gun-clubs-7464580.html>

<http://www.bridgton.com/waterford-gun-club-noise-hurts-property-values-county-rules/>

<http://www.vpc.org/studies/leadthre.htm>

Workman, Paul

From: Jake <jacobhpratt@gmail.com>
Sent: Friday, March 02, 2018 9:17 AM
To: Matthews, Bryce; Workman, Paul; Mayor, Council, and TA
Subject: Parker Gun Range Support

Good morning,

My wife and I just moved to Parker in December and the gun range that is being planned at Chambers and Double Angel would be right around the corner from our new house. I wanted to take a minute to let you know we both support having it there and we think most of the concerns raised in opposition are either desperate attempts to prevent anything gun-related from existing, or are from people who purchased a home knowing it backed to future commercial development and are now trying to stave off the inevitable hit to their property value.

Please let me know if I can provide any further information.

Regards,

Jacob Pratt

Workman, Paul

From: Kathryn Freudenberg <katiefreud@gmail.com>
Sent: Thursday, March 01, 2018 10:51 AM
To: Matthews, Bryce; Workman, Paul; Mayor, Council, and TA
Subject: Against the Shooting Range in Parker Homestead

Bryce, Paul & Members of the City Council,

I am writing to express my feelings against the purposed shooting range. While a shooting range in Parker is just fine with me this is not the location for it.

I have many concerns but my main ones are:

- 1) Noise
- 2) Increase in crime
- 3) Pollution
- 4) Declining property values.

We did not pay half a million dollars to move to Parker to deal with the above.

Not to mention I do not believe that this shooting range meets the criteria for the Back40 approval process because building a shooting range in this particular location could violate the following three criteria:
Criteria 1: Will be in harmony and compatible with the character of the surrounding areas and neighborhood.
Criteria 7: Will not cause significant air, water or noise pollution. Criteria 9: Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the Town.

Thank you for your time and looking out for our city.

Ross and Katie Gompert
Heirloom Residents

Workman, Paul

From: Brad Stamulis <bradstamulis@yahoo.com>
Sent: Thursday, March 01, 2018 8:38 AM
To: Matthews, Bryce; Workman, Paul; Mayor, Council, and TA
Cc: Jen Stamulis
Subject: Back 40 Application Concerns from Heirloom Resident

Paul & Bryce,

We apologize for not being to attend the meeting regarding the Back40 application last night. We appreciate the opportunity to be included and are in favor of the gas station and convenience it affords us (as there isn't one nearby currently).

That said, my wife and I are strongly in OPPOSITION to the GUN RANGE.

This violates several criteria including, "harmony and compatibility with the character of the surrounding area and neighborhood" as well our personal association and proximity to recreational gun usage. I would be opposed to this in any normal time period, but even more so lately in light of our country's ludicrous gun laws and inability to adapt to the effect it's having on our society. It's simply not something I want our children (we have 2 who live with us in this neighborhood) to be around or have to deal with anymore than is necessary. With so much wide open space near Hess and to the south of us I have no idea why anyone would even propose putting one directly next to schools, playgrounds and peaceful neighborhoods. Parker can do better than that.

Regards,

Brad & Jen Stamulis - 14747 Estonian Ave, Parker CO 80134

Workman, Paul

From: Terry Terrill <cobadger2010@yahoo.com>
Sent: Wednesday, February 28, 2018 10:28 AM
To: Waid, Mike; Workman, Paul
Subject: Back 40 Gun Range Proposal

Dear Mayor and Members of the City Council,

I am writing in response to the Back 40 Indoor Gun Range proposal. I recently heard about this proposal via a letter provided to my son/daughter-in-law and their neighbors in the Parker Homestead/Heirloom Subdivisions. My son's house is one of three homes on Auklet Street (Homestead Subdivision) that is nearest to the proposed gun range. Their backyard fence would literally be 150-200 feet from this gun range. This distance/location causes me concerns especially for my son and his family as well as for the other residents in these two subdivisions.

I fully understand this land is privately owned but the City of Parker has final approval over whether this type of business is appropriate for this location, just like the City of Parker leaders can decide if a liquor store or a marijuana business is appropriate and meets the standards set forth by the City in regards to location. My son/daughter-in-law moved to Parker from Centennial last year. They researched Lennar and other builders and felt the Homestead subdivision met their needs for a home in which to start a family. They also were fully aware the area near Chambers Road and Double Angel would some day be commercially developed but not in their wildest dreams did they ever think a gun range would be built on this land so close to them. If so, I can honestly say they never would have selected either the Homestead or Heirloom subdivisions.

I also want you to know that I am not opposed to small business growth in the City of Parker. My wife and I go out of our way to support local businesses. We simply oppose having a gun range so close to family homes. I also am not opposed to indoor or outdoor shooting ranges. In fact, I have been to both, but the indoor range was located in a more industrial area of the city (at least not near homes/apartments) and the outdoor ranges were a great distance from buildings or other places where individual safety would be in jeopardy.

I am sure as part of his application to the City of Parker, Rion Buswell will share the steps being taken to keep nearby residents safe as well as the noise to a minimum. These will be the same steps other businesses including the Centennial Gun Club, Cabelas, DCF Guns in Castle Rock and a gun store owner in Parker took. These measures weren't totally successful as their businesses were broken into and guns stolen. The ATF has made gun store and gun range burglaries their top priority as the number of gun thefts has more than doubled in the past couple of years. How should my son/daughter-in-law/15 month old grandson and their neighbors feel knowing this gun range business is a stone's throw from their homes? I'm sure Rion Buswell's reassurances for public safety will fall upon deaf ears when it comes to the residents of the Homestead/Heirloom subdivisions.

My wife and I live in the Stroh Ranch neighborhood and are fully aware of the contentiousness of the Dominion affordable housing project. We probably were in the minority when it came to supporting such housing. As City of Parker leaders, you had to listen and make a decision based upon the merits of the proposal. On the flip side, we're also aware the City of Parker is opposed and suing Douglas County over a proposed Recycling facility. I believe your opposition was based upon the impact of noise to local homeowners, truck traffic (safety), increase in rodent population, etc. I would find your actions contradictory and concerning if you opposed the Recycling project but approved the Indoor Gun Range project when the concerns and impacts are similar.

In closing, I know the City of Parker leaders will take into careful consideration the overall impact such a business will have on the Homestead/Heirloom residents. Impacts include safety concerns, noise levels, property values, etc. I strongly urge you to reject Rion Buswell's application for this particular site and to assist Rion in finding another appropriate location in Parker to build this indoor gun range.

Sincerely,

Terry Terrill
18961 E. Clear Creek Ave.
Parker, CO 80134

Workman, Paul

From: Jeff Aelmore <jeffaelmore@hotmail.com>
Sent: Wednesday, February 28, 2018 9:47 AM
To: ERIKA
Cc: Workman, Paul; Waid, Mike; Diak, John; Holland, Amy; Lewis, Debbie; Martin, Josh; Rivero, Joshua; Williams, Renee
Subject: Concerns on Project Parker Homestead AMD1 - UbSR Indoor Archery & Gun Range Project #Z18-004

Follow Up Flag: Follow up
Flag Status: Completed

Mr. Paul Workman, Mr. Mike Waid, and city council of Parker:

pworkman@parkeronline.org, mwaid@parkeronline.org, jdiak@parkeronline.org, aholland@parkeronline.org, deblewis@parkeronline.org, jmartin@parkeronline.org, jrivero@parkeronline.org, rwilliams@parkeronline.org

RE: Project Parker Homestead AMD1 - UbSR Indoor Archery & Gun Range

Project #Z18-004

Communication #2 to Parker Government from concerned citizen.

Mr. Workman, Mr. Mike Waid and city council of Parker:

I am a close neighbor to the above proposed project, a Parker resident since 2015, and an avid member of the Parker community living here with our family of 4 and loving our city. I write with significant concerns regarding the aforementioned Project #Z18-004 AKA Parker Homestead AMD1 – UbSR Indoor Archery & Gun Range (henceforth referred to as “the Project” or “Project”). To ensure my concerns are raised in a timely manner, I will be filing my concerns on this project over a number of emails/communications to you and the appropriate authorities with Parker Government. To avoid confusion, I will limit my concerns to one main area in each of my communications so they can be easily tracked, fairly raised with the proposed developer, and available for Parker Government to track within the project file.

Outline of concern: The proposed development will have a material adverse impact on community capital improvement programs (Rueter-Hess Recreation Master Plan). Criterea #4 of Use by Special Review Approval criteria.

The Parker community has explored and engaged at great cost and opportunity to develop Rueter-Hess Reservoir with our surrounding communities. The significant efforts and undertakings have resulted in a community improvement program in the form of the Reutter Hess Master Plan. Per communications from the city of Parker “Ultimately, the goal of the Rueter-Hess Recreation Master Plan is to develop a range of recreational opportunities in and around the reservoir, while safeguarding the quality of water in the reservoir and preserving the natural environment of the site. The Rueter-Hess Recreation Authority received great input from the public, which has been taken into account in the development of the newly completed Rueter-Hess Recreation Master Plan.” As part of that master plan, the city has proposed the development of a specific use of “archery” which appears to be a main line of business of the Project. Further, the Rueter-Hess Recreation Master Plan calls for the payment of the significant capital improvement project by Fee Stations and likely significant public investment.

Conclusion:

Noting the above facts, the Project does not meet decision criteria #4 of Use by Special Review. The Project, through the willful front-running of a material capital improvement project by the community of Parker, will have a material adverse impact on a capital improvement program. The approval of this Project will have severe adverse effects on the Rueter-Hess Recreation Master Plan and should not be approved.

Source Documentation for reference and above quotes:

- <https://www.pwsd.org/2193/Rueter-Hess-Reservoir>
- <http://co-parkerwsd.civicplus.com/2283/RHR-Recreation-Master-Plan---January-201>
- <http://co-parkerwsd.civicplus.com/DocumentCenter/View/1177>

Thank you for your attention to this significant matter,
Jeff Aelmore

Workman, Paul

From: pam <psbott@gmail.com>
Sent: Tuesday, February 27, 2018 7:48 PM
To: Workman, Paul
Subject: support new business but not indoor shooting range next to neighborhood,schools and churches

Follow Up Flag: Flag for follow up
Flag Status: Completed

Hello Mr. Workman,

We live in Horse Creek. We support new developments, especially commercial building such as gas stations, hair salons, medical buildings,etc, but not an indoor shooting range. We are family neighborhoods among schools and churches. Isn't there another space where the indoor shooting range can be built that is more segregated from our community? It is not about the noise, it is about the fact that people carrying guns will be in/out of their cars visiting this facility. It is the idea that our family neighborhood has a facility to practice shooting guns and that does not fit in the scenario of a family neighborhood.

Please can you not include this business in our neighborhood and find another suitable location for the business?

Thank you.

Pam Bottoms
Horse Creek

Workman, Paul

From: Dan <dterill619@gmail.com>
Sent: Tuesday, February 27, 2018 12:51 PM
To: Workman, Paul
Subject: Re: Proposed Indoor Gun Range & Commercial Development

Follow Up Flag: Flag for follow up
Flag Status: Completed

Hi Paul,

Thank you for the feedback on the proposal. Since my initial email to you, I have done much more research. I have a better understanding of the proposal and what hurdles it must meet to be considered an appropriate use of that land.

We received the letter and I, along with many other neighbors, plan to attend the meeting with the developer tomorrow to voice our concerns. As you may have seen, the news stations have been contacted and interviewed one of my fellow neighbors (who shares many of the same thoughts my family does). I personally have written to the Mayor and city council; although, I know they can't engage in discussion outside of the formal process.

The proposed facility clearly does not meet the criteria listed in the special review section, but we understand the need for the review to take place.

It is my sincere hope that you, along with any other officials making the decision, verify the information presented by the developer. For example, in their narrative associated with the application, the developer states "the project is also unique in that it is located on a site that is truly buffered on all side from residential users." Followed by the distance of 180 feet (60 yards). The proposed site is the complete opposite of buffered, as evidenced by the below map. There are zero trees and the extremely close distance to homes makes this statement by the developer almost laughable. I truly hope that you visit the site in person to understand just how close this facility would be located to the homes.



Again, thank you for your time. I appreciate your understanding on what an impactful decision this will have on many families.

Dan

Workman, Paul

From: jason g <jasongradney@hotmail.com>
Sent: Monday, February 26, 2018 1:46 PM
To: Workman, Paul
Cc: Williams, Renee; Rivero, Joshua; Martin, Josh; Lewis, Debbie; Holland, Amy; Diak, John; Waid, Mike; Mayor, Council, and TA
Subject: Gun Range - Parker Homestead

Follow Up Flag: Follow up
Flag Status: Completed

Dear Paul Workman,

I am writing you today to voice my opposition to a pending proposal (Parker Homestead AMD1 - UbSR Indoor Archery & Gun Range) which is before you. This has been a main topic of discussion on our neighborhood Facebook group and many of the residents are opposed as well. I request that you give this proposal careful consideration and do not recommend moving it forward to the City Council.

I have several concerns for this "Use by Special Review" that I would like to address. I have listed out several criteria below:

1. Criteria 1 - Will be in harmony and compatible with the character of the surrounding areas and neighborhood:
 - a. Having a gun range immediately adjacent to a residential neighborhood is not consistent with the character of the area. Gun ranges are typically within industrial or commercial districts and not residential. All of the examples of gun ranges around the country provided in document titled "approval considerations" are not immediately adjacent to a large residential neighborhood. It is interesting that when the developer put this document together, they did not include a Colorado example. Is it because of the 7 gun ranges in the Denver area, the closest one is 900ft to the nearest single family home and are on average 1400 feet away. The proposed gun range would be 180ft from the nearest home.
2. Criteria 6 - Will not result in undue traffic congestion or traffic hazards:
 - a. The developer mentions they contributed money to the road widening but does not address the fact that having a gun range will draw a lot of traffic that would not normally be in the area. The next closest gun range is 12 and 13 miles away, one in Centennial and another in Castle Rock. This is approximately 25 miles in between the two gun ranges. This will draw people that do not live in the immediate area to this gun range which will cause an increase in traffic to not only Chambers but the main road (Pelican) leading into the Parker Homestead neighborhood. Based on the proposed plan, Pelican is the only entrance when traveling North on Chambers without making a U-turn on Chambers. The developer wants to use the main road into the subdivision as another entrance to this commercial property. This is concerning

due to the amount of small children in Parker Homestead as well as a school bus stop near the proposed entrance.

3. Criteria 7 - Will not cause significant air, water or noise pollution:
 - a. This is hard to tell without the range being actually built. There have been noise complaints from other facilities across the country and with the proximity to a residence, it is troubling to build first and hope there are no issues with noise.
4. Criteria 8 - Will be adequately landscaped, buffered and screened:
 - a. I doubt there is any degree of landscaping that will adequately buffer the shooting range due to the proximity to a residence.
5. Criteria 9 - Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the Town:
 - a. It is troubling to read articles regarding gun stores being at a higher risk of being robbed. The Colorado legislature is currently debating a bill that would impose stricter prison times for gun store thieves. This law was in response to the increase in gun store robberies over the past two years. The Castle Rock gun store and shooting range was actually one of the locations robbed in June of 2017. The first link will take you to a map at the bottom of the article which shows gun store robberies. I believe having a gun store and shooting range adjacent to a residential neighborhood is detrimental to the health, safety and welfare of the residents. I have attached several articles that illustrate this point.

<https://www.denverpost.com/2018/02/15/colorado-gun-store-burglary-bill/>

<https://www.denverpost.com/2017/10/09/colorado-gun-store-smash-grab-burglaries/>

<http://www.9news.com/mobile/article/news/crime/5000-reward-offered-in-colorado-gun-store-burglary/485498624>

I appreciate you taking the time to read my concerns with the proposed gun store and shooting range. This gun range is best kept in an industrial or strictly commercial district. There are plenty of other areas within Parker that would be better suited and would not encounter this level of resistance. If you have any questions or would like to discuss this with me, please email me so that we can arrange a time to discuss. I look forward to the ongoing discussions.

Thank you,
Jason Gradney
Parker resident

Workman, Paul

From: Dan <dterrill619@gmail.com>
Sent: Saturday, February 24, 2018 11:19 AM
To: Workman, Paul
Subject: Proposed Indoor Gun Range & Commercial Development

Follow Up Flag: Follow up
Flag Status: Completed

Hi Paul,

I was given your information as the case planner for the potential indoor gun range located near S Chambers Rd and

Double Angel Rd. My family and I live in one of the homes in the Parker Homestead community; our home directly backs up to the open space where the development would occur. I have some major concerns about the proposed plan, which I will detail below. I apologize for the lengthy email, but each point is important as a look at the proposal.

1. Having an indoor gun range within 100 yards of residential homes is completely unacceptable. There is no reason for a facility like this to be constructed this close to homes. If you look at any surrounding city, an indoor gun range is located in an industrial/commercial area with a much larger distance to the nearest home. This provides an adequate buffer for noise or any potential safety issues. Some examples I'd like you to look at include Centennial Gun Club, Firing Line, or Franktown Firearms.

Additionally, Echo Park stadium currently sits across the street from the proposed firing range. This facility hosts thousands of students a year for sporting events, band competitions, graduations, etc. It is my firm belief that this creates another meaningful reason not to build the proposed facility. Our kids should not be subject to this type of facility so close to the primary outdoor venue for the school district.

I myself am a gun owner, so it is not merely my stance on guns in general, but rather the placement of a potential firing range. Families, in their homes or walking on the sidewalks of the neighborhood, should not be exposed to this type of facility.

