

6 January 2022

The Honourable Faris Al-Rawi
Attorney General and Minister of Legal Affairs
Ministry of the Attorney General and Legal Affairs (MAGLA)
AGLA Tower, Level 21 Government Campus Plaza
Corner of London and Richmond Streets
PORT OF SPAIN



BY EMAIL: falrawi@ag.gov.tt
fnamohammed@ag.gov.tt

Dear Attorney General,

CONSULTATION ON LEGISLATIVE PROPOSAL IN RELATION TO THE REGULATION OF THE USE OF FIREWORKS

On behalf of the Board of Directors of the Environmental Management Authority (EMA), I extend best wishes for a successful 2022.

The subject and MAGLA's correspondence dated 5 January 2022 refer. The EMA has been grappling with the issue of fireworks and the remit of the Summary Offences Act, Chap. 11:02 to treat with same for some time. From June-July 2020, the EMA conducted stakeholder consultations by way of a public survey on *'The Use and Impacts of Fireworks on Trinidad & Tobago'*. The results were presented to the Ministry of Planning & Development (MPD) in November 2020 and to the wider public via the EMA's Webinar series in August 2020.

In October 2021 the EMA completed and submitted its *'Position Paper on the Management of Fireworks in Trinidad & Tobago'* to MPD for urgent consideration.


In light of the current public consultation being conducted by MAGLA on a draft Summary Offences (Amendment) Bill in relation to the regulation of the use of fireworks, the EMA is pleased to share the enclosed Survey Results and Position Paper for information and reference.

Written submissions on the draft Amendment Bill will be provided under separate cover by the stipulated deadline of 26 January 2022. The EMA looks forward to the enactment of fireworks legislation to protect human health and the environment.

Should any clarification or further information be required, please do not hesitate to contact our Manager-Legal Services, Jenell Partap (jpartap@ema.co.tt) or Assistant Manager-Technical Services, Jiselle Joseph (jjoseph@ema.co.tt).

Yours sincerely,

ENVIRONMENTAL MANAGEMENT AUTHORITY


Nadra Nathai-Gyan
CHAIRMAN

Encl/(2) Survey Results on the Use and Impacts of Fireworks on Trinidad & Tobago
Position Paper on the Management of Fireworks in Trinidad & Tobago

cc MAGLA's Director Legal Criminal Justice Unit, Farzana Nazir-Mohammed

8 Elizabeth Street, St. Clair, Port of Spain, Trinidad & Tobago, West Indies.
Tel: (868) 226-4EMA(4362) Fax: (868) 628-9123; E-Mail: ema@ema.co.tt



Board of Directors

Chairman: Nadra Nathai-Gyan, Deputy Chairman: Judy Daniel

Directors: Ronald Adams, John Julien, Vyash Nandlal, Garth Ottley, Dr. Roshan Parasram, Gordon Paul, Althea Thompson, Jacqueline Wilson

REPORT ON THE RESULTS OF
THE PUBLIC SURVEY ON THE
USE AND IMPACTS OF
FIREWORKS IN
TRINIDAD AND TOBAGO



OCTOBER 1, 2020

CONTENTS

1. Introduction	1
1.1 Background.....	1
1.2 Fireworks Survey	2
2. Methodology	4
2.1 Survey Development / Design.....	4
2.2 Administration of the Survey	4
2.3 Data Processing	4
2.4 Virtual Presentation of Results	6
3. Results	7
3.1 Sample Size.....	7
3.2 Demographics.....	7
3.2.1. <i>Location of Respondents</i>	7
3.2.2. <i>Age and Gender of Respondents</i>	8
3.2.3. <i>Household Information</i>	9
3.3 Fireworks Use.....	11
3.3.1. <i>Purchase of Fireworks</i>	11
3.3.2. <i>Discharge of Fireworks</i>	11
3.4 Fireworks Impacts.....	12
3.4.1. <i>Affected Parties</i>	12
3.3.2. <i>Time and Frequency</i>	14
3.5 Proposed Actions.....	15
3.6 General Comments.....	16
3.6.1. <i>Additional Comments</i>	16
3.6.2. <i>Recommendations</i>	17
3.7 Virtual Presentation and Other Comments	19
3.7.1. <i>Webinar Series</i>	19
3.7.2. <i>Coalition of NGOs</i>	19
4. Conclusion and Recommendations	20
References	21

LIST OF FIGURES

Figure 1: Road Map of the EMA's Involvement in Fireworks Management.....	3
Figure 2: Geographic Location of Respondents	8
Figure 3: Respondent Age Categories	8
Figure 4: Respondents by Gender	8
Figure 5: Household Size	9
Figure 6: Pet Type	10
Figure 7: Residence Type	10
Figure 8: Fireworks Purchase Location	11
Figure 9: Events during which Fireworks were used	12
Figure 10: Fireworks Discharge Locations	12
Figure 11: Affected Persons and Age Groups	13
Figure 12: Affected Pet Types.....	13
Figure 13: Source of the Impact	14
Figure 14: Frequency of Fireworks Discharge	14
Figure 15: Time Period During Which Firework Impacts were Experienced	15
Figure 16: Preferred Actions to be Taken to Address the Issue of Fireworks	15
Figure 17: Additional Comments Received	16
Figure 18: Recommendations Received.....	18

1. Introduction

Fireworks are used in cultural, religious, and national celebrations throughout the world. In Trinidad and Tobago, fireworks are mainly used to celebrate Independence Day, Divali and New Year's Eve. To a lesser extent, they are used in private celebrations, such as, weddings, anniversaries and birthdays, as well as, at some public events, such as, Carnival concerts and fetes.

