The Bill Blackwood
Law Enforcement Management Institute of Texas

Railroad Quiet Zone Issues in Public Safety

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ABSTRACT

The establishment of railroad quiet zones or whistle ban zones is relevant to contemporary law enforcement. As the principle city entity responsible for public safety, the law enforcement agency is charged with the first line of defense for safe implementation of community initiatives. The recommendations made will have a direct impact on that public safety.

The purpose of this research is to examine the safety of railroad grade-level quiet zones and determine if the quiet zones are a safe alternative for the community. The research will produce a summary of factors or driver actions that will guide implementation of railroad grade-level quiet zones. The implementation will be based on the safest, most cost-effective method of quiet zone implementation.

The method of inquiry used by the researcher included: a review of articles, internet sites, periodicals, journals, and an examination of the Federal Railroad Administration (FRA) railway accident database. The FRA database will be queried extensively because of the direct relationship of accidents at quiet zone crossings and driver actions.

The researcher discovered that the lack of a sounding train horn does not adversely affect the vehicular safety at grade-level crossings. The research produced driver actions to be the main predictor of vehicle accidents at grade-level crossings. Another area of further study could be based on pedestrian actions at railroad quiet zones. This area of safety was not examined.

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INTRODUCTION

The problem or issue to be examined considers whether railroad quiet zones are a safe alternative for citizens of a community. A grade-level crossing is an intersection where train tracks and the vehicle roadway cross at the same level. A railroad quiet zone is an area of railroad tracks that extends one-quarter mile in either direction from a grade-level crossing and the train does not sound the horn.

Grade-level railroad crossings are typical where public streets and highways intersect and cross railroad train tracks. The federal government, through an act from the Federal Railroad Administration (FRA) (2005), has mandated all trains approaching within one-quarter mile of a grade-level crossing sound a horn to warn approaching vehicles. This same act allows exceptions to this requirement. Communities can create railroad quiet zones or whistle ban areas that eliminate the requirement for the approaching trains to sound their horn by meeting specific safety improvement guidelines.

The relevance of railroad quiet zones to law enforcement is dictated by investigative and reporting requirements of accident investigations at rail-grade crossings. The community leaders look to local law enforcement to maintain a safe standard for commuting members. Research by law enforcement agencies will help guide the community leaders in making decisions that create railroad quiet zones. Using pre and post-quiet zone implementation accident data, along with input from citizens and economic data derived from the benefits of quiet zones, community leaders can make an informed decision.

The purpose of this research is to examine the safety of railroad grade-level quiet zones and determine if the quiet zones are a safe alternative for the community. This information can be used to select the safest and most cost effective implementation of railroad quiet zones. Together, the findings can produce a safer and better quality of life for the community. The research question to be examined focuses on whether or not implementation of grade-level quiet zones is a safe alternative for the community. The results of measured accident data in quiet zones compared to non-quiet zones will aid in the determination of whether a quiet zone should be implemented.

The intended method of inquiry includes: a review of articles, Internet sites, periodicals, journals, and examination of the FRA train-vehicle accident database. Using queries of the FRA database will produce statistics that compare the type of intersection to driver actions at those intersections. The intended outcome or anticipated findings of the research will show there are no significant risks to the community in creating railroad quiet zones. It is anticipated that added benefits in economic development and quality of life measures will overwhelm the decision-making process in favor of the creation of the railroad quiet zones.

The field of law enforcement will benefit from the research or be influenced by the conclusions because law enforcement is directly responsible when the safeguards in place at grade-level railroad crossings fail or do not perform as anticipated. The most noticeable changes are in vehicle-train accident occurrences. The changes can also result in pedestrian incidents as well as heightened issues with hazardous chemical events.

REVIEW OF LITERATURE

The implementation of railroad quiet zones by the Federal Railroad Administration was created in 2005. Many authors have written reports that surmised the benefits of quiet zones. Most of the literature focused on the health benefits of quiet zones and not the crash safety benefits or issues of implementing a whistle ban area. Accident and safety information is being compiled, but a shortage of realistic factual data is available.