2. The proposed gas station does not have a separate entrance/exit point from Chambers Rd. The only entrance would be from Pelican St., which is a small, neighborhood street. There is no possible way this small entrance can handle the type of traffic, or size of tanker trucks, that would be part of a gas station.

In the past two years we have lived here, there has been some road work completed and each time those large trucks had issues making the tight turn on Pelican St. There is a median with landscaping that would be destroyed by large tanker trucks attempting to make this entrance.

If the gas station is to be built, there needs to be an entrance located off of Chambers Rd to allow large tanker trucks to enter into the commercial area without abusing our small neighborhood street.

According to the criterion used by Parker that you sent my wife, Jennifer, the plan as presented should not be approved. For the gun range, it specifically goes against:

1. Harmony and compatible with the character of the surrounding areas and neighborhood
2. Will not cause significant air, water, or noise pollution
3. Will not otherwise be detrimental to the health, safety, or welfare of the present or future inhabitants

The gas station using the neighborhood entrance as an access point goes against:

1. Harmony and compatible with the character of the surrounding areas and neighborhood
2. Will not result in undue traffic congestion or traffic hazards
2. Will not cause significant air, water, or noise pollution
3. Will not otherwise be detrimental to the health, safety, or welfare of the PRESENT or future inhabitants

Clearly, there are some major issues with the plan as presented. The gun range should not be approved in this location and there needs to be an additional entrance created for the gas station.

I appreciate your time reading this email and would appreciate if you could pass this along to anybody you deem necessary on the Parker committees that will be making the final decision.

Thank you,

Dan Terrill
303.748.9173
dterill619@gmail.com

Workman, Paul

From: Jennifer Terrill <jterrill620@gmail.com>
Sent: Friday, February 23, 2018 4:54 PM
To: Sietsema, Rosemary
Cc: Workman, Paul
Subject: Re: Parker Homestead Proposed Gun Range (CRM18-000190)

Follow Up Flag: Follow up
Flag Status: Completed

Thank you, Rosemary.

Paul,

There's already a discussion happening on our subdivisions private group on Facebook that want to contest this indoor gun range and I'd assume this will trickle into the Heirloom subdivision next door as people receive the notices on their doors tonight.

We are the most impacted because this gun range would back up right to our neighbors backyards (We are in the Parker Homestead Subdivision). We have safety and noise concerns and quite honestly, do not want this building put in our neighborhood. Not to mention that we are just a few blocks from an elementary school and this range will be right next to Echo Park Stadium where many Douglas county schools have games, events, and graduations with children all over. I think it's very controversial as well considering the current state of our country with school shootings, officer shootings, etc. We don't want people coming through our neighborhood (which by the way is the only entrance to this planned development) with guns. Even if the building "conforms" to noise ordinance's, there is no way those of us that have homes right behind this building will hear nothing. We already have to deal with stadium noise, now we have to put up with gun shots and tanker trucks coming through our neighborhood for the gas station? We would like to know how to contest this. We also aren't happy about the gas station and being the only entrance literally through our neighborhood but the bigger concern is this range that is still under review.

Thank you for listening to our concerns,

Jenn and Dan Terrill

Sent from my iPhone

On Feb 23, 2018, at 4:40 PM, Sietsema, Rosemary <rsietsema@parkeronline.org> wrote:

Hello,

Thank you for contacting the Town of Parker regarding the proposed indoor gun range at Parker Homestead.

You may contact the case Planner, Paul Workman at pworkman@parkeronline.org and at 303.805.3327 for detailed information on the proposal and to voice your concerns.

Best Regards,

Rosemary Sietsema
Community Development Executive Assistant

20120 E. Mainstreet
Parker, CO 80138-7335
303.841.2332
www.parkeronline.org

<image001.png>

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Workman, Paul

From: sathis ganapathy <sathis.ganapathy@gmail.com>
Sent: Friday, March 09, 2018 9:06 PM
To: Matthews, Bryce; Workman, Paul; Mayor, Council, and TA
Subject: Fwd: Back 40

Follow Up Flag: Follow up
Flag Status: Completed

Dear Messrs. Matthews and Workman,

I am writing to express my objection to the proposed location of the Back 40 Shooting Range, which as been designated as the intersection of Chambers Road and Double Angel Road (the "Location") in Parker. I am a resident of the Heirloom neighborhood, which is adjacent to the Location. I understand that development of a facility like Back 40 is subject to Use by Special Review, and the Town Council may only approve such projects if nine enumerated criteria are met. I, and many other Parker residents believe the development of Back 40 at the Location would violate all three of the following three criteria:

Criteria 1: Will be in harmony and compatible with the character of the surrounding areas and neighborhood.

Back 40 is in no way in harmony with, or compatible with, the character of the Location's surrounding area or neighborhood. The Location is directly across the street from The Church of Latter Day Saints, within blocks of multiple schools, one block from youth sporting facilities, and just beyond the backyards of several Heirloom and Parker Homestead residents.

- The Church of Latter Day Saints celebrates the Ten Commandments. See: <https://www.lds.org/topics/ten-commandments?lang=eng>. The sixth commandment reads, "Thou Shalt Not Kill". Guns, however, are designed to do exactly that.
- School shootings are an epidemic in this country, which you may recall sadly began here in Colorado with the "Columbine Killers". As a result, the idea of Back 40 selling guns and ammunition this close to schools and youth facilities is frightening to many local children and parents. Some of these individuals will be voicing this sentiment at the upcoming DCSD meeting.
- If Back 40 is built in the Location, it will undoubtedly detract from the "quiet enjoyment" that Heirloom and Parker Homestead residents have the right to experience in their own backyards. Thousands of people have moved to Parker's newly developed neighborhoods to create a better life for themselves and their families. Placing Back 40 in a residential versus commercial neighborhood severely threatens the peaceful lifestyle local residents have envisioned.

Criteria 7: Will not cause significant air, water or noise pollution.

Air and Water Pollution

- The U.S. Environmental Protection Agency does not certify or approve shooting ranges, range design or lead management practices. Rather, "scientists, engineers, attorneys, and other appropriate professionals must be called upon to make specific recommendations for individual range design and lead management". In attending the developer's meeting last week, it became apparent that neither the developer, builder nor owner of Back 40 have enlisted any scientists as it relates to studying lead as "an environmental, public and regulatory concern". See: https://www.epa.gov/sites/production/files/documents/epa_bmp.pdf.

- The meta analysis of 36 studies conducted between 1975 and 2016, published in the journal Environmental Health, examined the ways firing range patrons, employees and their families are exposed to lead. It found that individuals who patronize or work at gun ranges had blood lead levels from between two and eight times the level of exposure deemed cause for serious concern by the federal Centers for Disease Control and Prevention. The review's authors concluded that firing ranges, regardless of type and user classification, "currently constitute a significant and unmanaged public health problem." See: <https://ehjournal.biomedcentral.com/articles/10.1186/s12940-017-0246-0>.
- While the builder claimed during last week's meeting that Back 40 will have a "state of the art" air filtration system, he conceded that there will be no air quality gauge installed outside of the building to account for toxic air leakage. Likewise, there does not appear to be a plan in place to monitor for lead leaching. Notwithstanding the foregoing, exposure to lead is only mitigated, and not ceased, by good air and water filtration systems. In fact, workers at shooting ranges bring lead particles home on their skin and clothes. See: <https://www.atsdr.cdc.gov/PHS/PHS.asp?id=92&tid=22>.

Noise Pollution

- The discharge of firearms in an indoor firing range produces peak noise levels that exceed the occupational health limits. See: <https://blogs.cdc.gov/niosh-science-blog/2009/05/18/firingrange/>. Given this level of noise, gun shots within an indoor shooting range can be heard from the exterior of the building. Back 40 itself acknowledged this fact, and stated in its Project Narrative that "sound that emanates from the building will be muted and be comparable to the level of sound produced by car doors and trunks being shut and traffic on South Chambers Road". See: <https://lms.parkeronline.org/etrakit3/viewAttachment.aspx?Group=PROJECT&ActivityNo=Z18-004&key=PWOR%3a180125091358003>.
- I am curious to know how many shots are fired on a typical day at a shooting range, but I suspect it to be in the hundreds, if not thousands. Homeowners within earshot of hundreds or thousands of "car doors and trunks being shut" each day will most certainly be annoyed (at best) by the sound. This would particularly be the case in the early morning and late evening hours of Back 40's operation. Residents living near a Trussville, AL shooting range have repeatedly asserted this claim. See: <https://patch.com/alabama/trussville/noise-trussville-indoor-shooting-range-still-problem-despite-repeated-complaints>. Per Miriam-Webster, noise pollution is defined as "annoying or harmful noise...in an environment" (emphasis added). Therefore, the aforementioned noise emanating from Back 40 would by definition qualify as noise pollution.

Criteria 9: Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the town.

Health

- It is well established that suicides, accidental deaths and mass shootings have occurred within numerous shooting ranges across the country. Sirens from ambulances and fire trucks responding to any such incidents at the Location will most certainly add to the noise pollution highlighted above. It would also be a great distraction for those trying to worship in church and concentrate in school. Not to mention, witnessing the aftermath of a severe or even fatal injury could be traumatizing for onlookers in this residential area, thus compromising their mental health.

Safety

- It is also well established that facilities renting and/or selling firearms are often robbed or burgled. The Bureau of Alcohol, Tobacco, Firearms and Explosives has published statistics showing an alarming increase in such incidents since 2013. Specifically, robberies have increased 266.67%, and burglaries have increased 70.71%, during this time period. See: <https://www.atf.gov/firearms/federal-firearms-licensee-ffl-burglary-and->

robbery-statistics-calendar-years-2013-2017. Having a shooting range at the Location necessarily has the possibility of inviting crime to its surrounding area. This is exacerbated by the fact that home residences are popular targets for criminals prone to robberies and burglaries.

Welfare

- Again borrowing from Miriam-Webster, welfare is defined as “the state of doing well especially in respect to good fortune, happiness, well-being, or prosperity”. Prosperity is in turn defined as “the condition of being successful or thriving; especially: economic well-being” (emphasis added). According to Realtor.com, "it's not the guns or the people who shoot them that the neighbors of shooting ranges object to most; it's more the idea of the places ... especially outdoor gun ranges". As a result, the values for houses situated near shooting ranges drops 3.7% on average. See: <https://www.realtor.com/news/trends/things-that-affect-your-property-value/>. Such homes also take longer to sell or do not sell at all. See: <https://pocketsense.com/property-impacted-presence-gun-clubs-7464580.html>. Given these statistics, building Back 40 at the Location would most assuredly threaten the economic welfare of local residential property owners.

I would be happy to discuss my concerns with you in greater detail, via telephone or an in-person meeting. In any case, I hope you will seriously consider the objections raised above, and ultimately arrive at the conclusion that the Location is unsuitable for a shooting range. With the Location set at 360-400 feet from the nearest homes, the builder himself confirmed Back 40 would be built closer to residences than any other shooting range he built previously, making it an unfortunate anomaly. See: https://docs.google.com/spreadsheets/d/1PZdfTTn0EJfWa_FG97ScImoz8hs8eP-BY97DqnoL1eU/edit#gid=0. I respectfully request that you, as members of the Planning Commission, advise the Town Council that Back 40 should not be built at the Location. As a business owner, I do wish other business owners every success. Yet, such successes cannot reasonably be supported if they come at the expense of other people's livelihoods and well-being.

Thank you very much,
Sathis Ganapathy

Workman, Paul

From: leo <lthamilton2@msn.com>
Sent: Friday, March 09, 2018 1:39 PM
To: Matthews, Bryce; Workman, Paul; Mayor, Council, and TA; Maloney, Jim; Waid, Mike; Fussa, John
Subject: Fw: Proposed Gun Range

The message written below I would like for you to take the time and read. I agree with Amy message. I do not feel that this is the correct location for a gun range. I am pretty sure that an area away, from homes and concerned people, can be located. The people I have talked to about this, some say build it, they are the ones that do not live close to the purposed site. The people I talk to in the neighborhoods close to the site, do not want this to be part of their neighborhood. I for one do not want it. Thank you and when voting on this issue, please think of the people close to this gun range.

Thank You
Leo Hamilton

From: DOROTHY HAMILTON <dhamilto1@msn.com>
Sent: Tuesday, March 6, 2018 1:12 AM
To: Leo Hamilton
Subject: Fwd: Proposed Gun Range

Sent from my iPhone

Begin forwarded message:

From: Amy Camp <amygriff@yahoo.com>
Date: March 5, 2018 at 3:26:43 PM MST
To: Amy Camp <amygriff@yahoo.com>
Subject: Proposed Gun Range
Reply-To: Amy Camp <amygriff@yahoo.com>

Hello Neighbors,

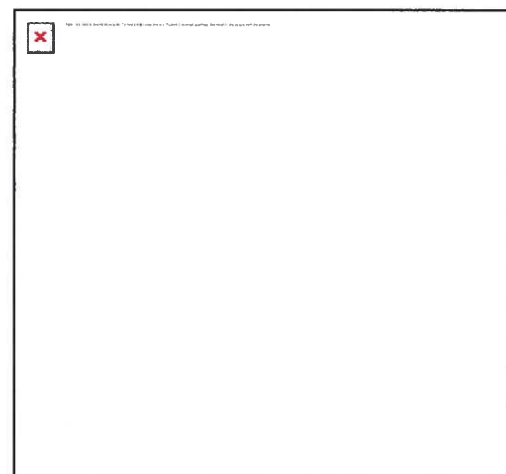
I am writing you in hopes you will help us to fight the proposed plans to put an indoor gun range at Chambers and Double Angel. I have many concerns with the proposed location of this property. This business will rent and sell guns and ammunition. There will be no membership, so anyone can go in and use the facility.

It is very close to the Douglas County School District stadium. As I am sure you hear every weekend, the games, practices, band competitions, graduations and now even prom is being held there. This just is not the right place for this facility. The proposed owner even stated at the development meeting that he did not look at certain lots because they were too close to schools. I am struggling to see how a stadium, holding

hundreds of kids, families, community members and staff members on school district property at a school related function, is different than a school.

I am also very concerned about property values. On average, homes next to gun stores see a drop of 3.7% nationwide! I would not like to see our home values drop because of this business.

I am concerned about the environmental pollution the gun range may cause. Gun ranges, due to the ammunition and gun powder released with each shot, can produce a toxic amount of lead. Please see the attached articles outlining these issues. Our area is filled with nearby homes, retention ponds and many animals that share our space. I have seen a blue herring on one of my neighbor's rooftops, a family of hawks at the church, an owl on my own roof, a coyotes in the fields, a numerous other birds. We do not want lead leaking out of that building in any way. The company says they will have an HVAC system that filters and replaces the air in that building every 90 seconds. What happens with that HVAC system fails, or does not get the proper maintenance over the years, or new owners come in to the business and cut corners? (See these links for more information about the toxic lead produced from gun ranges [Outdoor Gun Ranges Produce 80,000 Tons of Toxic Pollution a Year](#) [Take Aim at Protecting Yourself || Blogs | CDC](#))



[Take Aim at Protecting Yourself || Blogs | CDC](#)

blogs.cdc.gov

CDC - Blogs - NIOSH Science Blog – Take Aim at Protecting Yourself -

Outdoor Gun Ranges Produce 80,000 Tons of Toxic Pollution a Year

Residual lead can poison humans and contaminate nearby soil or water, sometimes with fatal consequences for loca...



Gun Ranges Produce Thousands of Tons of Toxic Pollution ...

www.thetrace.org

The Trace is an independent, nonprofit news organization dedicated to expanding coverage of guns in the United States. We believe that our country's epidemic rates ...

I am concerned about the noise this business will create. There are homes 180 FEET from the proposed building, will we be able to hear gun shots from the building, will we be able to hear the constant humming of the HVAC system that is designed to replace the air every 90 seconds. I love the sounds of the high school stadium, most of the time (that first weekend in October for the band competition is a bit much). I would hate for the sounds of our community coming together to celebrate students to be muffled by the sounds of gun shots and HVAC systems. I would hate to begin normalizing the sounds of gun shots (muffled or not).

I am concerned about the possibility of increased crime. Gun stores have become increased targets for robberies. Just recently the gun shop on Main and Parker was hit with a "smash and grab." It happens all the time. This business will be selling guns and it will have guns and ammunition on site. It will be a target for these types of crimes. I do not want our neighborhood to have to deal with increased crime. The business said they would have a "top of the line security system." I do not believe that will prevent people from attempting to commit these crimes. All systems will have vulnerabilities, it is only a matter of time before someone finds those opportunities and attempts the crimes. When a crime is committed or attempted on that business and the police arrive, where will the criminals go? To the neighboring community? Into our backyards? In to the crowded stadium? How can we hold the owners accountable for updating their security over the years? How can we prevent new owners from taking short cuts in security when the business is sold years later? [Solving gun store burglaries has become a top ATF priority in Colorado](#)



Solving gun store burglaries has become a top ATF priority in Colorado

Dragon Man Mel Bernstein believed his store — stocked with thousands of guns, including 200 machine guns — was ...

I am sending you this email in hopes that you will join me in telling the proposed owner, and Town of Parker Town Council that this is not the appropriate location of this business. The name of the proposed gun range is Back 40 and that is where this business belongs. They need to build it further away from residential homes and school district property. There are plenty of locations for this facility, please let us build and develop more appropriate businesses in this location, like an ice cream shop, coffee shop, fun restaurant, something that is more harmonious with this location. A gun range just does not fit. This project is still in the planning stages and has not yet been approved, we still have a chance to have this project stopped.