The increased popularity and availability of fireworks to the general public has led to bigger and more extravagant discharges and displays, and it has been observed that these have resulted in noisier discharges and smokier aftermaths. As a result, more and more persons have been highlighting the negative effects that fireworks may have on humans, animals, and the general environment.

Globally, there is a growing shift to awareness of the effects of traditional fireworks and calls for greater use of noise reducing fireworks. Decisions have been made by public and private entities to restrict the use of loud fireworks and promote the use of silent fireworks instead. In terms of legislation, the Italian town of Collecchio banned loud fireworks in 2015 and replaced these with silent fireworks (Yin 2016). Similarly, the City of Vancouver, British Columbia, Canada is developing an implementation plan to ban the use of personal and consumer fireworks by 2021 (Vancouver City Council 2020). The United Kingdom (UK) Parliament, received a petition in 2019 from citizens calling for a ban on fireworks. It is currently engaging in a fact-based evidence study to determine whether there is in fact a problem and to determine appropriate action, as necessary (Conway 2020). Other general measures and actions include: venues permitting only silent fireworks, local authorities restricting usage of loud fireworks in the vicinity of sensitive receptors, stores stocking noise reducing fireworks only, and personal choices in the types of fireworks bought and used.

1.1 Background

The Environmental Management Authority's (EMA) role in the management of fireworks, in Trinidad and Tobago, is primarily one of a technical advisory nature. Based on the EMA's technical expertise in environmental management, the organisation advises those entities with the jurisdiction for fireworks, in Trinidad and Tobago.

In November 2015, a Joint Select Committee (JSC) on Social Services and Public Administration was convened to conduct an “Inquiry into the Adverse Health Effects of Fireworks”. The EMA appeared before this Committee, in a public hearing in April 2017, to answer queries pertaining to the role of the EMA, and the bounds of its legislation on the issue of fireworks. At this hearing, the EMA was tasked with carrying out an investigation into the negative impacts of fireworks with regard to air and noise pollutants. This study was completed and submitted to the JSC as required. The JSC subsequently concluded its hearing and issued its final report in May 2018, which contained short, medium, and long-term recommendations for the EMA.

In June 2019, the EMA submitted a Draft Cabinet Note to the Ministry of Planning and Development (MPD), recommending a ban on the importation of traditional fireworks and that the use of noiseless fireworks be encouraged. In response, MPD instructed the EMA to conduct further consultations to support this recommendation.

In compliance with this instruction, the EMA reached out to key stakeholders, inviting them to participate in discussions on the issue of fireworks. However, in March 2020, due to the Coronavirus disease (COVID-19) pandemic, the Government of the Republic of Trinidad and Tobago (GORTT) imposed several restrictions, including those regarding gatherings. As a result, the EMA adapted its approach and issued a public survey via electronic media, to gather the necessary information. Figure 1 provides a road map of the EMA’s interactions with the JSC and MPD, and the requirement for a Public Survey.

1.2 Fireworks Survey

The aim of the fireworks survey was to obtain data from the public, using a random sampling method. The survey sought to garner information on the current practices, with respect to the use of fireworks, as well as, to obtain feedback on its impacts and opinions, on any proposed actions to deal with fireworks.

This data was compiled into this report, to the MPD, in support of the EMA’s recommendation to ban the importation of traditional noisy fireworks, while promoting the use of noiseless fireworks.