In a recent article written to study the community impact of railroad quiet zones, Andersen (n.d.) investigated several effects of a railroad quiet zone and the safety of implementation. Writing on trains sounding their horns, he stated, “It has long been settled that failure to do so by a railroad can constitute negligence per se, Missouri, K. & T. Ry. Co. of Texas v. Cardena, 22 Tex. Civ. App. 300, 54 S.W. 312, (Tex. Civ. App. 1899, no writ)” (Anderson, n.d., p. 4). He added that Texas does have a statutory requirement that trains approaching an intersection from a quarter of a mile distant sound a horn. As an attorney, he focused on the legal requirements in effect for maintaining safety at railroad crossings. Charged with the studying the implementation of quiet zones and not just the safety concerns, he narrowed his focus to the benefits to the community as a whole.

In 2005, the Federal Railroad Administration released a final Environmental Impact Statement (EIS) that dealt directly with the safety of grade-level quiet zones implemented at railroad crossings. Looking at both safety and environmental noise, the EIS found that quiet zones would have a positive impact on the human environment. The impact occurs through a reduction in noise pollution and improvements in rail safety

that saves lives and reduces injuries. Because of the improved safety measures that are required at installations of railroad quiet zones, the Federal Railroad Administration declared that these intersections will result in enhanced and improved vehicle/train accident data.

Lee (2002) wrote that anticipated safety issues in railroad quiet zones would be "beneficial in the health of the community" (p. 8). His research focused more on the sound impact of quiet zones and did not address the collision impacts. Although an important aspect of the health and safety of the community, the topic of sound impact distorted the singular effect of accident data.

In 2005, John Redden, Professional Engineer and Senior Railroad Engineer, provided an insight into the projected safety of railroad quiet zones. In observing the intersection improvements required by the new Federal Railroad Administration rules, he noted that flashing light signals with gates, as the minimum level of protection, are required at all grade crossings within new quiet zones. The grade crossing warning devices must be activated by constant warning circuitry. Each highway approach to every public and private grade crossing within a new quiet zone must have an advance warning sign that advises motorists that train horns are not sounded at the crossing. In addition, the installation of one of several FRA-approved supplemental safety measures or alternate safety measures may be required at all or some grade crossings within the quiet zone. In summary, he explained the usage of a "Risk-Index." Before implementation of a railroad quiet zone can be completed, the intersection must score as acceptable. The criteria for scoring the intersection results in a determination that the quiet zone will be safer after implementation.

The most resourceful reference to date is the Federal Railroad Administration database of January 2009. This database has compiled all of the available accident data that involved trains, whistle bans or quiet zones, and crashes that involved vehicles at grade-level crossings. The data quoted in this collection of crash information gives a raw truth about the driver actions that occurred leading up to a crash.

METHODOLOGY

The research question to be examined considers whether or not railroad quiet zones are a safe alternative for citizens of a community. The researcher hypothesizes that railroad accident data will not display an increase in accidents at railroad crossings that are under a quiet zone umbrella. The method of inquiry will include a study of engineering data on article reviews and a study of the accident data files form the Federal Railroad Administration. The instruments that will be used to measure the researcher's findings regarding railroad quiet zone safety are the accident data files from the Federal Railroad Administration.

Prior to 2005 and the passage of the Federal Railroad Administration rule on quiet zones, there were an indeterminate number of crossings that had unregulated whistle bans. This number is still unknown today. Because of this determination, a percentage-based number of accidents in whistle ban crossings versus non-whistle ban crossings cannot be used. Other factors, including number of crossings and number of trains at these intersections, make the percentage-based methods unreliable. As a result, other criteria will be used to determine the safety of whistle ban railroad crossings.

Using the Federal Railroad Administration database, queries will be constructed to interrogate the database and produce accident data numbers. Many driver actions can contribute to a highway rail crossing accident. To compare the safety of a whistle ban crossing to a non-whistle ban crossing, a focus on driver actions before the crash will be made. These comparisons of driver actions allow one form of safety evaluation by comparing the whistle ban and non-whistle ban intersections.

The queries consisted of year of accident, accident circumstance, whistle ban implemented, driver action, and state of occurrence. The driver actions will be documented as: drove around or through the gate, stopped and then proceeded across, did not stop, stopped on crossing, and other. The accident circumstance will be confined to the rail equipment striking the vehicle. The whistle ban implemented will consist of a whistle ban either in effect or not.