If you would like to join me in fighting this business, please join me in emailing our Town Council members and the Mayor of Parker (addresses below). Please feel free to contact me for more information about how you can help!

Bryce Matthews, Planning Manager: bmatthews@parkeronline.org

Paul Workman, Senior Planner: pworkman@parkeronline.org or 303-805-3327

Town Council: Elected@parkeronline.org

Mayor Mike Waid: mwaid@parkeronline.org

Jim Maloney, Town Attorney: jmaloney@parkeronline.org

John Fussa, Community Development Director: jfussa@parkeronline.org

Thank you.

Your neighbor,

Amy Camp

Workman, Paul

From: Sandra Ricci <sandraricci12@gmail.com>
Sent: Friday, March 16, 2018 10:43 AM
To: Workman, Paul; Waid, Mike; Fussa, John
Subject: proposed firing range Back 40 LLC

Dear Sirs:

I am writing in opposition to the proposed indoor gun range, Back 40 LLC for the following reasons:

Possible lead contamination to nearby soil, air and ground water. In a November 16, 2016 newspaper article in the Sacramento Bee, 11 nearby homes had lead contamination in the soil surrounding their homes from a shuttered indoor firing range.

Most indoor firing ranges are located in or near industrial parks or business districts, not in residential neighborhoods for obvious reasons, ie, noise, air and ground pollution. Firing ranges should be far away from schools, school stadiums for the obvious safety reasons.

Lastly, this proposed firing range is not in keeping with the character of the surrounding residential neighborhoods.

Thank you for your consideration.

Sandra Ricci
11713 S. Flower Mound Way

Workman, Paul

From: Sue Terrill <coyoteridgesue@yahoo.com>
Sent: Sunday, March 25, 2018 10:24 AM
To: Workman, Paul; Waid, Mike; Matthews, Bryce; Rogers, Jason; Robberson, Dannette; Fussa, John; Mayor, Council, and TA
Subject: The Back 40 Gun Range

Follow Up Flag: Follow up
Flag Status: Completed

Dear Mayor Waid, Paul, Bryce, and the Members of the Council,

I have been thinking about the proposed gun & archery range and its effect on the local neighborhoods. Throughout the week, I drive by many locations that stand empty. From an environmental perspective, allowing huge buildings to sit unoccupied is neither an efficient nor a practical use of those buildings. Further, it is not good stewardship of our finite natural resources. Many of us take great pains to reduce, reuse, and recycle. We wash out Ziploc bags to reuse, we donate clothes and household items to worthy charities, we recycle anything and everything that can be recycled.

When I see nearly new, empty buildings, like the Gander Mountain building near Parker Road, it makes me wonder why a building like that, already built, cannot be used to house the gun & archery range. There are empty buildings around the entire metro area, that could be used to house the Back 40 Range. The Gander Mountain location, so close to E-470, near Parker Road, within walking distance of a huge multi-family complex, would appear to be an ideal one. There are food establishments nearby, gas stations, & shopping, such as Costco and smaller enterprises. Using that particular building would not create a noise disturbance for nearby homeowners, has a large new parking lot, and must have been built to accommodate the city's building codes.

It would probably take a moderate amount of money to retrofit a building like that to add soundproofing, air quality controls, and interior modifications intended for individual shooting areas. But the structure and its infrastructure are already in place.

When our family needs a new sink or carpeting, we don't bulldoze the house and build from scratch. That would be neither cost-effective, time-saving, nor good use of resources.

Could the gentleman who wants to open up the Back 40 be able to fix up an existing building, such as the Gander Mountain building lower the ceilings, if needed, and be able to open up sooner than he could building a new building near Chambers Road, that does not even have roads in place? If not that particular building, then another? I drive by empty buildings all the time, even in other areas, such as empty K-Marts or empty Sports Authority stores.

From the people I have spoken to with concerns about the Back 40, this is not a 2nd amendments rights issue. It is an issue of location. It does not seem like the proper location to build a gun range right next to an existing neighborhood. The plans for a gun range were not even a thought when Lennar built the Homestead neighborhood, nor the other neighborhoods around the proposed gun range. If the council thinks that people would be willing to live within 150 feet of a gun range, then maybe the Back 40 entrepreneur should consider building the gun range in an area not already

established with homes. There is still a lot of open space in Parker and the surrounding area. One could build the Back 40 in the open space and let a large home developer develop the land surrounding the gun range, if location to a neighborhood is not an issue.

When the homeowners bought in Heirloom, Homestead, Newlin Meadows, and other nearby neighborhoods, a gun range was not proposed. There were athletic fields, a football stadium, a sports bubble, and a large church. If people did not want to hear the cheering of sports fans on a Friday night, they would not have opted to build or buy in that vicinity. However, those same people may not necessarily want to live next to an indoor gun range, for many reasons already given to the council. Those residents were told there would be small commercial enterprises built in that spot near Chambers and Double Angel. Those small businesses would be an asset to the community, not a detriment. Realtors are already having people walk away from possible contracts on homes, and some people are no longer interested in looking at homes in one of those beautiful, thriving neighborhoods. Declining home values, even in this market, is not what these homeowners have saved for and dreamed of.

I read with interest an article in the March 23rd edition of the Parker Chronicle. The city of Parker has filed a lawsuit against Douglas County regarding the location of the trash-transfer facility in the Compark Industrial Area. If I may, I would like to quote Mayor Mike Waid regarding the location of the proposed facility, "This is just the wrong place for this type of facility. The town therefore felt it had no choice but to take this action." This facility has drawn criticism from the town and residents, "Claiming property values would decrease, as well as noise, and bad smells."

I, and others, can see a parallel between the two proposed businesses. One business is opposed by the town of Parker for the exact same reasons that the neighbors near the proposed gun range have expressed. One should assume that these exact same reasons would receive the exact same response from Mayor Waid and the Council. I especially found it interesting that a trash-transfer facility would not be appropriate in an industrial area. Yet, a shooting range could possibly be considered within 150 feet of a neighborhood?

Maybe the industrial site would be a better fit for the shooting range?

Thank you for taking the time to read my letter. Thank you for your consideration. I really hope you can understand that the quality of life, as well as the depreciation of home values for these communities near Chambers Road would be adversely affected. We wish the business owner of the Back 40 great success, and hope to support his business venture, but not in the proposed location near Chambers Road.

Respectfully submitted,

Sue Terrill

Workman, Paul

From: Mark Paiz <mark@q3consulting.com>
Sent: Thursday, July 19, 2018 2:11 PM
To: Workman, Paul
Cc: Mark Paiz
Subject: UBSR Project #Z18-004 GUN RANGE

Follow Up Flag: Follow up
Flag Status: Completed

Mr. Workman

Hope all is well.

Sir I am a concerned resident of Park and Parker Homestead HOA.

Sir I am very concerned that the meeting the Applicant had with the HOA Parker Homestead only, and did not include Heirloom, & the neighborhoods overall objection to this project in our backyard, has gone relatively unnoted by the applicant.

The applicant held a private meeting that was not productive and HOA was very negative towards the proposal, there was very minor support and the meeting did not include Heirloom HOA who is the adjacent parcel to the proposed parcel of a gun range, where there are homes/ children and loved ones as the background to the ranges targets.

Sir I am simply very opposed as well as a majority of my Parker Homestead & Heirloom HOA Neighbors , and would like to ask if the community will be allowed to speak?

Also will we be informed of any public meetings where our very serious concerns can be heard by the planning department before a decision is made?

I moved here in 2016 & I not naïve enough to believe this area would be developed commercially, but I do depend on the planning department to make my community safe and noise free and trust that you do so,.

This is not safe/noise proof but more importantly how is this in harmony with this community?

I would have never even consider this location to buy a home and live in had I known that a project like this would get this far....

I moved here from Lakewood on purpose to help start a great community, to put my tax money to work & to put a gun range less than 100' from a residential home and HOA I live in, is almost un heard of.

Sir I have read the response of the applicant and the biased and paid comments of the so called experts by the applicant are not going to compensate me for their lies when the value of my home drops and it becomes impossible to sell. Also almost every location they speak of is in an industrial area, period not in a backyard of a district stadium and homes.

Overall a GUN RANGE is a red flag when buying a home with Children and near children period, & unless you live near an industrial area NOT commercial only it really is not in harmony with this community.

It will be more than difficult to sell my home if this project is allowed to development in this location.

Lastly this will affect every child in the district that uses that stadium, with a gun range across the street are we setting ourselves up for a tragedy, those things should not mix!! & defiantly Not 20' from each other.

Back 40 should mean just that IN the back 40 & not on Main and Chambers.....

Thanks for your time and I look forward to your response.

Respectfully

Mark Paiz | Q³ Consulting, Inc. | 11817 Phoebe Street | Parker, Colorado 80134 | Cell 303-915-3428 | Office 720-925-5103



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Workman, Paul

From: Jamie Sunderman <nordyaddict@gmail.com>
Sent: Tuesday, August 21, 2018 10:23 AM
To: Workman, Paul; bmathews@parkeronline.org; Mayor, Council, and TA; Town Administrator
Subject: Back 40 Gun Range

Dear Messrs. Mathews and Workman,

I am writing to oppose the development of the Back 40 Gun Range. I am a Colorado native and have experienced my fair share of gun violence here in Colorado including: Chuck-E Cheese, Columbine, Arapahoe High School, and the Aurora Theater shooting, just to name a few. The last thing I want is more guns in our neighborhood, next to our school, athletic stadium and religious institutions.

My family and I have lived in the Heirloom development for 3 years. We specifically chose this neighborhood because it was smaller than the others and it had a very natural and peaceful way to it. We have 3 children and regularly enjoy walks along the open space trail of our neighborhood, observing the beauty and wildlife that lives there. Building a gun range would completely destroy the peacefulness of this neighborhood and would have a severe impact on my mental and emotional well being knowing that just a few feet away there would be a large stash of guns and ammunition. We also have a lovely community pool where many families gather throughout the summer months to enjoy the peacefulness that this neighborhood offers. The noise of a gun range just a few feet away would completely obliterate the joy of this experience.

The mental and emotional toll that it would bring to myself and my children would force us to move. My oldest has had to experience atrocities that I never had to at her age. Not to even mention the multiple active shooter drills at school and having to go to school time after time after these mass shootings. That has had an emotional and psychological impact on her that I probably have not even begun to realize. I will not subject my children to having to listen to the sound of GUNS day in and day out, knowing they are just across the open area.

In conclusion, there is absolutely no circumstance that I can imagine, that would warrant putting a noisy shooting range in the middle of a peaceful neighborhood that includes a school, church and athletic stadium regularly visited by 1000's of children. I hope that you hear OUR VOICES, those of the people to actually live here and that you will find in our favor that this is NOT the place for a shooting range, that it does NOT go with the aesthetic of this neighborhood and does NOT belong here.

Respectfully and peacefully yours,

Jamie Sunderman

Workman, Paul

From: Sietsema, Rosemary
Sent: Tuesday, August 21, 2018 2:30 PM
To: Workman, Paul
Cc: Heckber, Kim; Fussa, John; Rogers, Jason; Matthews, Bryce
Subject: FW: Back 40 Range

Follow Up Flag: Follow up
Flag Status: Completed

Hi Paul

This for your case file to respond.

Thank you,



Rosemary Sietsema, Community Development Executive Assistant
20120 E. Mainstreet Parker, CO 80138-7335
303.805.3170 www.parkeronline.org



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From: RYAN SAIN [mailto:ski0440@yahoo.com]
Sent: Tuesday, August 21, 2018 1:42 PM
To: Planning
Subject: Back 40 Range

To whom it may concern,

I'm a resident in the Heirloom subdivision not far from the proposed site. I haven't heard much lately if this was passed?

Today a few rumbling in the neighborhood that it's back up for discussion?

I know everyone is negative and scared of it going in and I'm sure the board has had many emails and calls from residences stressing they're discomfort with it.

I want it to be known that it's not all negative to have a range like this in Parker and in surrounding area. Ranges are very well kept and provide a training that most individuals haven't taken. If they took courses, they might be less negative on the subject.

I wanted to show my support for the town of Parker and the possibility of putting in a range that I think could add value to people's perspective.

Thank you.

Workman, Paul

From: Jeff Aelmore <jeffaelmore@hotmail.com>
Sent: Tuesday, August 28, 2018 12:57 PM
To: ICE - Erika Aelmore; Williams, Renee; Workman, Paul; Waid, Mike; Rivero, Joshua; Martin, Josh; Diak, John; Lewis, Debbie; Holland, Amy
Subject: Resident Comments on Project Z18-004 - UBSR denial criteria

To the members of the Parker Town Council and planning Commission.

I write today to restate an objection to the proposed Use By Special Review ("UBSR") for the Back 40 Gun Range project ("Project" or "Applicant"). As a nearby resident, I ask you to deny UBSR request Z18-004 for the following reasons and matching USBR review criteria. After reviewing the latest revisions from the USBR project applicant, it is clear that this project fails to meet the UBSR criteria noting the following:

- 1) The town of Parker has clearly established that a gun range is meant for an Industrial zoned location. This area is NOT zoned for industrial use and as such does not match Criteria 1 "Will be in harmony or compatible with the character of the surrounding areas and neighborhood." Despite the misleading claims of the applicant, the area proposed for this project is residential homes and is zoned commercial neighborhood center. The area is NOT zoned for industrial use. The Town of Parker clearly established in 2013 with the Freedom Gun Range project #SP12-005/8036 that a gun range is a project for a zoned INDUSTRIAL site. The UBSR should be denied as the proposed site is not zoned in accordance with the established decision history of the Parker town council and city planning commission.
- 2) As noted in objection 1 above, a gun range is a project meant for an INDUSTRIAL zoned area. As such, this project is not in compliance with Criteria 2 of the Town of Parker's Master Plan. The Town's master plan clearly identifies projects for industrial zoned uses (such as gun ranges as established by the aforementioned Freedom Gun Range project #SP12-005/8036) should match the master plan zoning. This project fails to meet the Master Plan (Criteria #2) and should be denied. Land use design is fundamental to Parker's identity (Master Plan). This area is not zoned industrial and this project is not in compliance with the Town of Parker master plan for industrial use projects to be in industrial zoned areas. This project does not meet criteria #2 of the UBSR criteria.
- 3) Criteria #7 is clearly not met by this proposal and the UBSR should be denied in full with respect to significant noise pollution. This project will cause significant noise pollution which will impact the heavily-populated residential area surrounding the project. The applicant has made misleading statements in his proposals which fail to meet Criteria #7. Specifically, I draw your attention to the response red-lined submittal in the document "Combined Revised Submittal." The document alleges that the project has engaged an engineer for a noise study. However, the revised narrative dated July, 2018 on PCS Group Letterhead specifically states in writing that "Back 40, LLC is committed

to making improvements to its facility so that no gunfire is heard at residential property line.” This statement is misleading to the board as the project agreement with the vendor Wave Engineering does not meet a guarantee that “no gunfire is heard at residential property lines.” Instead, the vendor and remaining documents revert to a separate decibel-level representation.

Further, the applicant makes misleading comparisons to Douglas County noise regulations and fails to address the higher standards of the Parker Municipal Code Section 6.03.030 which states “It shall be unlawful for any person to make, continue or cause to be made or continued, any noise disturbance....” The decibel levels established by Douglas County are NOT the presiding noise-level for noise-pollution and are inappropriate comparisons. The UBSR committee should instead review the project as a whole against the Parker Municipal Code. This project fails to meet that criteria. From the outset, this project stated that gunshots would be heard at surrounding homes. Continued noise disturbance, such as the sound of gunshots, are therefore NOT in compliance with the Town of Parker municipal code. As such, the barrier for entry must be NO audible sounds of gunshots of any nature at surrounding homes at any time.

The applicant continues to make misleading comparisons that the sounds of a baseball game (double angel ballfield) or high-school football game (Echo park stadium) to that of the gunshot noise-pollution which will impact our neighborhoods from his facility. These are misleading comparisons on many levels. The applicant does not propose limiting his business to 3-hour windows on a Friday night such as a football game, or to the peaceful Saturday-only use of baseball games – local community-building football and baseball games are NOT noise disturbances and a comparison to such noise is misleading. This is akin to comparing toxic industrial waste smells with that of a rose garden by saying both are ‘pungent’ to the olfactory senses and that a scale of olfactory volume is the appropriate measurement tool. Comparing decibel levels of football/baseball games and that of gunshots is misleading, inappropriate and the wrong basis for approval or denial of a USBR project. Any ‘like’ comparisons are inconsistent with the review criteria and should not be considered by the UBSR committee.

- 4) Criteria #7 is clearly not met by this proposal and the UBSR should be denied in full with respect to significant air pollution. This project will cause significant air pollution which is intended for an industrial-zoned area but is proposed to impact a heavily-populated residential area. Again, the project narrative makes no means to address the air pollution this project will expel on the surrounding residential neighborhood. The project update solely provides information regarding within-facility air pollution. The poisonous led-filled air from this facility will be dispersed onto a residential area and must be denied. I draw your attention to the document from “Carey’s Small Arms Range Ventilation” which was provided by the applicant as a means to mitigate Criteria #7. The document makes no tangible measure to address air pollution on the surrounding neighborhood of the facility. In fact, the “three main purposes for properly venting a small arms range” (page 1) solely detail how the project will remove the poisonous air

from the project from the internal inhabitants with no regards to those surrounding the facility.