Early in the research, it became apparent that using a percentage of accidents in whistle ban crossings versus non-whistle ban crossings in Texas could not be used. There were not enough accidents in whistle ban crossings in Texas. Since a reliance on using driver actions before the accident would be compared in whistle ban crossings and non-whistle ban crossings, national numbers will be used for the whistle ban driver actions. The Texas numbers will be included in the findings for reference only.

FINDINGS

Only highway railroad crossings that had accidents were evaluated. Only those intersections that were known to have a whistle ban in effect or not were examined. If the intersection was unknown, it was not included in the findings. The Federal Railroad Administration (2009) database produced the following accident information.

Less than 5% of the highway railroad crossings examined did not have any audible or flashing warning signals. Ninety-five percent of the crossings with accidents had a combination of flashing signals, audible warnings, and crossing arm barricades.

Accidents in Texas were compiled for the years 2005 through 2008. In the four years of accident data examined in Texas, there were 1,126 accidents involving vehicles and trains at highway crossings. These accidents resulted in fatalities, injuries, and property damage. Of these 1,126 accidents, six occurred at crossings that had a whistle ban in effect. Not knowing the percentage of whistle ban intersections versus non-whistle ban intersections in existence will make a direct comparison not practical. The driver actions before the crash are the best indicator of the safety differences.

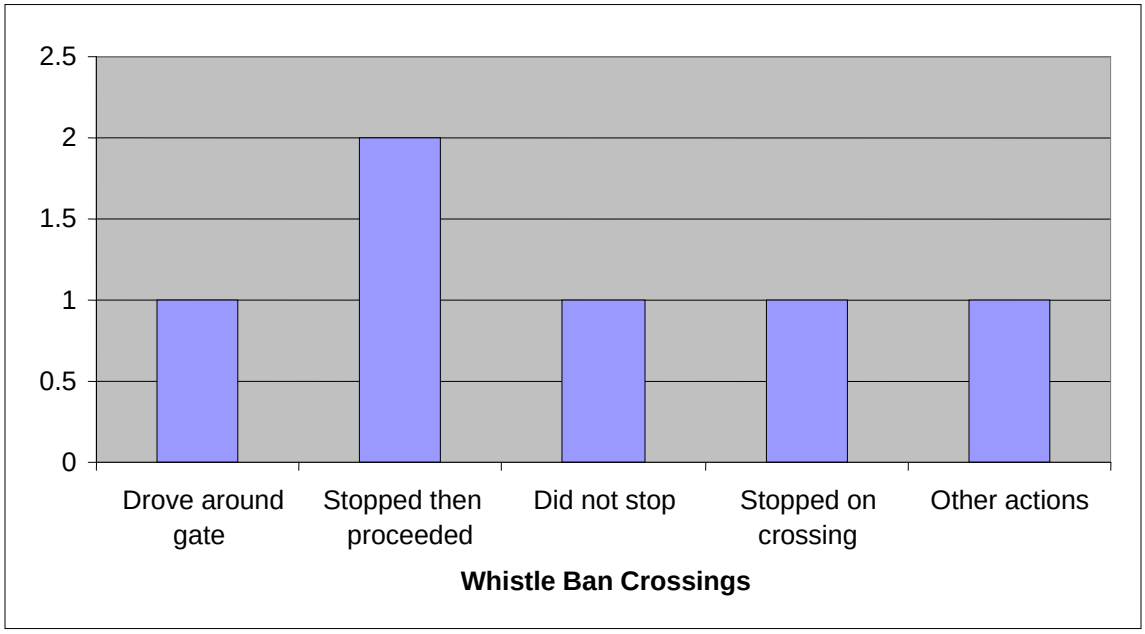

Figure 1. Number of accidents at Texas whistle ban crossings.

The above chart shows the limited number of samples available. Based on the limited data of only six accidents at whistle ban crossings, 33% of the drivers stopped and then proceeded across the tracks. The graph displays the number of grade-level

crossing accidents involving trains striking vehicles. There were five actions categorized that each driver did before the accident. It is apparent that even with gates, lights, and markers indicating when a train is approaching, drivers continue to drive into the path of a train or stop on the tracks.

There were 895 accidents in the four-year database that involved trains striking vehicles in a non-whistle ban crossing. The following chart depicts the breakdown of driver actions before the accident.