Importantly, the vendor cites a formula utilizing many unknown factors such as “activity rate” or “overall emissions reduction efficiency.” The applicant fails to provide any of the necessary inputs to generate such a formula for a UBSR evaluation. For example, there is no input provided for the formula input “activity rate” of the facility. Further, the applicant fails to name the actual HEPA filter or system which will meet the stated “overall emissions reduction efficiency” formula. The figures used in the provided ‘formula’ are open to interpretation and arbitrary until these terms are defined. As there are no defined inputs for these formulas, in no way is the owner restricted to a defined ‘activity rate’ at the actual facility being proposed by the applicant. As such, this formula can be manipulated in any fashion unless restrictions are imposed on a maximum “activity rate.” Such ‘fun with math’ is insulting unless the UBSR committee imposes an “activity rate” on the facility to ensure the led-emission factors listed by the vendor are in fact met by the applicant.

No matter what mitigating measures are performed, there is no monitoring mechanism in place by the proposal to guarantee the poisonous air-pollution emitted from the facility remains under approved OSHA and EPA guidelines. Again, this would not matter for an industrial site; however, this air-polluting facility is adjacent to residential neighborhoods. The proposed “buffers” of roads and ditches will have no impact controlling the pollution from the facility. Continued compliance with Criteria #7 cannot be met under the proposal from the applicant as A) The “activity rate” cannot be governed or restricted by the city and the applicant has made no representations that the “activity rate” of his facility will be restricted to not exceed that of the air vendor; and B) There are no alarms/monitoring devices on the outflow of air to ensure continued compliance with OSHA and EPA requirements on air-pollution on the proposed system.

- 5) The applicant continues to provide previous financial contributions as a means to ‘pressure’ or otherwise ‘coerce’ the UBSR to approve the project. Such behavior is not only unethical but clearly was warned against by the Planning Commission in your communication to the project in your document titled “Z18-004 Comments” where you specifically instruct under Criteria #4 comment 1 that “The reference to the master developer’s previous obligations for public improvements are not relevant for this request.” In response, the applicant doubles-down in an attempt to provide undue influence on our city by providing a “Sheet A” outlining fees previously paid to the Town of Parker as a means to meet Criteria #4.

This proposal must be denied in full by the UBSR committee, planning commission, and Town of Parker. As a neighbor, I welcome commercial development in my neighborhood and I look forward to commercial projects intended for a residential setting. This project is clearly in need of an industrial site, as previously established in zoning approvals by this town, and must not be allowed to move forward.

Sincerely,

Jeff Aelmore

Parker resident – Newlin Meadows

Workman, Paul

From: Andrew Copland <nacopland@gmail.com>
Sent: Thursday, October 04, 2018 4:43 PM
To: Workman, Paul
Subject: Back 40 Range

Follow Up Flag: Follow up
Flag Status: Completed

The best way to insure gun safety is through thorough education and instilling standard operating procedures until they become routine.

I live in Parker and there is not a range/practice facility near where I live. Being ex-military I believe it is safest to practice within a controlled environment such as this facility would provide.

This facility will have sound suppression designed in as well as being relatively buffered by open space.

Parker would benefit from a facility like this in many ways, after all you do not want to send sales tax dollars to the facility in Castle Rock.

Andrew Copland

Workman, Paul

From: cory jackson <coryjackson1@live.com>
Sent: Friday, October 05, 2018 9:02 AM
To: Workman, Paul
Subject: Z18-004 - Parker Homestead - Indoor Archery & Gun Range

Follow Up Flag: Follow up
Flag Status: Completed

Mr. Workman,

This email correspondence is being sent in full support of the development of the Parker Homestead - Indoor Archery & Gun Range. It is my belief that the organized resistance to this project is representative of a passionate minority. As a resident of the greater Parker area it is evident that this type of facility would benefit a great majority of residents as there are none like it in Parker. Currently, we are driving to the expensive range in Centennial or further into Aurora. This is not only inconvenient, it is lost tax revenue for the town. While I realize given the current political climate that this project is of a seemingly sensitive matter that should be reviewed. However, it should not be treated any different than many other recreational type facilities already in Parker or proposed for future construction. The potential members and guests of this facility should be allowed to pursue their hobby no differently than golfers, baseball players, basketball players, hockey players, tennis players, skateboarders, swimmers, weight lifters, etc. It is my personal belief that as a society we offer very little support for proper training of safe firearm use. This facility would help facilitate a healthy and responsible environment where people can properly enjoy their sport of choice.

Without getting too deep into the philosophical weeds here are a couple things to consider for your evaluation. According to the CDC, gun deaths roughly equal the number of deaths by automobile accident per year in the US. The irony of this fact is that a vast majority of the guns involved in these deaths are illegally purchased whereas the vast majority of cars involved are legally owned. I seriously doubt that the Town of Parker vets the potential auto shops, auto sales, and auto parts stores in the same manner as they are vetting this potential recreational facility.

On the other hand, I am certain that the town carefully considers and weighs the issuing of Alcohol sales and vendor licenses. There are currently numerous businesses (bars, stores, restaurants, etc.) that sell and serve alcohol in the Town of Parker and I am sure there will be many others in the future. Did you know that according to the CDC there are roughly 9 times as many deaths that are directly linked to alcohol per year as there are linked to guns? This ratio is probably low as there are roughly 50 times as many heart disease deaths in the US per year.

Please understand that I am not advocating for prohibition or the elimination of cars from our society. I am simply pointing out the facts that may get overlooked by many of the people opposed to this project.

Please document my support by uploading this correspondence to the eTrakit portal.

Thank you,
Cory Jackson
303-435-2217

Workman, Paul

From: christopher lacount <clacount11@gmail.com>
Sent: Friday, October 05, 2018 1:47 PM
To: Workman, Paul
Subject: Support for Z18-004 - Parker Homestead - Indoor Archery & Gun Range

Follow Up Flag: Follow up
Flag Status: Completed

Mr. Workman,

I wanted to contact you in regard to the project known as Z18-004 - Parker Homestead - Indoor Archery & Gun Range. While there has been an organized resistance to this project I and many other Parker area residents would enjoy having a facility like this in the Town. The facility will undoubtedly be an asset to the Town of Parker. Many residents that I know currently leave the Town limits to attend ranges in Centennial and Aurora. Due to this Parker dollars and tax revenues leave the Town limits, additionally many residents of the Franktown / Elizabeth community drive through Parker to reach these facilities.

The Town is using the Use by Special Review criteria for approval and I hope that the Town is objective in its review of the project. Some residents may have a dislike of the project type for personal reasons but the Town should be unbiased in its consideration of the project. The members of the facility should be thought of no differently than the members of a private golf community. I hope that the Town of Parker doesn't discriminate against this project because it is an Archery and Gun Range. The eTRAKiT documentation and requests for additional studies and information are substantially more stringent than other Use By Special Review Processes the Town has completed. I would like my support to be documented by being uploaded to the eTRAKiT document portal.

Thank you

Regards,

Christopher LaCount

Workman, Paul

From: stablemasterprod@aol.com
Sent: Monday, October 08, 2018 10:22 AM
To: Workman, Paul
Subject: Indoor shooting range

Follow Up Flag: Follow up
Flag Status: Completed

To whom it may concern,

It is my understanding that Rion Buswell has applied for a permit and approval of a indoor shooting range here in Parker. I would submit that it would be an asset to our community to have such a facility available, without having to take ourselves and our money out of Parker.

I also think it is the responsibility of our local government to enhance and help our local small business owners to be as successful as possible, and to contribute to our community.

I would urge a speedy approval to his application.

Respectfully,

Mark Moore

Stablemaster Products

10336 S Dransfeldt Rd

Parker, CO 80134

303-841-8545

Sent from my iPad

Workman, Paul

From: Mark Gasper <mark_c_gasper@hotmail.com>
Sent: Thursday, October 25, 2018 9:16 AM
To: Workman, Paul
Subject: Back 40 Range

Dear Mr. Workman,

I'm writing you in support of the proposed new indoor gun range Back 40 at Chambers and Double Angel roads. The community stands to benefit in several areas as follows:

- The shooting range will provide us with a safe environment to target practice
 - Keeps more individuals from shooting in unregulated areas and minimizes risks from grass fires of resources shooting outside, accidents to impacting humans & animals, ect
- The training and instruction will provide the community and myself the experience to safely use a firearm
- The opportunity for everyday citizens to maintain proficiency with their firearms
- Additionally, I support business investment in Parker. Not only will the city be rewarded with for the development and building of the site, it will also provide an on-going tax base to help continue to build out the city of Parker services as we continue to grow.

In today's environment, I certainly understand some individuals' concern and opposition to firearms in general, but the fact is that we live in a country where that is currently one of our freedoms and having a safe/controlled environment to enjoy that freedom is an important opportunity for individuals in Douglas county and specifically Parker.

Thanks for your time and support of the initiative to build this new facility for the Parker community.

Sincerely,
Mark Gasper
42241 Brokenhorn Circle
Parker CO 80138

Workman, Paul

From: Jim Lewien <jim@lewiens.com>
Sent: Monday, October 29, 2018 5:42 PM
To: Workman, Paul
Subject: Shooting & Archery Range

As a resident of Parker, I am very pleased to learn that an indoor shooting and archery facility is being planned for Parker. This will be a great amenity for residents of many ages, including families. Currently, it's necessary for Parker residents to leave town and drive considerable distance to participate in this type of recreational activity. When open, the planned facility will draw people into Parker from surrounding areas. They will spend money at the range and on other goods and services in Parker, thus generating additional sales tax revenue to support necessary services in our community. I am strongly in favor of and urge you to give favorable consideration to the application for a shooting and archery range facility and recommend it for approval.

Thank you.

/s/James C. Lewien

James C. Lewien
20715 Omaha Avenue
Parker, CO 80138

Workman, Paul

From: Mark DeLange <mdelange01@gmail.com>
Sent: Wednesday, November 14, 2018 9:28 AM
To: Workman, Paul
Subject: Parker Archery and Range

Paul

I am in support of the proposed Archery and Shooting Range located in Parker. This would be a valuable addition to Parker just as the shooting range in Centennial was to their local residents.

Workman, Paul

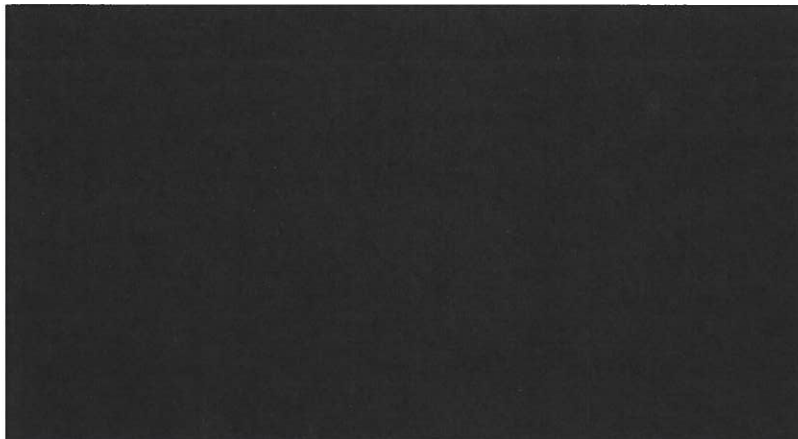
From: Amy Camp <amygriff@yahoo.com>
Sent: Wednesday, November 14, 2018 10:08 PM
To: Matthews, Bryce; Workman, Paul; Mayor, Council, and TA; Waid, Mike; Maloney, Jim; Fussa, John
Subject: Back 40

Follow Up Flag: Follow up
Flag Status: Completed

Dear Parker Town Council and Newly Elected Council Members,

I am writing you as I have just gotten word that, yet again, schools in our town are dealing with threats. From what I understand, more than one school in Parker dealt with threats of some sort this week. Did you know the state of Colorado ranks 9th in the nation for threats against schools? <https://kdvr.com/2018/08/23/report-colorado-ranked-10th-for-school-threats/>

Just today a student in Colorado was arrested for having a gun at school. [High school students arrested by Thornton police for allegedly possessing gun at school](#)



High school students arrested by Thornton police for allegedly possessing g...

Two high school students in Thornton were arrested on Wednesday for allegedly bringing a gun to school.

I am writing you to ask you to stop considering the development of the Back 40 Gun Range near Echo Park Stadium. It is not the place for a gun range, period. I have read the developers remarks about he believes it will fit in with the community. I beg to differ. This is not the place. The stadium holds numerous sporting events, band competitions and graduations. It is not a secure facility and the last thing we need is a gun range near our school facilities. This facility is owned by Douglas County School District. The WHAT IFs on this are just too big! This is not a risk we should even be considering. There are other places this development could go, places that are not within 500 feet of our students. Students at the games and sporting events are at an age where they are beginning to

go out on their own, to drive independently, and their parents are trusting that their child is in a safe environment at these events. A gun range, drastically changes that area. I do not want my child, as she is just beginning to go out on her own, hanging out near a gun range. Again, too many "What ifs." It DOES NOT fit in with this area. **It is NOT in harmony with this area.** I agree shooting can be considered a sport, but please do not put this near where adolescents are hanging out, unsupervised and in a climate where threats are real.

Did you know, there have been 312 mass shootings in the United States in 2018, this is day 318. There have been 2,474 children aged 11-17 have been killed or injured by guns in 2018. [Gun Violence Archive](#)



I have heard that the town can just continue to go back and forth with the developer until basically the developer gets tired and decides to look elsewhere. I think it is time to save everyone some time and say no. This is not the place for a gun range. Please find another location for this development.

Thank you,

Amy Camp

Workman, Paul

From: Ian Elfner <ian.elfner@navpointre.com>
Sent: Friday, November 16, 2018 11:05 AM
To: Workman, Paul
Cc: Shelly Elfner - Pediatric Speech Therapy Associates (saelfner@dcsdk12.org)
Subject: PROPOSED INDOOR ARCHERY AND GUN RANGE

Follow Up Flag: Follow up
Flag Status: Completed

Mr. Workman:

I live in the Horse Creek neighborhood. I personally do not support an indoor archery/gun range in or around the location being proposed. The proposed site is adjacent to a large stadium that holds many people for many events every year. In addition, the site is surrounded by many residential properties, parks, schools, etc.. Having a lot of weapons brought into and out of the facility is simply asking for trouble for those in the area at any given time and those that live in the area. I also do not support The Town or Town Council providing a special use right to allow for the use under the current zoning. I do not support this initiative and I respectfully request to be notified as to when the Town Council meetings will take place so I can come out and voice my thoughts and opinions on the matter in person along with my other neighbors. I believe there are better locations in the Town of Parker for this type of business that are likely zoned and don't require a special use review. I also believe there are locations that are more within the "middle" of commercially zoned areas and away from stadiums, residential neighborhoods, schools, churches, future assisted living facilities, future daycares, etc.. Please confirm receipt of this email.

Regards,
Ian Elfner
414-559-6000

Workman, Paul

From: Dianna Hemphill-O'Byrne <dianna.hemphill@gmail.com>
Sent: Friday, November 16, 2018 3:02 PM
To: Workman, Paul
Subject: Proposed Indoor Shooting Range

Follow Up Flag: Follow up
Flag Status: Completed

Mr. Workman,

My family and I live in the Parker Homestead subdivision of Parker and I'm writing today to voice my opposition to the indoor archery/gun range at the corner of Chambers and Double Angel. The proposed site is directly across from a large stadium that holds many events for local children every year. Additionally, the site is surrounded by homes, many of whom are my direct neighbors, parks, schools, open space, the new reservoir, and walking trails. I do not support the Town of Parker providing special use right of land for this type of business and I believe there are other areas in the Town that are better suited. I respectfully request to be notified when Town Council meetings will be so I may attend with my family. I whole-heartedly believe there better locations for this type of business, and ones that do not need special permitting. Please confirm receipt of this email and I look forward to working with you on this matter in the future.

Thank you,

Dianna Hemphill-O'Byrne
970-690-3214

Workman, Paul

From: Kivela, Michelle
Sent: Friday, November 16, 2018 3:10 PM
To: Workman, Paul
Cc: Fussa, John; Town Administrator
Subject: FW: Parker Homestead.

Follow Up Flag: Follow up
Flag Status: Completed

FYI

Thanks,
Michelle

-----Original Message-----

From: Sylvia Schumacher [mailto:sschuma@comcast.net]
Sent: Friday, November 16, 2018 2:58 PM
To: Mayor, Council, and TA
Subject: Parker Homestead.

I am not opposed to the gun range however I am opposed to using Pelican drive as an entrance. I know to many living here this is a bigger concern, complaint and not so much the gun range. Please consider an alternative in order to keep traffic out of Parker Homestead.

Thank you, Sylvia Schumacher
Sent from my iPad

Workman, Paul

From: Randall Quinn <randallquinn@sbcglobal.net>
Sent: Friday, November 16, 2018 3:17 PM
To: Workman, Paul
Subject: New gun range

Follow Up Flag: Follow up
Flag Status: Completed

Totally for it. Thank you.

Workman, Paul

From: Hatcher, John <john@hatchernet.org>
Sent: Friday, November 16, 2018 3:37 PM
To: Workman, Paul
Subject: Support for Proposed Gun Range on Chambers Road

Follow Up Flag: Follow up
Flag Status: Completed

Mr. Workman:

I recently heard about and did some research on the proposed indoor gun range off of Chambers Road near Douglas County Stadium and would like to provide my input and support for approval of the facility by the town of Parker.

As both a hunter and target shooting enthusiast, I would definitely find great use and enjoyment for such a facility so near to my home in Clarke Farms. I am currently a member of the Colorado Rifle Club and regularly drive 45 minutes to Byers in order to use those facilities for sighting and targeting shooting of my hunting rifles as well as practice handgun shooting. Obviously, an indoor shooting range won't support rifle shooting, but would still be something I would use on a regular basis. Based on comments I have read on the neighborhood forum Nextdoor, there would appear to be significant support for the facility from a variety of neighborhoods. I also understand concerns local residents in proximity might have for noise and safety. However, having spent significant time in several indoor facilities, I'm certain both aspects will be well addressed through required engineering controls. I also agree with many opinions that having such a facility presents outstanding opportunities to provide highly qualified safety training for adults and children.

Please add my support for approval of the project by name.

Thank you very much

John Hatcher
Clarke Farms
720-839-7185
john@hatchernet.org

Workman, Paul

From: Garrett Horner <ghorner30@gmail.com>
Sent: Friday, November 16, 2018 5:58 PM
To: Workman, Paul
Subject: Gun range

I'm all for a indoor gun range.

Workman, Paul

From: Leila Sueper <lsueper@yahoo.com>
Sent: Friday, November 16, 2018 5:53 PM
To: Workman, Paul
Subject: Proposed Gun Range

Hello Mr. Workman:

I live in the Newlin Meadows neighborhood; my home actually backs to Newlin Gulch Blvd. and I overlook the development area for the proposed gun range. I personally do not support an indoor archery/gun range in or around the location that is being proposed. The site is adjacent to a large public school stadium that holds many people for many events every year. Further, there are ball fields a short walk from the proposed site as well as an elementary school a few blocks down the road. In addition, the site is almost completely surrounded by residential properties. Having a constant stream of weapons and ammunition brought into and out of the facility is troubling to me and for those who are in the area at any given time. Furthermore, it is my understanding that a daycare facility is intended for the property almost directly across from the gun range; adjacent to the church. The proposed area is quiet, residential, and family-centric; I'd like to see it remain as such and the gun range moved to a more appropriate, industrial part of the Town of Parker.

I also do not support The Town or Town Council providing a special use right to allow for the use under the current zoning. I do not support this initiative and I respectfully request to be notified as to when the Town Council meetings will take place so I can come out and voice my thoughts and opinions on the matter in person along with my other neighbors. I truly believe there are better locations in the Town of Parker for this type of business that are likely zoned and don't require a special use review. I also believe there are locations that are more within the "middle" of commercially zoned areas and away from stadiums, residential neighborhoods, schools, churches, future assisted living facilities, future daycares, etc..

Please confirm receipt of this email.

Thank you for your time,

Leila Sueper

Sent from my iPhone

Workman, Paul

From: Christopher King <3pugdaddy@gmail.com>
Sent: Friday, November 16, 2018 6:32 PM
To: Workman, Paul
Subject: Proposed Indoor Shooting Facility

Hi there,

As Parker residents who live in Clarke Farms, my wife and I fully support the permitting and building of the indoor shooting range on the corner of Chambers and Double Angel Road. It will be nice to have a local business where residents can practice with their firearms in a safely controlled location.

Please consider this and any other communications that support this project as the final deliberations are made for this project's approval.

Thanks for your time,

Christopher and SuZ King

Workman, Paul

From: Robert Ham <outlook_6A9562063E3BFBCB@outlook.com> on behalf of Robert Ham <robert@roham.net>
Sent: Friday, November 16, 2018 7:07 PM
To: Workman, Paul; Planning
Subject: Indoor Shooting Range in Parker

There is currently a very hot thread on the NEXT-DOOR app right now and in a couple posts it suggests emailing these two addresses. I am a resident of Parker and am in full support of this business being authorized. The discussion is mostly around safety and a few feel the purposed location being is too close to schools, churches and a daycare. I don't care where it is located, but I and my family are in full support of such a business within Parker. The amount of support on the NEXT-DOOR app is staggering. Please let me know when any public meetings are scheduled to be held regarding this. Tonight was the first I was hearing of it.

Thank you,

--Robert Ham

Workman, Paul

From: Justin Salmon <jrs7801@hotmail.com>
Sent: Friday, November 16, 2018 8:16 PM
To: Workman, Paul
Subject: Proposed Gun Range in Parker

Yay, been waiting and hoping for a new range near me. I fully support it being near a stadium or school. Makes those locations more safe actually, in my opinion. As long as it conceals the noise, that is my only stipulation. New suburban gun ranges have the ability to make them sound proof too near homes that may be buy it.

This is much needed around here. People need a safe place to go practice and earn, and as many people as we have that conceal carry it makes it even more important. The Town of Parker approve this for the majority of people who want it!

Thank you,

Justin - Parker resident

Sent from my iPhone

Workman, Paul

From: James <james@spamizbad.com>
Sent: Saturday, November 17, 2018 11:24 AM
To: Workman, Paul
Subject: Fwd: Indoor gun range

> We are reading about a proposed gun range in our neighborhood and want to say we do NOT want this to happen.
> We are in Parker Homestead neighborhood at 11816 Phoebe St Parker Co
> 80134 First we have a stadium with high school students right outside. We feel this will have a negative impact on our homes value. Please do NOT allow this gun range to be this close to our neighborhood.

>

> Respectfully,

>

> James Donalson

> 11816 Pheobe St

> Parker Colorado 80134

> 512-277-4667

>

>

Workman, Paul

From: greg L <greg197430@yahoo.com>
Sent: Saturday, November 17, 2018 5:21 PM
To: Workman, Paul
Subject: Re: gun range special use off of Chambers

Greetings Paul,

I understand there is a proposal for a special use permit to allow a gun range to go in on Chambers near Double Angel. Will there be a public hearing on this before a final decision is made? A large group of residents are very much in favor of this and would like to ensure our voices are heard. Thank you Greg lindsey Parker resident

Sent from my iPhone

Workman, Paul

From: Heather Crawford <heatherrcrawford@icloud.com>
Sent: Monday, November 19, 2018 2:52 PM
To: Workman, Paul
Subject: Gun range

Hello,

I'm writing to voice my support for the gun range being proposed off of Chambers near the Douglas County Stadium. We live in Newlin Meadows, and would be excited to have this close to us. We also attend the nearby church, and the Douglas County stadium. Some people seem to have issues with a gun range being close to these venues, but we do not. This business should be welcomed, and is much safer than having a liquor store or a pot store in that location.

Thank you,

Heather & David Crawford

Workman, Paul

From: Ashton Bell <ashton.c.bell@gmail.com>
Sent: Tuesday, November 20, 2018 11:04 AM
To: Workman, Paul
Subject: Public Indoor Shooting Range

Good morning Mr. Workman,

I am a resident of Parker, CO and I have heard there was a proposal that is being considered for an indoor shooting range. Myself, and those that I've talked to would love this type of business in the town. Were tired of filling the town with corporate business, and we need to encourage an entrepreneurial spirit in our community members. Douglas County has a lot of interest in sport shooting, and this access will only serve to improve gun safety across the community. Thank you for your consideration.

-Ashton Bell

Workman, Paul

From: Jason Fordyce <jasonfordyce@comcast.net>
Sent: Wednesday, November 21, 2018 3:02 PM
To: Workman, Paul
Subject: Proposed Indoor Archery and Gun Range - Opposed

Hello Mr. Workman,

I would like to take a few moments to relay our opinion on the proposed facility on Chambers and Double Angel.

First off We'll be clear that we are opposed to the location of the facility, nothing more. We are not against the 2nd amendment as it was intended, but believe this is not a 2nd amendment topic, this is a retail facility.

The location leaves a lot to be desired, yes we are residents of Horse Creek, a neighboring community to the proposed location. Yes, we have 3 daughters whom attend Gold Rush Elementary. Potential aging parents that may end up at the long term care facility planned for Newlin Gulch and Chambers.

Things that we would hope the town keeps in mind:

- The 2nd amendment is the right to bear arms, not the right to have a location to use them or anything related to this facility and should be removed from Pros or Cons of this argument.
- The facility does not need any additional retail anchor stores to draw its crowd, we know this based on the selection of this proposed facility. While arguments against the location may be drawn from residents "fears" or "concerns for safety" etc., I've seen no real arguments for why this location is necessarily "good", "necessary" or "desired" either. I don't think it matters much where it goes, residents that are looking for this type of facility will travel to it if it is anywhere in the town limits as we aren't that big of a town...
- Other potential locations such as west of Reuter-Hess on Hess road, across from Parker Police Station, Parker Road open lots or more commercial/industrial areas that do not have high foot traffic, kids present in volume, or nearby facilities that would go through lock-down initiated events at the slightest pin drop these days.
- Traffic is pretty bad during sporting events and graduating events at Echo Park already.
- While I am no expert, I do believe that it would have a negative impact on property value.

I think the bottom line is that, yes, we could play the What-If game indefinitely these days, but it doesn't look like Parker is putting the right foot forward if they make this decision in favor of the location.

I could not find an email for Paul Workman, but would like my comments forwarded on if possible.

Thank you for your time

Jason & Stephanie Fordyce

Workman, Paul

From: pam <psbott@gmail.com>
Sent: Sunday, November 18, 2018 3:11 PM
To: Workman, Paul
Subject: No-regarding Parker indoor archery and shooting range

Thank you Paul for your informative phone message how to contact you regarding the Parker indoor archery and shooting range.

Although I am for safe gun ownership, I am against having the indoor archery and shooting range being built in Parker. This is next to my neighborhood. I do not like the idea of people who have the intent to shoot guns at this facility, driving in their cars possessing guns, coming and going, in my neighborhood. I would like to see them take their business somewhere more isolated, away from neighborhoods.

Will this email be counted as a vote against this facility being built off of Chambers?

Thank you,

Pam Bottoms

Workman, Paul

From: Jason Rank <captainawesome3195@gmail.com>
Sent: Wednesday, November 21, 2018 3:14 PM
To: Workman, Paul
Subject: Support for indoor Shooting Range

As a Douglas county resident and voter I wholly approve of the indoor shooting range.

Thanks!

Jason Rank
Sent from my iPhone

Workman, Paul

From: digrdie1970@comcast.net
Sent: Wednesday, November 21, 2018 6:59 PM
To: Workman, Paul
Subject: Parker Homestead AMD1 - UbSR Indoor Archery & Gun Range

Mr Workman,

I'd like your agency to consider and add my comments on the proposed Archery & Gun Range to your file. I do not live in the Heirloom community, but I am a neighbor in Horse Creek.

I am familiar with the application to place this facility by Use By Special Review to piggy back on the land use for recreational use. All recreations are not in the best interest of the the surrounding communities. We have learned first hand about the problems these "recreational facilities" have caused for those of us that live here. Things like cars doing donuts in the stadium parking lot at all hours of the night. Drag races being held in the same parking lot. Invading parking in the surrounding neighborhood during sporting events making it difficult to enter and exit the communities during events. Kids and their modified loud cars driving up and down Double Angle Rd for 20-30 minutes at a time showing off their cars to their friends. Excessively loud stadium broadcasting system during games. All day band competitions for several days on end. Noise coming from the Game Day Sports Bubble. Poor upkeep of the landscape at the stadium such as weeds and dead shrubs.

The first issue I see of the development of this commercial lot is the excessive traffic that will be directed directly behind the homes backing up to the commercial property regardless of which business the patron is visiting. It would be one thing if there was land between the road and the houses, but these cars will effectively be driving right along the back of these homes. There is no buffer zone. It would be the right thing to do to make a separate entrance into the commercial property that will not negatively impact these home owners. Why is the entrance not coming off of Double Angle Rd directly?

The other issue I see is why is the town allowing a shooting range so close to a residential area? Just because there is a provision to make the a request for "special use" does not mean it belongs here. I am not against having an archery and gun range in Parker, but I don't see how placing it so close to homes is appropriate or the right thing to do. This is the type of recreational facility that is better suited to be in more of an industrial or commercially developed property such as those along Main Street, Parker Rd or Dransfelt. Even Centennial Gun Club is not this close to homes even though they are in the vicinity of the homes. this is just the wrong location for this business.

I than you for your consideration of my comments.

Paulette

Sent from Xfinity Connect Mobile App

Workman, Paul

From: B Collins <bcollinscolorado@gmail.com>
Sent: Wednesday, November 21, 2018 7:59 PM
To: Workman, Paul
Subject: Z18-004

This project is totally inappropriate for this location. I can't believe Parker Government would consider having a gun range next to a high school stadium, base ball stadium and private homes.

Regards,
Brian Collins

Workman, Paul

From: stella and john <stellaghome@comcast.net>
Sent: Saturday, November 24, 2018 9:06 AM
To: Workman, Paul
Subject: FW: Horse Creek - Email Bulletin - Proposed Archery and Gun Range

Importance: High

Good Morning Mr. Workman, we live in Horse Creek and please count us as a "YES" for the Indoor Gun Range.
Sincerely,
John & Stella Moss

From: TMMC Office <tmmc@tmmccares.com>
Sent: Wednesday, November 21, 2018 2:54 PM
To: stellaghome@comcast.net
Subject: Horse Creek - Email Bulletin - Proposed Archery and Gun Range

Residents,
Please see the below update from the Town of Parker regarding a proposed Indoor Archery and Gun Range.

Horse Creek HOA, c/o Hammersmith Management 10,

Case Number: Z18-004

Application Type: ZONINGUBSR

Application Name: Parker Homestead AMD1 - UbSR Indoor Archery & Gun Range

Due Date: Monday, November 26, 2018

This application has been forwarded to you as part of the requirements of Section 13.04, 13.06 & 13.07, et. al., of the Town of Parker Lar

You have been identified as an agency which may be impacted by the proposed development. The Town asks that you review the propo
November 26, 2018. If no comments are received by this date, it will be assumed you have no comment.

Please visit Agency Center at
<https://linkprotect.cudasvc.com/url?a=https%3a%2f%2fms.parkeronline.org%2fetrakit3%2fagency%2fagencylogin.aspx&c=E,1,TclGPhGyJDZxzWGwtBTUsvXcUIB39ED-dtl7krhHcXrzU6d7kVxyndOfTNP7U1a2cspzlWCkB&typo=1> to complete your review.

Your input on this proposal is critical to ensuring the best possible development. Please also accept this invitation to attend the hearing, ' comments and/or concerns regarding this project. On behalf of the Town of Parker, thank you for your time in reviewing this material and comments. Please contact Paul Workman with the Town of Parker at pworkman@parkeronline.org, with any questions or comments you

Paul Workman

pworkman@parkeronline.org

Sincerely,

TMMC Property Management

This email is intended for the members of the Horse Creek Homeowners Association only. Please direct queries on this email to manager@hcrha.com.
these email broadcasts by changing your preferences on the Membership/Web tab in your online [member portal](#).
Horse Creek Homeowners Association is professionally managed by TMMC Property Management.

Workman, Paul

From: Ian Elfner <ian.elfner@navpointre.com>
Sent: Sunday, November 25, 2018 3:58 PM
To: Workman, Paul
Subject: RE: PROPOSED INDOOR ARCHERY AND GUN RANGE

Paul:

For the reasons I stated in my prior email, I do not believe the use will be in harmony and compatible with the existing character of the surrounding areas and neighborhood AND I believe adding this use will be detrimental to the health, safety or welfare of the present or future inhabitants of the Town. The property owners nearby must provide details on how a gun range with a retail sales component with guns and ammunition will be harmonious with the surrounding stadium, nearby existing church and future daycare and senior facility, as well as a nearby middles school and numerous parks and trails. I wanted to add to my existing concern prior to the 11/26 deadline by requesting the applicant to address how they plan to deter and protect the community and community resources against smash and grabs/burglaries of weapons and ammunition since they will have a retail operation as part of what they are doing and the retail operations throughout Colorado have become increasingly popular targets for thieves and a strain on public safety resources. Further, how will the parking lot be secured to ensure the public's immediate safety in the area and to ensure safe transportation of weapons into and out of the gun range facility. Will this location have 24/7 security? Please let me know when the hearing will be. I would like to attend and have a moment to express my concerns.

Please let me know if you have any questions.

Thanks,

Ian Elfner
414-559-6000

From: Workman, Paul <pworkman@parkeronline.org>
Sent: Monday, November 19, 2018 10:24 AM
To: Ian Elfner <ian.elfner@navpointre.com>
Cc: Shelly Elfner - Pediatric Speech Therapy Associates (saelfner@dcsdk12.org) <saelfner@dcsdk12.org>; Fussa, John <jfussa@parkeronline.org>; Rogers, Jason <jrogers@parkeronline.org>; Matthews, Bryce <bmatthews@parkeronline.org>
Subject: RE: PROPOSED INDOOR ARCHERY AND GUN RANGE

Mr. Elfner,

Please find this information in response to your email inquiry dated November 16th of 2018. The Town of Parker Community Development Department is in receipt of an application for a Use by Special Review from an entity called Back 40, LLC for an archery and gun range having education, training and retail elements. The application is in the third review cycle of what is typically a multi-phase review process having at least two- to three review cycles.