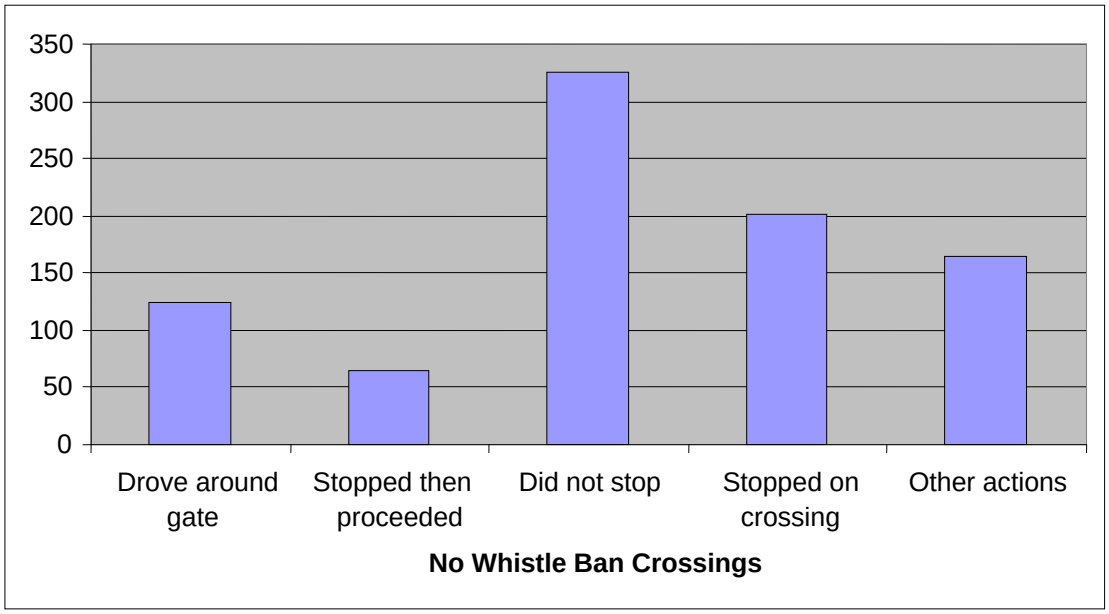

Figure 2. Number of accidents at Texas non-whistle ban crossings.

The above chart shows the number of driver actions before being struck by a train in a non-whistle ban crossing. Thirty-six percent of the drivers did not stop before impact. The presumption at a non-whistle ban crossing is the train was blowing the horn, yet 36% ignored or did not hear that horn. It is apparent from the data that drivers continued to drive across the tracks with all warning systems in place. The case of the

train blowing its horn is present in all of the accidents depicted here, yet the number one driver action was “Did not stop.”

In the four years of accident data examined nationally, there were 7,751 accidents involving trains striking vehicles at highway crossings. These accidents resulted in fatalities, injuries, and property damage. Of these 7,751 accidents, 345 occurred at crossings that had a whistle ban in effect.