The property in question is located at the northwest corner of the intersection of Chambers Road and Double Angel Road in the Parker Homestead Planning Development, Planning Area 1, Mixed-Use Neighborhood Center. This area is zoned for a broad range of commercial uses and the proposed archery and gun range requires a Use by Special Review to be eligible for approval. This process incorporates an enhanced level of review and public hearings before the

Planning Commission and Town Council. The applicant must address the Town's nine (9) Use by Special Review criteria to be eligible for approval as follows:

- a. Will be in harmony and compatible with the character of the surrounding areas and neighborhood;
- b. Will be consistent with the Town Master Plan;
- c. Will not result in an over-intensive use of land;
- d. Will not have a material adverse effect on community capital improvement programs;
- e. Will not require a level of community facilities and services greater than that which is available;
- f. Will not result in undue traffic congestion or traffic hazards;
- g. Will not cause significant air, water or noise pollution;
- h. Will be adequately landscaped, buffered and screened; and
- i. Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the Town

The Town takes concerns about safety and nuisance impacts such as noise seriously and the Community Development Department has advised the applicant that they will have to address these issues as part of their Use by Special Review application. Town staff will be looking for the applicant to address comments about safety, nuisances, traffic and other project related issues in a satisfactory manner. The applicant is also required to satisfactorily address the nine (9) Use by Special Review Criteria required by Town zoning which establishes a higher burden of proof for approval than a use permitted by-right. Finally, the applicant is required to appear and present at public hearings before the Planning Commission and Town Council to address comments, answer questions and respond to the nine (9) Use by Special Review Criteria.

The required public hearings have not been scheduled yet because the application is still in the review stage. You may review the submitted application on the Town web site through the Development Tour Map, Project 25 or Application #Z18-004, which may be found

here: <https://parkerco.maps.arcgis.com/apps/Shortlist/index.html?appid=7879283391d3453da213a439f2dca232>.

Thanks and please contact me if you have any questions or need additional information.



Paul Workman, Senior Planner
20120 E. Mainstreet Parker, CO 80138-7335
303.805.3327 www.parkeronline.org



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From: Ian Elfner [<mailto:ian.elfner@navpointre.com>]
Sent: Friday, November 16, 2018 11:05 AM
To: Workman, Paul
Cc: Shelly Elfner - Pediatric Speech Therapy Associates (saelfner@dcsdk12.org)
Subject: PROPOSED INDOOR ARCHERY AND GUN RANGE

Mr. Workman:

I live in the Horse Creek neighborhood. I personally do not support an indoor archery/gun range in or around the location being proposed. The proposed site is adjacent to a large stadium that holds many people for many events every

year. In addition, the site is surrounded by many residential properties, parks, schools, etc.. Having a lot of weapons brought into and out of the facility is simply asking for trouble for those in the area at any given time and those that live in the area. I also do not support The Town or Town Council providing a special use right to allow for the use under the current zoning. I do not support this initiative and I respectfully request to be notified as to when the Town Council meetings will take place so I can come out and voice my thoughts and opinions on the matter in person along with my other neighbors. I believe there are better locations in the Town of Parker for this type of business that are likely zoned and don't require a special use review. I also believe there are locations that are more within the "middle" of commercially zoned areas and away from stadiums, residential neighborhoods, schools, churches, future assisted living facilities, future daycares, etc.. Please confirm receipt of this email.

Regards,
Ian Elfner
414-559-6000

Workman, Paul

From: Kivela, Michelle
Sent: Monday, November 26, 2018 9:48 AM
To: Workman, Paul
Cc: Fussa, John; Rogers, Jason
Subject: FW: Gun range

Follow Up Flag: Flag for follow up
Flag Status: Completed

FYI.
Thanks, Michelle

-----Original Message-----

From: Sarah Wolff [mailto:srwolff1223@hotmail.com]
Sent: Wednesday, November 21, 2018 8:06 PM
To: Mayor, Council, and TA
Cc: brianccleary79@gmail.com
Subject: Gun range

To whom it my concern,

Two years ago, I was living in Centennial, Colorado. We decided to move to Parker once my daughter was two years old. Parker was appealing to us due to the young families, schools, safety, the family friendly feeling of the the town and the amount of green belts and parks the town had to offer.

Recently we were made aware of a possible gun range going in about 500 ft from our house. This was devastating news to us. Now we have a 1 year old son and our daughter is 4 years old. I never envisioned raising my two children next door to a gun range. I'm concerned about noise control, our property value, and safety. Imagining my children playing in our back yard with possible gun shot noise going in the background, is not what I envisioned when we purchased our home.

I think a gun range should be placed in a non-residential area to ensure it doesn't effect the families that decided to move to Parker for a family oriented town.

I truly appreciate you taking the time to read this email and consider my concerns.

Regards,
Sarah Cleary

Sent from my iPhone

Workman, Paul

From: Sietsema, Rosemary
Sent: Monday, November 26, 2018 11:47 AM
To: Workman, Paul
Cc: Planning
Subject: FW: Back 40 Shooting Range

Town of Parker, Colorado
Rosemary Sietsema Community Development Executive Assistant
20120 E. Mainstreet Parker, CO 80138-7335
303.805.3170 www.parkeronline.org

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-----Original Message-----

From: Adam Workman [mailto:aceworkman@gmail.com]
Sent: Friday, November 16, 2018 5:33 PM
To: Planning
Subject: Back 40 Shooting Range

Hello,

I'd like to find out what, if any, research has been done regarding the anticipated safety concerns of the proposed shooting range near Chambers and Double Angel. Some people on the Nextdoor app are under the impression that there is a safety risk that comes with this type of business. To my knowledge there are no documented increased real world safety risk examples that are associated with this type of business. I am in support of this proposed business and its current location, but would like some facts presented so both sides can be objective in their reasoning to support/oppose this business.

Thanks,

Adam Workman
Parker Resident, Bradbury Hills Neighborhood

Workman, Paul

From: Sietsema, Rosemary
Sent: Monday, November 26, 2018 11:47 AM
To: Workman, Paul
Cc: Planning
Subject: FW: Indoor Shooting Range in Parker



Rosemary Sietsema, Community Development Executive Assistant
20120 E. Mainstreet Parker, CO 80138-7335
303.805.3170 www.parkeronline.org



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From: Robert Ham [mailto:outlook_6A9562063E3BFBCB@outlook.com] **On Behalf Of** Robert Ham
Sent: Friday, November 16, 2018 7:07 PM
To: Workman, Paul; Planning
Subject: Indoor Shooting Range in Parker

There is currently a very hot thread on the NEXT-DOOR app right now and in a couple posts it suggests emailing these two addresses. I am a resident of Parker and am in full support of this business being authorized. The discussion is mostly around safety and a few feel the purposed location being is too close to schools, churches and a daycare. I don't care where it is located, but I and my family are in full support of such a business within Parker. The amount of support on the NEXT-DOOR app is staggering. Please let me know when any public meetings are scheduled to be held regarding this. Tonight was the first I was hearing of it.

Thank you,

--Robert Ham

Workman, Paul

From: Sietsema, Rosemary
Sent: Monday, November 26, 2018 11:50 AM
To: Workman, Paul
Cc: Planning
Subject: FW: Gun Range

Follow Up Flag: Follow up
Flag Status: Completed

Town of Parker, Colorado
Rosemary Sietsema Community Development Executive Assistant
20120 E. Mainstreet Parker, CO 80138-7335
303.805.3170 www.parkeronline.org

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-----Original Message-----

From: Lowell Willock [mailto:lwillock@yahoo.com]
Sent: Monday, November 19, 2018 11:45 AM
To: Planning
Subject: Gun Range

I live in Horse Creek 15699 E Copper Creek Lane This location is very near the Gun Range. I am in full support of the gun Range

Clarence Willock

Sent from my iPad

Workman, Paul

From: Courtney Alberty <courtney_alberty@yahoo.com>
Sent: Monday, November 26, 2018 1:43 PM
Subject: Proposed Gun Range

Good afternoon~

I am writing for several reasons. First, I would like to say I think a gun range in Parker is an excellent idea. I think the town council and planning committee should look at locations that would be good for a gun range. However, I do not think the proposed site of a gun range next to residential houses and a high school stadium is a good location.

My major concern is that guns will be sold at this facility. It is a prime target for a robbery. The nearest police station is the Parker PD, which is about 4 miles away. I think given the recent string of smash and grab, and the history of gun stores on twenty mile and surrounding areas of Parker having being robbed or attempted to be robbed should be a huge reason to not put the gun range so far away from police. I think it is not safe for these houses to have a gun store in the neighborhood.

I'm also concerned about the noise and the pollution. I attended the neighborhood meeting where the developer and potential owner spoke. They could not guarantee no sound, they just said it would be minimal. This is very important to me, that there is zero sound. I was a junior at Columbine High School the day of the shooting there. I cannot hear gun shots on a daily basis. Even a single gun shot will trigger my PTSD. I have talked to all my neighbors and several in Parker homestead area and I have not met a single person who wants the gun range in this location. All the people I have talked to that want the gun range, do not live within a mile of it. I honestly feel that most people are for a gun range in Parker, but I think it has to be the right location. This location is near a church, elementary school, and there will soon be a day care and an assisted living home. There are no commercial businesses here.

I would also like to say that I do not understand why some neighborhoods near the proposed gun range are getting communication and others are not. I have not received any communication from the town about a proposed gun range less than a two thousand feet from my house, that I will be able to see out my kitchen window. I am concerned that there is not enough effort of informing the neighborhood about what is going on.

If you could please let me know about any town council meetings regarding the proposed gun range, I would appreciate it.

Thank you for your time,
Courtney Alberty

Workman, Paul

From: Sietsema, Rosemary
Sent: Monday, November 26, 2018 1:49 PM
To: Workman, Paul
Cc: Planning
Subject: FW: Proposal addressing gun range in Parker



Rosemary Sietsema, Community Development Executive Assistant
20120 E. Mainstreet Parker, CO 80138-7335
303.805.3170 www.parkeronline.org



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From: Julie Redlinger [mailto:jjredlinger@msn.com]
Sent: Sunday, November 18, 2018 8:07 PM
To: Planning
Subject: Proposal addressing gun range in Parker

Hello

Simply put...we support this 100%

*Ken and Julie Redlinger
10712 Jordan Court
Parker, CO 80134*

Workman, Paul

From: Sietsema, Rosemary
Sent: Monday, November 26, 2018 1:50 PM
To: Workman, Paul
Cc: Planning
Subject: FW: Proposed Gun Range in Parker



Rosemary Sietsema, Community Development Executive Assistant
20120 E. Mainstreet Parker, CO 80138-7335
303.805.3170 www.parkeronline.org



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From: Richard Hartung [<mailto:rick.hartung@icloud.com>]
Sent: Sunday, November 18, 2018 7:54 PM
To: Planning
Subject: Proposed Gun Range in Parker

City of Parker Planning-

I would like to email in support of the proposed building of a gun/archery range at the Chambers/Double Angle intersection. This is a business that my family and I would be happy to solicit.

I can be reached for comment at this email or the cell number below.

Thanks,

Rick Hartung
469-231-1716
11794 Churchfield St
Parker, CO 80134

Workman, Paul

From: Sietsema, Rosemary
Sent: Monday, November 26, 2018 4:25 PM
To: Workman, Paul
Cc: Planning
Subject: FW: Proposal for gun range, Back 40 Range



Rosemary Sietsema, Community Development Executive Assistant
20120 E. Mainstreet Parker, CO 80138-7335
303.805.3170 www.parkeronline.org



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From: Jeff Butler [mailto:jeff.butler@comcast.net]
Sent: Wednesday, November 21, 2018 10:04 PM
To: Planning
Subject: Proposal for gun range, Back 40 Range

Hi,

I understand that there is a proposal for the building of a gun range at the corner of Chambers and Double Angel Road. Will there be a public hearing before approval is determined? If so, where and when will it be held as I would like to attend.

If there is no public hearing, then I would like to take this opportunity to express my support of the Back 40 Range. I am a Parker resident and this is a business that I think Parker needs and it is a business that I would be a customer of. I have actually read through the application and the list of nine Use by Special Review Approval Criteria. I can not see how the this business would not meet all nine criteria. It is a well though out and designed range. The owner has used a consultant who specializes in range design and operation and can provide examples of other successful ranges. I hope the Planning Commission approves this plan for the range.

Thank you,

--Jeff Butler
10737 Kimball St
Parker, CO 80134
303-968-4631

Workman, Paul

From: Kate Donalson <katedonalson@yahoo.com>
Sent: Monday, November 26, 2018 6:13 PM
To: Workman, Paul
Subject: Proposed Gun Range at Chambers and Double Angel

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Mr. Mayor,

My husband and I recently purchased a property in Parker Homestead (Oct. 2018) - the small, quiet community directly adjacent to the proposed gun range at Double Angel and Chambers. We have concerns that our peace and quiet will be disturbed by the noise of constant gun fire. To be clear, it was never disclosed to us prior to our purchase that a gun range was being proposed so close our property and we have serious concerns. Had we been aware we would not have purchased here if we had known and feel that this will negatively affect our property value in the long term. According to the application by the company proposing the range the noise would be equivalent to that of a car door closing. Is that to mean that one gun firing one shot would create that noise? What does it sound like when several guns fire several shots? We chose to purchase property in Parker to be away from the hustle and bustle of big city life. I do not wish to hear gunfire when relaxing on my back porch.

I also have concerns with the fumes released from the ventilation systems of the facility. I do not want to smell gunpowder while grilling out in my back yard.

I have no problem with the addition of a high quality gun range to our community but the proximity to residential properties as well as school district facilities is troubling to me.

Sincerely,

Katherine Donalson
11816 Phoebe Street
Parker, Colorado 80134

Workman, Paul

From: Jason Price <joprice1@gmail.com>
Sent: Tuesday, November 27, 2018 4:10 PM
To: Workman, Paul
Subject: Indoor Gun Range

Follow Up Flag: Follow up
Flag Status: Completed

Hi Paul,

I am a Parker Homestead residence and I was just reviewing some of the documents on eTrack regarding this project. More specifically, information on construction techniques and materials planned for sound isolation. After review, it is very clear the folks designing the project have no clue about acoustics or sound isolation techniques. For example, in the "Sound abatement materials.pdf", they list only acoustical panels, which is for sound absorption. Sound absorption only treats a specific room for acoustical reasons and modifies the acoustical response of the interior space. Sound absorption is very different from sound isolation, which folks like me are most interested in. What is the STC rating of the exterior walls and ceiling of the building? How many leafs are planned for the exterior walls, one? two? If the folks planning this project can't answer those questions, I'm concerned they don't have the right engineers involved that know how sound works.

Thanks,
Jason Price

Workman, Paul

From: Adam Paschal <japaschal@hotmail.com>
Sent: Wednesday, November 28, 2018 3:29 PM
To: Workman, Paul
Cc: Amanda Paschal
Subject: Re: Use By Special Review Criteria

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Paul,

Thank you for taking the time for our phone conversation, and for providing the evaluation criteria for Use by Special Review regarding the Back 40, LLC archery and gun range. As I review the 9 Use by Special Review evaluation criteria, there are 4 criteria that are of concern and would like to address to you and the Town of Parker formerly for your consideration. They are as follows:

a. Will be in harmony and compatible with the character of the surrounding areas and neighborhood;

The proposed location of this indoor archery and gun range is in an affluent residential neighborhood surrounded by houses, a church, Douglas County High School Football Stadium (frequented by children and families), Double Angel Baseball Fields (frequented by children and families), an elementary school just up the road (well within effective range of a pistol), a retirement home (directly adjacent) under construction and a small child daycare (directly adjacent) which is soon to be under construction. All of the surrounding facilities which were just described are in perfect harmony with each other and complement one another as they promote a naturally safe family atmosphere. That being said, it is difficult to identify a harmonious connection between the homes & surrounding facilities just outlined above in the community, and a gun & archery range. Please understand that I myself am a gun owner, avid hunter, have a conceal & carry permit, and frequent indoor gun ranges to practice with target shooting. I strongly believe there is a place for such facilities, such as the locations of the indoor gun facilities I use that are in more industrial or very heavy commercial areas (as there are several to choose from within 10 to 30 minutes of this proposed facility). To me, an indoor gun & archery range is harmonious with surrounding areas that are industrial or very heavy commercial; however not harmonious when surrounded by neighborhood homes, church, school, daycare, retirement home, Douglas County Schools Football Stadium and Double Angel Baseball Fields utilized by children. As further explained below, I took the opportunity to interview several people at the nearby Centennial Gun Club and adjacent Holliday Inn & Suites (who share a parking lot) in Centennial, CO. The employees at the adjacent Holliday Inn & Suites gave me an odd look when I told them about the location of the proposed facility, and even the employees of Centennial Gun Club had a look of concern when explaining the location of the proposed Back 40 facility, all stating the same thing – “That’s an odd place to have a gun range in a residential neighborhood”. It simply is not in harmony with a residential neighborhood and such surrounding facilities.

f. Will not result in undue traffic congestion or traffic hazards;

The plans as explained by the developers during their public meeting show the traffic flow in and out of the Back 40 indoor archery & gun range flowing through Double Angel Road and Pelican Street. This will unquestionably increase the traffic on Double Angel Road and Pelican Street (as this is the main entry into that neighborhood, and will cause congestion for those neighborhood residents & visitors). In

addition, it will increase the traffic along Double Angel Road coming out of that area and onto South Chambers Road via the traffic light at the intersection of Double Angel Road and South Chambers Road. The traffic signal will activate more frequently with the increased traffic volume, thus causing additional congestion along South Chambers Road.