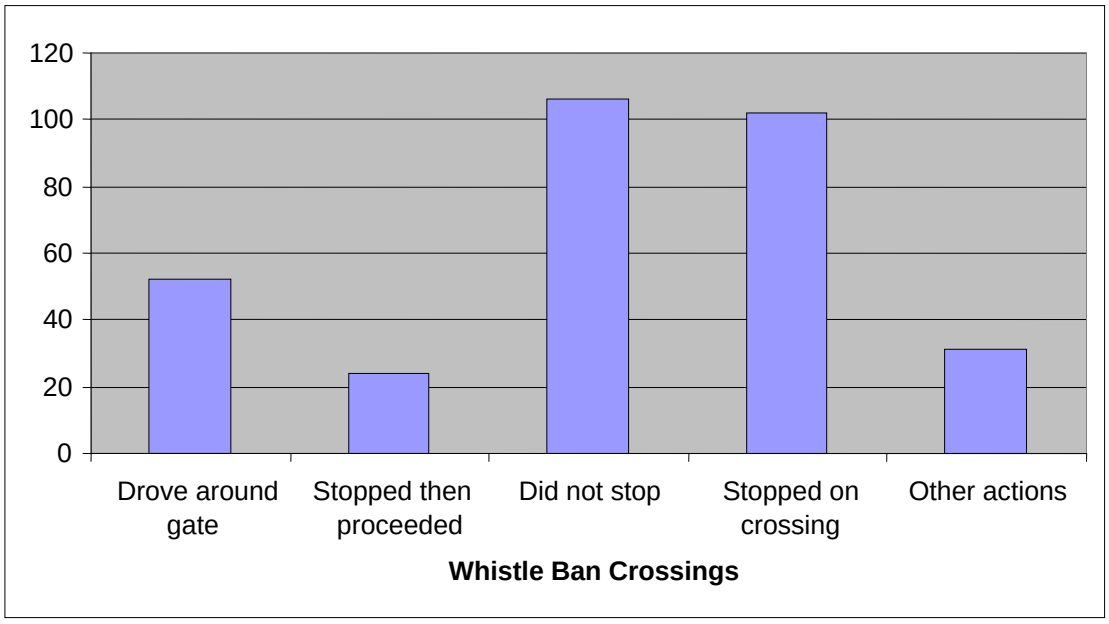

Figure 3. Number of accidents at national whistle ban crossings.

Thirty-three percent of the drivers at active whistle ban crossings did not stop at the crossing. Thirty-two percent stopped on the crossing before being struck. Sixteen percent of the drivers chose to drive around the crossing gate. Almost 8% stopped and then proceeded across the tracks and were struck by a train.

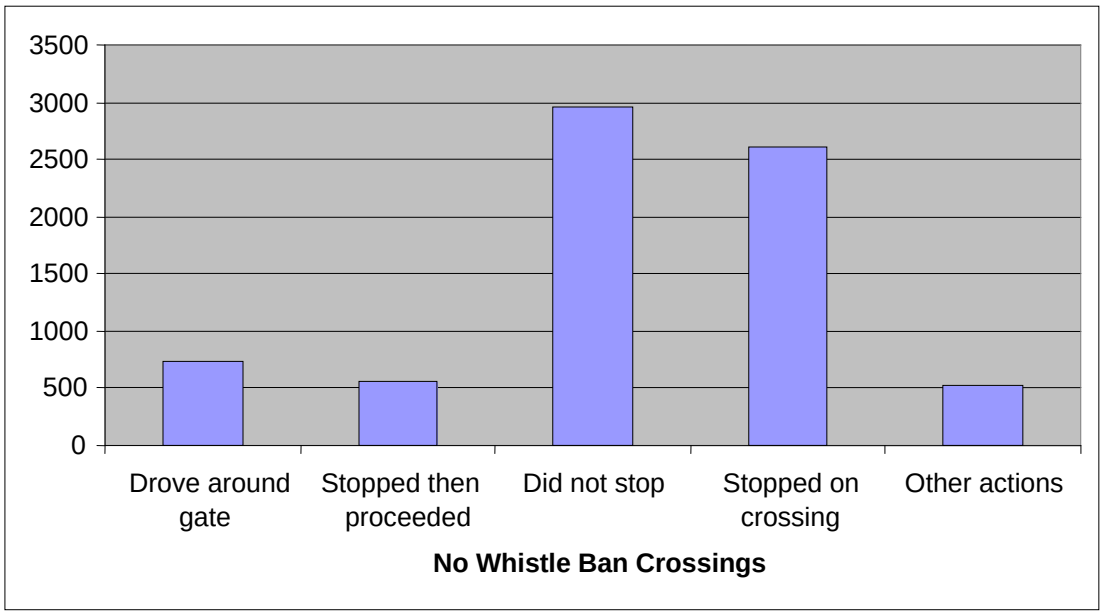

Figure 4. Number of accidents at national non-whistle ban crossings.

Forty percent of national drivers involved in a vehicle-train accident at a no whistle ban crossing did not stop for the train. The presumption at a non-whistle ban crossing is the train was blowing the horn, yet 40% ignored or did not hear that horn. Thirty-five percent stopped on the crossing. Again, the presumption is they ignored or did not hear the horn. The national ratio numbers at non-whistle ban crossings is very similar to the numbers present for Texas.

DISCUSSION/CONCLUSIONS

The problem or issue examined by the researcher considered whether or not railroad quiet zones are a safe alternative for citizens of a community. Grade-level railroad crossings are typical where public streets and highways intersect and cross railroad train tracks. The federal government, through an act from the Federal Railroad Administration (FRA) (2005), has mandated all trains approaching within one-quarter mile of a grade-level crossing sound a horn to warn approaching vehicles. This same act allows exceptions to this requirement. Communities can create railroad quiet zones

or whistle ban areas that eliminate the requirement for the approaching trains to sound their horn by meeting specific safety improvement guidelines.