As further explained below, I took the opportunity to interview several people at the nearby Centennial Gun Club and adjacent Holliday Inn & Suites (who share a parking lot) in Centennial, CO. One of the major issues coming from the Holliday Inn & Suites was that of traffic congestion. Apparently there are many special events held at the Centennial Gun Club (as these are significant money makers for the store), such as firearm vendor events or sponsor events, which draw a very large crowd. I was told by the hotel that especially during these events, it causes traffic and parking issues for their (the hotel's) customers to try to find a place to park. This would translate in a similar way to the neighborhoods when the Back 40 were to hold similar events, where traffic would be congested and spillover parking would go over into the neighborhood streets (negatively impacting those residents), and into the stadium parking lots (which there is a good chance this could conflict with a school event at the Douglas County Stadium). This would cause another problem the County and Town of Parker would need to work out with regard to coordination and parking lot monitoring, with the potential to have in impact on us taxpayers due to financial funds having to be allocated to management of this issue.

g. Will not cause significant air, water or noise pollution;

As with any indoor gun range, there will be noticeable noise not only inside the facility but also outside the facility. Even with modern insulation technology, unfortunately you will be able to hear the gunshots going off while standing outside of the facility. While the developer tries to play down this fact, even they admitted during the public meeting that you will be able to hear the gunshots while standing outside. In addition, this is not only one or two gunshots to consider – rather it is many gunshots given the number of pistol lanes in the proposed facility, and the noise will be constant throughout their hours of operation. This noise pollution will affect the houses to the south (approximately 50-100 feet from the back of the proposed facility), the houses the west directly across the creek bed, the houses to the north across South Chambers Road, and the houses southeast along Newlin Gulch Blvd as there are no noise barriers to stop the attenuation of the gunshot noise. This is not to mention the effect it will have on the church, daycare, retirement home, football stadium and baseball stadium. It is not a natural and comforting feeling to take your kids and family to a baseball game, football game, or to drop them off at childcare and hear the echo of repeated gunshots going off. Nor would it be comfortable to those families living in the hundreds of homes that surround the area to now be faced with having to hear the many gunshots that would go off throughout the day and into the evening. Imagine sitting in the backyard of your home on a spring, summer or fall day trying to enjoy a BBQ in a once quiet area, now only to hear the echo of gunfire. However muffled it may be, it is still gunfire and there is no discounting that. It is not natural to hear that in your home or backyard, nor was this ever known to be even a possibility to any of the families who built their homes in this area. Everyone had access to see the zoning between residential and commercial, but nowhere during the decision making process to build or buy a home in this community was there anything even coming remotely close to the potential there could be a gun range in this residential community. Because of this, (if the gun range is built) many of the families in the surrounding area will sell their homes to get away from the new noise pollution and risks affiliated with a gun range. As a result, housing values will decline – if of course that is those families are able to sell their homes when prospective buyers find out there is or will be a gun range in that neighborhood. Statistically speaking, housing values decline by an average of 3.7% when an indoor shooting range is built in a residential neighborhood according to several sources including this [realtor.com article](#). Given the types of homes in this residential neighborhood, that is over an instant \$20,000 loss to these homeowners. In the longer term, it will have the potential to eventually bring an undesirable demographic into this neighborhood area, which can bring with it an increased crime rate into our community and the Town of Parker. Is this really something we want to risk in Parker? Again, I believe there is a place for an indoor gun range

(potentially even in our Town of Parker). However it is just not in a residential neighborhood. If this were proposed in a light industrial or heavy commercial area (which we have several light industrial / heavy commercial locations in Parker), that type of location would seem to make more sense; not a residential neighborhood.

In addition to noise pollution, there is an air and water pollution concern referred to as lead-shot health link. Lead shot poses a threat to clean water supplies, the health of wild animals and plants and the health of local people and their children. When shot is fired, it tends to create a fine dust which travels through the air or into water. In the case of an indoor gun range, this dust would circulate through the air circulation system and ultimately be vented to the outside air. Lead is poisonous when ingested and is absorbed by the gut and lungs, leading to potential nervous-system problems in children and adults. For example, Springer Link reports a direct correlation between firing ranges and elevated lead exposure and poisoning of surrounding ecosystem, wildlife and people. (Source: Leaf Group, Ltd.)

i. Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the Town

Health, safety and welfare are a major concern with this proposed indoor gun range for several reasons. In addition to aforementioned lead-shot health link, there are many other considerations. The first being bringing a new risk of burglaries into this residential neighborhood. As mentioned above, I took the opportunity to interview several people at the nearby Centennial Gun Club and adjacent Holliday Inn & Suites (who share a parking lot) in Centennial, CO. Centennial Gun Club is a new state-of-the-art indoor gun range & gun store that advertise the latest technology in surveillance, new sound insulation, as well as safety & training. I learned this facility (even with its new technologies) has several issues that would cause serious concern in a residential neighborhood. First, they have been the target to multiple break-in robberies for theft of pistols, rifles & shotguns in their gun store. This would be a new threat to our residential community because of the gun store within the proposed Back 40 facility. Consider what were to happen if the perpetrators were to get caught in the act, causing 1) a shootout between police and the perpetrators with all of the surrounding houses; or 2) the perpetrators flee from the police. Where would they go? There is a very high likelihood these perpetrators would flee into the surrounding neighborhood to hide from, or lose the police chasing them. Either way, this is a very significant risk and safety concern for those residents in the neighborhood that does not currently exist.

Another safety risk is that of patrons to the gun range handling their guns and ammunition outside of the walls of the facility while they are in the parking lot. For example, today while I was at Centennial Gun Club for the interviews, I walked by a gentlemen at his blue Ford Escape that was handling his pistol and loading it from a new box of ammunition out in the open of the parking lot. While Centennial Gun Club touts their safety and training, which part of their restrictions is to not handle firearms or ammunition on their property while outside of their facility walls, clearly they are not able to police everyone that utilizes their facility; case in point is this gentlemen as just described. Unfortunately accidents happen. What if this person (or someone like him) was (wrongfully) handling their firearm in the parking lot and it accidentally discharged where the stray bullet went into one of the adjacent homes, or the church across the street during a service, or into the new child daycare across the street during business hours, or up and over to the elementary school (well within range of a pistol), or into the crowd at a football game killing one or several person(s). Each of these are very real possibilities due to the proximity of this proposed facility. Accidents, injuries, deaths and suicides unfortunately happen at gun ranges and is a real risk (see link for examples of such [accidents, injuries, deaths and suicides at gun ranges](#)). It is a significant safety risk on many levels that is absolutely unnecessary to introduce into a residential neighborhood such as this.

In summary, there are numerous (unnecessary) significant issues that arise when considering to bring a facility such as the Back 40 indoor archery and gun range into a residential neighborhood. I understand that you, the Planning

Commission and the Parker Town Council are receiving both negative and positive comments from interested parties of this proposed facility. I urge you to strongly consider the issues as I have outlined above which clearly portray that a facility such as this just simply does not belong in a residential neighborhood surrounded by houses, a church, Douglas County High School Football Stadium (frequented by children and families), Double Angel Baseball Fields (frequented by children and families), an elementary school just up the road, a retirement home (directly adjacent) under construction and a small child daycare (directly adjacent) which is soon to be under construction. It is not harmonious with the surrounding area, it will cause additional and undue traffic congestion & hazards, there will be noise pollution, and there will be health & safety risks to the surrounding residential neighborhood & inhabitants that are just unnecessary. While I understand there are those that are providing positive feedback in favor of this gun range, I would like to question if those individuals live along any of the streets that are directly adjacent to this proposed facility? These streets would include Pelican Street, Murrelet Street, Auklet Street, South Flower Mound Way, East Copper Creek Lane, South Great Plains Court, Melco Avenue, Phoebe Street or Yellowthroat Street? I would venture to think that most of the positive feedback in favor of this proposed indoor gun range come from those that do not live along any of these streets listed that will be directly impacted by the negative effects of this facility. I will conclude with asking you and the Parker Town Council with this question – would you want this indoor gun range literally in your backyard? Please keep in mind that if this facility is approved, that is in fact what hundreds of individuals will have (a gun range in their backyard) as they will have to live with all of the negative effects and unnecessary risks that come along with such a facility. Please reject the Use by Special Review application by Back 40, LLC archery and gun range. Thank you for your consideration.

Best regards,
Adam Paschal, MBA
Horse Creek Homeowner

From: Workman, Paul <pworkman@parkeronline.org>
Sent: Thursday, November 15, 2018 3:02 PM
To: japaschal@hotmail.com
Subject: Use By Special Review Criteria

Mr. Paschal,

Please find this information in response to our phone conversation on November 15th of 2018. The Town of Parker Community Development Department is in receipt of an application for a Use by Special Review from an entity called Back 40, LLC for an archery and gun range having education, training and retail elements. The application is currently in the third referral period of what is typically a multi-phase review process of two to three referral periods.

The property in question is located at the northwest corner of the intersection of Chambers Road and Double Angel Road in the Parker Homestead Planning Development, Planning Area 1, Mixed-Use Neighborhood Center. This area is zoned for a broad range of commercial uses and the proposed archery and gun range requires a Use by Special Review to be eligible for approval. This process incorporates an enhanced level of review and public hearings before the Planning Commission and Town Council. The applicant must address the Town's nine (9) Use by Special Review criteria to be eligible for approval as follows:

- a. Will be in harmony and compatible with the character of the surrounding areas and neighborhood;
- b. Will be consistent with the Town Master Plan;
- c. Will not result in an over-intensive use of land;
- d. Will not have a material adverse effect on community capital improvement programs;
- e. Will not require a level of community facilities and services greater than that which is available;
- f. Will not result in undue traffic congestion or traffic hazards;
- g. Will not cause significant air, water or noise pollution;
- h. Will be adequately landscaped, buffered and screened; and

- i. Will not otherwise be detrimental to the health, safety or welfare of the present or future inhabitants of the Town

Town staff will be looking for the applicant to address comments about safety, nuisances, traffic and other project related issues in a satisfactory manner. The applicant is also required to satisfactorily address the nine (9) Use by Special Review Criteria required by Town zoning which establishes a higher burden of proof for approval than a use permitted by-right. Finally, the applicant is required to appear and present at public hearings before the Planning Commission and Town Council to address comments, answer questions and respond to the nine (9) Use by Special Review Criteria.

The required public hearings have not been scheduled yet because the application is still in the review stage. You may review the submitted application on the Town web site through the Development Tour Map, Project 98 or Application #Z18-004, which may be found

here: <https://parkerco.maps.arcgis.com/apps/Shortlist/index.html?appid=7879283391d3453da213a439f2dca232>.

Thanks and please contact me if you have any questions or need additional information.



Paul Workman, Senior Planner
20120 E. Mainstreet Parker, CO 80138-7335
303.805.3327 www.parkeronline.org



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Mr. Paul Workman
Town of Parker Planning
20120 East Mainstreet
Parker, CO 80138

10506 Meadow Run
Parker, CO 80134
October 16, 2018

Dear Mr. Workman,

We are writing in support of the proposal by Back 40, LLC to develop an education and training center, archery and gun range at the corner of Chambers and Double Angel Roads.

Increasing options for recreation appeals to many Parker residents. The proposed facility will include an archery range, pistol and rifle bays, and large, specially designed rooms for shooter training for club members and members of the law enforcement community. Indoor ranges play an important role in educating people about the proper handling of firearms, in a safe, hands-on learning environment.

Archery as a sport is growing in popularity in Colorado - <https://kdvr.com/2018/03/06/archery-growing-in-popularity-in-colorado/>. It is an increasingly popular choice for especially popular among young people who don't enjoy participating in traditional high school team sports. As cited in this article, "according to the U.S. Consumer Product Safety Commission, archery is one of the safest sports in the country - safer than soccer, golf, and baseball". Archery enthusiasts are challenged both mentally and physically; it is both a precision sport (aiming to hit the target) and a team sport, in which participants work together to accumulate points. Movies like "Hunger Games", "Brave" and TV shows like "Arrow" have brought new interest to various groups of people for the first time. Much like skiing and snowboarding, archery can be both an individual and a team sport.

Indoor shooting ranges no longer appeal almost exclusively to an aging demographic of the population and is growing in popularity with women. Research by the National Sporting Goods Association indicates that the number of women who target shoot has increased by 50% in the past 10 years; female hunters have increased 42%, according to the same study. The 4-H Shooting Sports Program is the most popular 4-H program in the state of Colorado, with more than 3,500 young people participating, learning the safe and responsible use of both archery equipment and firearms. The inclusive nature of recreational shooting appeals to young people, and many parents report that spending time with their family at a shooting range ensures that their children are properly educated on gun safety.

The proposed site is buffered on all sides from residential use in addition to extensive sound abatement to accommodate users of the facility, as well as neighbors. A sound

engineering study has been conducted, consistent with the owner's intent that area residents would not be disturbed by additional sound from this facility. It would provide a new option in the Reuter-Hess Reservoir area, an increasingly popular area for outdoor sports enthusiasts. This is aligned with the Town of Parker's careful planning that has resulted in extensive athletic options for residents, including the network of trail facilities in the area. They are interested in enhancing opportunities of community members, being a good neighbor, and have been mindful throughout the planning process of specific requirements by the Town of Parker. A study of national exemplary ranges has been conducted, as well as those that have negatively affected neighborhoods.

Building this facility in Parker will bring both tax revenue and increased employment opportunities to Parker. As the parents of four sons and grandparents of eight grandchildren, we support the approval of this facility in our community.

Sincerely,



Dr. Douglas Hesbol



Dr. Kristina Hesbol

Workman, Paul

From: Jeff Johnson <jnkjson@yahoo.com>
Sent: Tuesday, December 11, 2018 5:58 PM
To: Workman, Paul
Subject: Fw: Z18-004

Mr. Workman,

It appears that I sent this e-mail to a ".com" in lieu of the ".org" e-mail. Please forgive my typo and put the e-mail below on file.

Jeff Johnson

----- Forwarded Message -----

From: Jeff Johnson <jnkjson@yahoo.com>
To: pworkman@parkeronline.com <pworkman@parkeronline.com>
Sent: Thursday, October 4, 2018, 10:12:41 PM MDT
Subject: Z18-004

Mr. Workman,

I wanted to contact you in regard to the project known as Z18-004 - Parker Homestead - Indoor Archery & Gun Range. While there has been an organized resistance to this project I and many other Parker area residents would enjoy having a facility like this in the Town. The facility will undoubtedly be an asset to the Town of Parker. Many residents that I know currently leave the Town limits to attend ranges in Centennial and Aurora. Due to this Parker dollars and tax revenues leave the Town limits, additionally many residents of the Franktown / Elizabeth community drive through Parker to reach these facilities.

The Town is using the Use by Special Review criteria for approval and I hope that the Town is objective in its review of the project. Some residents may have a dislike of the project type for personal reasons but the Town should be unbiased in its consideration of the project. The members of the facility should be thought of no differently than the members of a private golf community. I hope that the Town of Parker doesn't discriminate against this project because it is an Archery and Gun Range. The eTRAKiT documentation and requests for additional studies and information are substantially more stringent than other Use By Special Review Processes the Town has completed.

I have been witnessing a much less objective and balanced development review process within the Town of Parker. Requirements are bent and manipulated by the Town Attorney behind the scenes to preset the outcomes. It has been admitted to me that the Town Attorney provides "legal insight" into how the council can / should respond to projects after the public hearing process. This coaching has resulted in standards for old town's historic area being changed to allow for outrageous arts and library facilities and insane efforts have recently been made to annex land to stop a development not even in the Town of Parker. The Town has also allowed group homes for drug treatment and senior living in single family homes for fear of the federal government. Those use by special review processes were not stringent, thorough or delayed as much as the mentioned project and in the end I ended up with drug rehab business in my single family residential neighborhood.

I would like my support to be documented by being uploaded to the eTRAKiT document portal.

Thank you

Jeff Johnson
720-660-7885

Workman, Paul

From: Matthews, Bryce
Sent: Wednesday, January 02, 2019 8:12 AM
To: Workman, Paul
Subject: FW: Parker Homestead AMD1 - UbSR Indoor Archery & Gun Range

Follow Up Flag: Follow up
Flag Status: Completed

-----Original Message-----

From: Jessica Bobrick [mailto:jeccazilla@yahoo.com]
Sent: Sunday, December 30, 2018 2:47 PM
To: Matthews, Bryce
Subject: Parker Homestead AMD1 - UbSR Indoor Archery & Gun Range

Hello- I'm writing in support of the proposed indoor archery and gun range in the Heirloom/Horse Creek neighborhood. As a resident of the Horse Creek neighborhood, with my children attending Gold Rush Elementary school, I am in full support of this project. Also, I would be more than happy to share any comments from our neighborhood thread on the Nextdoor app. Most of the comments that were listed were in full support of this new business, opportunity to safely and in a controlled environment teach people about firearms and how to respect them. Many people volunteered to hold a membership to this range as soon as it opens. The principal purpose of the thread was to discourage and oppose this range, however the original writer was sharply contrasted by outspoken neighbors in full support. Please let me know if you'd like to see copies of this thread and all of the positive and supportive comments.

Workman, Paul

From: Jimmy Hawkins <jimmy.hawkins@gmail.com>
Sent: Thursday, January 03, 2019 9:49 AM
To: Workman, Paul; Mayor, Council, and TA; Waid, Mike
Subject: Proposed Back 40 Gun Range

Dear Mayor Waid, Mr. Workman and Town Council,

I'm writing today concerning the proposed indoor gun range at the corner of Chambers Rd. and Double Angel Rd. As a gun owner myself, I think Parker could benefit from and support an indoor range and training facility. However, having one this close (200 ft) from residential houses is not appropriate.

I live on Auklet St. just adjacent to the proposed location, and this location concerns me a lot due to the crime that a business like this attracts. Just last night, Douglas county had another gun store break in occur in Castle Rock and end in Highlands Ranch.