The purpose of this research was to examine the safety of railroad grade-level quiet zones and to determine if the quiet zones are a safe alternative for the community. The research produced a summary of factors or driver actions that will guide implementation of railroad grade-level quiet zones. The implementation will be based on the safest, most cost-effective method of quiet zone implementation.

The research question examined focused on whether or not implementation of grade-level quiet zones is a safe alternative for the community. The results of measured accident data in quiet zones compared to non-quiet zones aided in the determination of whether a quiet zone should be implemented.

The researcher hypothesized that railroad accident data would not display an increase in accidents at railroad crossings that are under a quiet zone umbrella. Reading from the Federal Railroad Administration data, they estimated that there are over 250,000 railroad crossings in this country. More than 60,000 of these crossings are equipped with some type of collision avoidance device. From their accident data, there are approximately 3,000 to 4,000 accidents per year nationally, many of which are caused by drivers that know a train is coming yet drive around the crossing gates.

Railroad crossing accidents are relatively rare. More than three out of four of the accidents are caused by factors other than not being warned of an arriving train (Federal Railroad Database, 2009). Based on this, the assumption is that having additional barrier based safety equipment or supplemental safety equipment required in a quiet zone crossing will result in improved safety for the community. This assumption

is based on railroads, historically, installing barriers and other warning devices at railroad crossings to increase safety.

The researcher concluded from the findings that after examining the accident data, there is no definitive data that indicates quiet zones are more dangerous than whistle blowing intersections. Based on the data and improved grade-level crossings mandated by quiet zones, the quiet zones are actually safer. In the national statistics, the drivers that did not stop, stopped then proceeded, or stopped on the tracks were consistent in both whistle ban and non-whistle ban crossings. Only one category seemed to indicate a whistle ban intersection may be more dangerous. When drivers drove around or through the barricade, the result was a higher percentage of accidents in whistle ban intersections. Other data that should be examined is the health benefits of whistle ban areas. Fleming (2002) suggested that some industrial areas and residential areas around trains do not meet federal guidelines on noise pollution. He indicated there may be harmful effects to the workers and citizens by train noise. This would be an interesting area of research for further study.

The findings of the research did support the hypothesis. The reasons why the findings did support the hypothesis are probably due to the accident data and the driver actions. Drivers made mental decisions to stop on tracks, ignore warnings and not stop, and also stop and then proceed into the paths of oncoming trains. The education of the public in train safety should help these behaviors. Driving around a barricade into the path of an oncoming train is a very bad decision or, at worst, suicide. The Federal Railroad Administration has allowed the creation of quiet zones when a standard of safety can be demonstrated at an intersection. The standards that must be met can

either exist at application time or be implemented by supplemental safety enhancements. Two of the enhancements that help meet the standard are crossing arms that drivers cannot go around and secondary wayside horns. The wayside horns are mounted at the intersection and alert drivers to an oncoming train. The advantage is environmental. Only the immediate intersection has the noise pollution instead of one-half mile of track.

When considering a whistle ban or quiet zone, the implementation of supplemental safety equipment should be used. Additional barricades that completely block the road and additional sounding devices such as wayside horns that are local horns to drivers should be considered. These enhancements will mimic the train and reduce the one area of safety that is more dangerous in a whistle ban intersection: drivers driving around barricades.

Limitations that might have hindered this study resulted because quiet zones are new and the accident data is not extensive. The FRA cannot produce an exact number of intersections and the equipment installed in those intersections. Since driver actions were interpreted by witnesses, the intent of their actions can only be attributed to negligence and not an overt act. Other train accident data that involved pedestrians near whistle ban areas was not examined. It should also be noted that train operators who see a safety violation by drivers can still blow their whistle at whistle ban intersections.

The study of railroad quiet zones or whistle ban zones is relevant to contemporary law enforcement. As the principle city entity responsible for public safety, the law enforcement agency is charged with the first line of defense for safe

implementation of community initiatives. The recommendations made will have a direct impact on that public safety. The community stands to benefit from the results of this research by the recommendations made resulting in a safer place to live and work.

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