<https://www.9news.com/article/news/suspect-sought-after-chase-gun-store-break-ins/73-cad22acc-f04e-4918-98de-bb6fa2f6c233>

There are several examples of gun store break robberies in the south metro area (including Parker) over the past several years:

<https://www.thedenverchannel.com/news/crime/4-guns-stolen-after-smash-and-grab-robbery-at-parker-gun-store>

<https://www.denverpost.com/2017/05/24/littleton-gun-shop-smash-grab/>

<https://www.krdo.com/news/top-stories/trend-of-gun-store-break-ins-continues-in-colorado/566465736>

This is a nation wide trend. Firearms stolen during FFL robberies is up 200% since 2013!

<https://www.atf.gov/firearms/federal-firearms-licensee-ffl-burglary-and-robbery-statistics-calendar-years-2013-2017>

It's terrifying to think that a gun store robbery could occur 200 ft away from families and kids sleeping at night. Then these newly armed thieves could easily commit crimes of opportunity against residents considering the exit for the gun shop parking lot leads directly into our neighborhood. Please move this development to a more appropriate, commercial or industrial area.

Sincerely,

James (Jimmy) Hawkins
15201 Auklet St.
Parker, CO 80134
720-231-1018

Workman, Paul

From: Shannon Fitzgerald <shannon.fitzgerald@regulatoryridge.com>
Sent: Thursday, January 03, 2019 11:02 AM
To: Workman, Paul; Mayor, Council, and TA; Waid, Mike
Subject: Back 40 Gun Range

Dear Mayor Waid, Mr. Workman, and Town Council,

I am writing today concerning the proposed indoor gun range at the corner of Chambers Rd. and Double Angel Rd. While many believe Parker could benefit from and support an indoor range and training facility, having one this close (200 ft) from residential houses is not appropriate. I suspect that if you analyzed where most of the gun range's support is coming from, you will find it is from Parker residents (or others) who do not live this close to the proposed site. Therefore, they would not share the safety concerns that those of us who live very close to the proposed site share.

I live in the Heirloom community, which is adjacent to the proposed location. This location concerns me and my neighbors quite a bit due to many factors, not the least of which is the crime that a business like this attracts. Just last night, Douglas county had another gun store break-in occur in Castle Rock and end in Highlands Ranch.

<https://www.9news.com/.../73-cad22acc-f04e-4918-98de-bb6fa2f6...>

There are several examples of gun store break robberies in the south metro area (including Parker) over the past several years as well:

<https://www.thedenverchannel.com/.../4-guns-stolen-after-smas...>

<https://www.denverpost.com/.../24/littleton-gun-shop-smash-g.../>

<https://www.krdo.com/.../trend-of-gun-store-break-i.../566465736>

This is a nationwide trend. Firearms stolen during FFL robberies is up 200% since 2013!

<https://www.atf.gov/.../federal-firearms-licensee-ffl-burglar...>

It's terrifying to think that a gun store robbery could occur 200 ft away from families and kids sleeping at night. Then these newly armed thieves could easily commit crimes of opportunity against residents considering the exit for the gun shop parking lot leads directly into our neighborhood. Please move this development to a more appropriate, commercial or industrial area. We simply cannot implore you enough to do this.

Thank you,
Shannon

Shannon K. Fitzgerald, Esq. Founder & Managing Director

Regulatory Ridge, LLC | Regulatory Ridge, LLC | 17011 Lincoln Ave., #433 | Parker, CO
80134 | (o) 720.422.0914 | (c) 732.921.2316 | <http://www.regulatoryridge.com>

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Workman, Paul

From: Amy Camp <amygriff@yahoo.com>
Sent: Thursday, January 03, 2019 12:46 PM
To: Matthews, Bryce; Workman, Paul; Mayor, Council, and TA; Waid, Mike; Maloney, Jim; Fussa, John
Subject: Back 40 Gun Range

To Whom it May Concern,

I woke up this morning to the news that, yet again, there were gun shop robberies in Douglas County. This time two gun shops were robbed. This is just another piece of evidence as to why we should not have a gun range, with a gun retail shop, so close to our homes, schools, and churches. When these criminals attempt, and no matter how great the security system attempts will be made, the criminals will flee through our neighborhoods. As I write this, the third suspect is still at large and possibly armed.

<https://www.9news.com/article/news/suspect-sought-after-chase-gun-store-break-ins/73-cad22acc-f04e-4918-98de-bb6fa2f6c233?fbclid=IwAR3jcd5MLU0ghpmW6GG5fWYYHQxowIQvifdxOmjMIvtw3LhW3NAqNsemBM>

This is not the first time gun shops in our county have been targeted, this is not an isolated event. We should not be considering this location for this type of business. Please tell the Back 40 development not to develop in this location and to find a more suitable location for this type of business.

I did see that the Franktown Firearms recently opened a new/remodeled firing range. I am not sure why we need yet another range so close.

I also noticed the Sound Survey done on this location includes the loudest day of the year, the Legend Marching Band competition, that day should not be included in the "norm" as that is 1 day a year where the bands play all day long. It is something we as a community recognize as the 1 day the noise from the stadium is louder, but it is not part of our day to day noise. We will not be welcoming of the sounds of the gun range, nor the sounds it's HVAC system running all day long. My daughter attends gymnastics next to a gunsmith shop. Occasionally we can hear the gun shots from inside that business during her practice. They are loud, jarring and terrifying at first. I can not stand the fact that they are becoming "normal sound" for us at gymnastics. I am seriously considering moving my business elsewhere because of this adjacent business. I know I would NOT visit any businesses near this proposed gun range for the same reason. I do not believe other businesses would want to be near this facility either as it will effect their profits.

Thank you,

Amy Camp
Parker Resident

Workman, Paul

From: Scott Wells <scott@catch72golf.com>
Sent: Monday, January 07, 2019 11:05 AM
To: Matthews, Bryce; Maloney, Jim; Fussa, John; Workman, Paul; Mayor, Council, and TA; Waid, Mike
Subject: Back 40 Gun Range

Dear Mayor Waid, Mr. Workman, and Town Council,

I am writing today concerning the proposed indoor gun range at the corner of Chambers Rd. and Double Angel Rd. While many believe Parker could benefit from and support an indoor range and training facility, having one this close (200 ft) from residential houses is not appropriate. I suspect that if you analyzed where most of the gun range's support is coming from, you will find it is from Parker residents (or others) who do not live this close to the proposed site. Therefore, they would not share the safety concerns that those of us who live very close to the proposed site share.

I live in the Heirloom community, which is adjacent to the proposed location. This location concerns me and my neighbors quite a bit due to many factors, not the least of which is the crime that a business like this attracts. Just last night, Douglas county had another gun store break-in occur in Castle Rock and end in Highlands Ranch.

<https://www.9news.com/.../73-cad22acc-f04e-4918-98de-bb6fa2f6...>

There are several examples of gun store break robberies in the south metro area (including Parker) over the past several years as well:

<https://www.thedenverchannel.com/.../4-guns-stolen-after-smas...>

<https://www.denverpost.com/.../24/littleton-gun-shop-smash-g.../>

<https://www.krdo.com/.../trend-of-gun-store-break-i.../566465736>

This is a nationwide trend. Firearms stolen during FFL robberies is up 200% since 2013!

<https://www.atf.gov/.../federal-firearms-licensee-ffl-burglar...>

I would also like to highlight some of the research that has been conducted, showing the dangers that indoor gun ranges pose from exposure to lead dust. It has been determined that there is a serious health threat to all that frequent these locations and live in surrounding areas, especially children.

<https://projects.seattletimes.com/2014/loaded-with-lead/1/>

<https://www.npr.org/sections/health-shots/2017/05/10/527648768/lead-dust-from-firearms-can-pose-a-silent-health-risk>

It's terrifying to think that a gun store robbery could occur 200 ft away from families and kids sleeping at night. Then these newly armed thieves could easily commit crimes of opportunity against residents considering the exit for the gun shop parking lot leads directly into our neighborhood. Please move this development to a more appropriate, commercial or industrial area. We simply cannot implore you enough to do this.

Regards,

Scott Wells

--

Scott R. Wells, PGA
Owner & Teaching Professional



Catch-72 Golf | 717.283.8193 | <http://www.catch72golf.com>
At CommonGround Golf Course | 10300 East Golfers Way | Aurora, CO 80010

Workman, Paul

From: Marc Thomas <thomasdds@rocketmail.com>
Sent: Wednesday, January 23, 2019 6:03 PM
To: Workman, Paul
Subject: New Shooting Range in Parker

Follow Up Flag: Follow up
Flag Status: Completed

Hi Paul,

I had the pleasure of speaking with Rion Buswell today we had the chance to talk about his proposed project.

My office constructed a ground-up dental office last year and I understand the importance of thoroughly evaluating each project and the plan review process.

I'm writing to voice my support for his project. We discussed safety, minimizing sound disturbances etc and I was very impressed with the steps that he has taken to do this project correctly. As a father and business owner in Parker I feel that this project would be a popular attraction and a valuable addition to the community.

All the best,

Marc D. Thomas DDS

Canyon Ridge Pediatric Dentistry

(303) 841-7900

<http://www.canyonridgepediatricdentistry.com/>

Workman, Paul

From: Jeff Aelmore <jeffaelmore@hotmail.com>
Sent: Thursday, January 24, 2019 5:50 PM
To: Workman, Paul
Cc: ICE - Erika Aelmore
Subject: Re: Resident Comments on Project Z18-004 - UBSR denial criteria

Follow Up Flag: Follow up
Flag Status: Completed

Paul,

After reviewing the sound study for this file, I wanted to bring to your attention that on October 6, 2018 there was a marching band festival at EchoPark Stadium. On page 19 of the report, that day shows a spike in sound which skews the averages of Db higher than the usual quiet neighborhood. As such, I recommend a redline to show that excludes the outlier day.

Importantly, it remains concerning that Db levels are being considered as a component as it misses the point. The sound of gunshots, at any level, is a nuisance. I welcome marching bands and football games. Gunshots are NOT a pleasant sound and should not be given equal footing as local school events. Pursuant to Chapter 6.03.010 of Parker Municipal Codes, it is the policy of the town to prevent excessive sound and vibration which may jeopardize the health and welfare or safety of its citizens or degrade the quality of life.

This project, and the sound of gunshots at ANY level in a residential neighborhood, degrades the quality of life of Parker residents. It is illegal under our city code and should not be considered for UBSR.

Jeff

On Aug 30, 2018, at 3:08 PM, Workman, Paul <pworkman@parkeronline.org> wrote:

Hi Jeff.

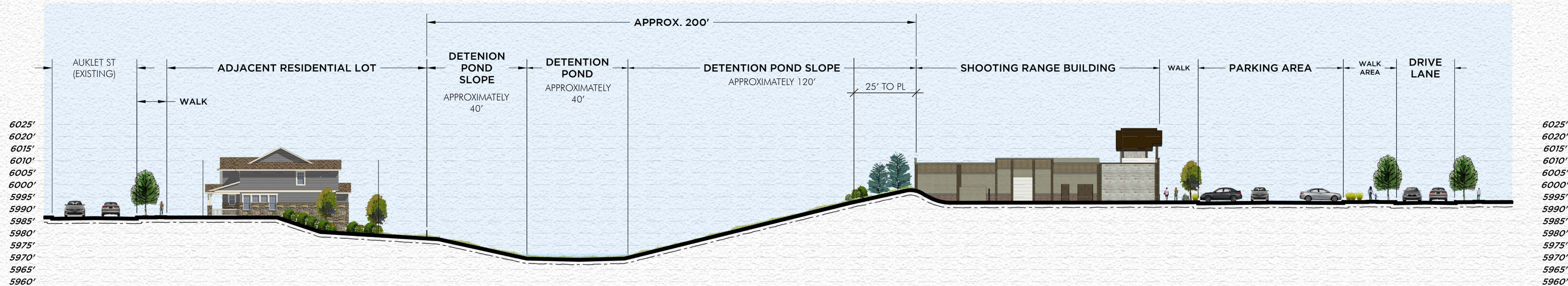
I appreciate you following-up on my email and the opportunity to clarify the information. I am a member of the Planning Division, which is a Division in the Community Development Department. The management team for Community Development is John Fussa – Community Development Director, Jason Rogers – Deputy Director of Community Development and Bryce Matthews – Planning Manager. In my earlier response to your email, I copied these individuals and they are copied again on this email. Please be assured that they are aware of the noise concerns.

As the assigned Planner for the applicant's request, I would encourage you to reach out to me with any additional information or concerns as I am the primary point of contact. I welcome any specific concerns that you or your neighbors provide.

Again, thanks for reaching out. Enjoy your afternoon.

<image001.png>

Paul Workman, Senior Planner



SECTION: A

SCALE: 1" = 20'-0"

BACK 40 BUILDING

10/25/2018
illustrative depiction, subject to change

Back 40 Shooting Range Rules

1. Firearms brought onto the property must be unloaded and in a secure case, range bag, or holster prior to entering the facility.
2. Eye and ear protection is required at all times while on the range.
3. Always keep your firearm unloaded until you are ready to use it.
4. Treat all firearms as if they are loaded.
5. Always keep your firearm pointed in a safe direction.
6. Always keep your finger out of the trigger guard until you are ready to fire.
7. Never point your firearm at anything you do not want to destroy.
8. Be sure of your target and what is beyond it.
9. Always use proper ammunition for your firearm.
10. If your firearm fails to fire, keep muzzle pointed down range and unload the firearm. Ask Range Safety Officers (RSO) for help if needed.
11. Immediately follow all instructions from the RSO.
12. Never pass a loaded firearm from one bay or person to another.
13. Shoot at the target in your bay only.
14. Shooter should only fire as rapidly as their ability permits.
15. No drawing from holster, unless you have passed the Back 40 "Holster Draw Class" and at holster draw events (Please show your Draw card to the RSO if you plan to draw from holster).
(optional, edit)
16. No handling of firearms out of shooting bay.
17. Firearms should be removed from and returned to transporting cases while in the bay area.
18. Collection of your own brass that is behind the firing line is permitted.
19. No part of your body is to go forward of the firing line at any time.
20. Range Safety Officers decisions or determinations are final.
21. Any misuse of the facility or disregard of the rules will result in expulsion from the range.
22. Shooters under the age of 18 must be accompanied and supervised by a parent or legal guardian at all times.
23. No food, drink, gum or use of tobacco permitted.

FFL Safety & Security
Plan Review & Recommendations
For: Back 40, Rion Buswell
(Site Pre-Construction)

Purpose

A physical security site assessment will be completed to assist the business owner in developing a strategic security and safety plan for a new firearms retail and gun range business, namely Back 40, proposed to open for business in Parker, CO. All recommendations are based on industry best standards, ATF guidelines as set forth in publication 3317.2 – Safety and Security Information for Federal Firearms Licensees and Security Assessment Criteria as described by the National Shooting Sports Foundation. This assessment does not include references to local zoning or building code requirements and remains the responsibility of the business owner and may be coordinated with JB Group, LLC upon request.

John Bocker and JB Group, LLC, a Colorado company, are independently contracted and assigned as “primary security consultants” to more than 12,000 firearms industry members including retailers, manufacturers, distributors and range operators. John Bocker is also the primary author on security related topics for all NSSF industry publications and www.nssf.org.

The recommendations described herein are intended to provide maximum security against major crimes specific to burglary and robbery, acceptable business standards regarding firearms inventory security and storage, site “target hardening” and the personal safety of employees and guests visiting the business location. Site drawings relative to current and future space planning and design must be provided to consultant by owner. Comments and recommendations related to building specifications are drawn from these items provided.

The evaluation and recommendation process will include, but is not limited to, the following:

- Access Control Systems
- Intrusion Detection Systems (Burglar Alarm)
- CCTV System Review, inclusive of Camera Type and Placement
- Information Security & Document Management
- Lock and Key Management
- Perimeter and Property Security
- Safety Systems (fire suppression, backup power)
- Firearms Inventory Management
- Firearms Display Case and Rack Security
- Visitor Entry, Vendor, Guest and Personnel Safety

The business will be owned and managed by owner, Rion Buswell (has been granted / has applied for) a Federal Firearms License, Type 1:

Type 1	Title 1 Dealer in Firearms Other Than Destructive Devices	This license allows you to buy, sell, and repair firearms.
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Both security and control elements will be reviewed during the planning assessment to evaluate overall business practices and ensure effectiveness of implemented practices and control measures.

The following areas of the business will be discussed and evaluated for future program development and implementation:

- I. Impression of Control
 - a. Exterior/Interior
- II. Physical Security Controls
 - a. Exterior/Interior
 - b. Intrusion Detection Systems
 - c. CCTV Systems
 - d. Physical Mechanisms
- III. Information Security Controls
 - a. Information Security
 - i. Document Security
 - ii. PII/PCI/EMV
 - b. Business Systems
- IV. Back Office Operations
 - a. Inventory Management & Control
 - i. Inventory Processes
 - b. Merchant Operations
 - i. Purchasing/Buying
 - c. Shipping / Receiving
 - d. Cash Management
 - i. Cash Runs/Deposits
- V. Human Resource Functions
 - a. Hiring Practices
 - i. Background Screening
 - ii. Training/On-boarding
- VI. Personnel Security
 - a. Incident Planning
 - b. Firearm Policy and Use of Force
 - c. Opening & Closing Procedures
- VII. Emergency Management
 - a. Business Continuity & Incident Planning

- b. Situational Communications
- VIII. Safety & Risk
 - a. General Liability
- IX. Other
 - a. Range Operations Safety