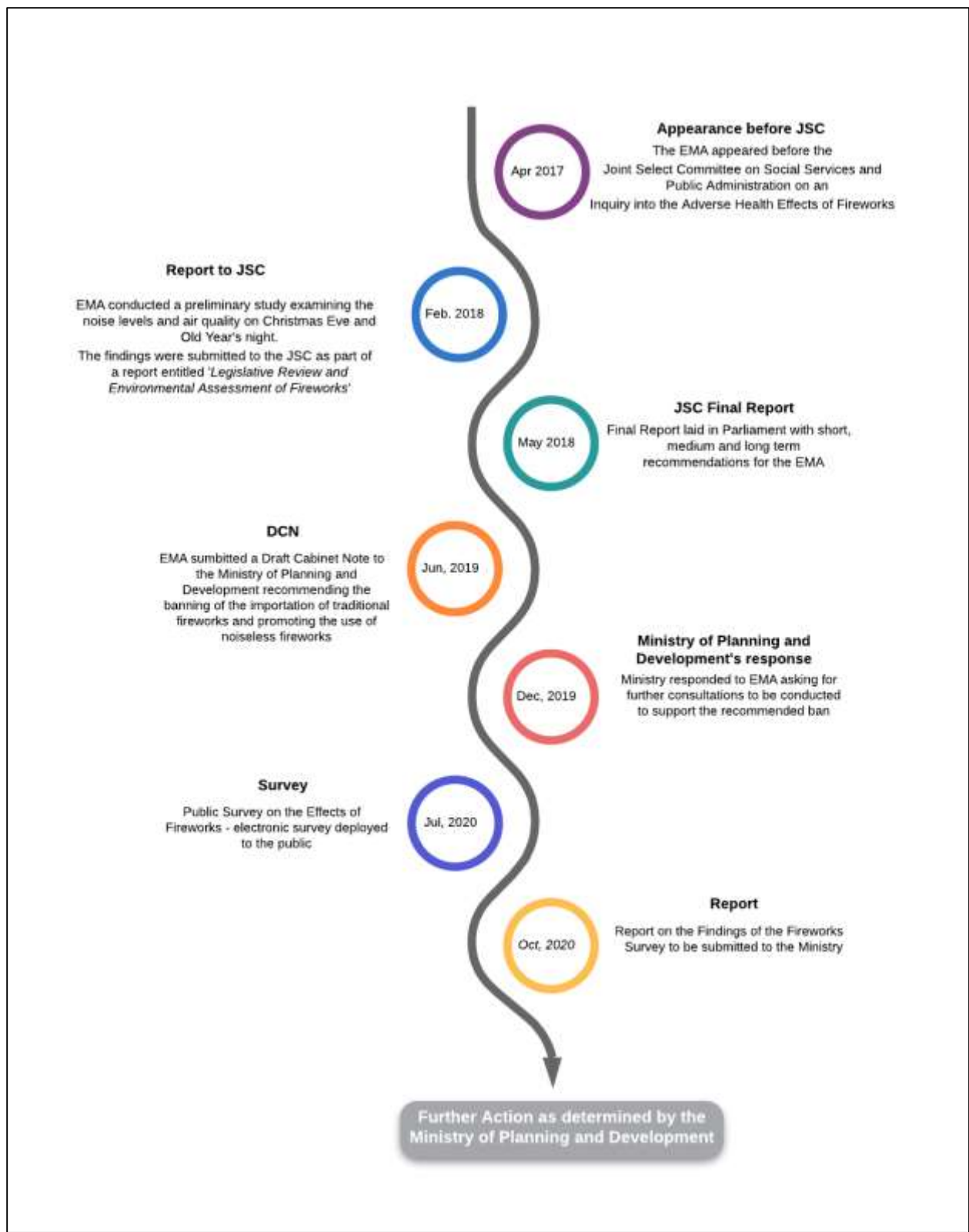


Figure 1: Road Map of the EMA's Involvement in Fireworks Management

2. Methodology

2.1 Survey Development / Design

The survey aimed to acquire information on the following:

- How fireworks are currently used – by whom, when, where, and how,
- The impacts of fireworks – who is affected and how are they affected,
- The preferred actions for dealing with fireworks,
- General comments.

Relevant questions to gather the pertinent information were then formulated. The survey was designed to optimize the experience of the user and to keep the user's interest, while completing the form. Questions were open and closed-ended. There were also options to complete fillable boxes. Respondents were required to type their responses. Where possible, user control options, such as, checkboxes were utilized, as well as branching to omit those questions that were irrelevant to the respondent.

2.2 Administration of the Survey

The survey was administered electronically, to the public, using Survey Monkey. The link to the survey was publicised on the EMA's web page, as well as, the EMA's Facebook account. This survey was available to the public during the period June 19 to July 31, 2020.

The survey was deployed in two iterations. The first iteration did not employ the use of branching or allow multiple selections for queries where multiple responses were applicable. A modified version of the survey that rectified the issues experienced with the first survey was re-administered. As such, there were alterations to some of the questions asked, as well as, the implementation of multiple responses options, for certain questions.

2.3 Data Processing

Due to the differences between the two surveys, some of the data required processing, prior to analysis.

In the first survey, the first question asked for the "*respondent's location.*" Respondents were asked to identify the specific "*Regional Corporation.*" They were required to type their response. However, the second survey provided respondents with options. They were required to select the applicable choice. Data from the first survey was sorted, in order to determine the

relevant Regional Corporation, for each answer provided. Once this was done, the responses were tallied for each Regional Corporation. The responses for both surveys were then combined and analysed.

Participants were required to indicate the “*number of persons within their household.*” In the first survey, respondents were required to type their response. In the second survey, the responses were in the format of a fillable boxes. Respondents had to identify the “*age groups,*” and type in a number which represented the “*number of persons in the household*”, who fell into the appropriate age group. The responses received in the first survey was a mix of numerals and words. All responses were converted into a numerical format and sorted into ranges that were given in the second survey. With the second survey, it was observed that rather than a response representing a number of persons, many of the responses were representative of the actual ages of the household members. Due to this factor, it would have been extremely difficult to use the data, in the form it was intended, (*number of persons in each age group*). As a result, the data was converted into a format similar to that of the first survey, where a total number representing the number of persons in the household was provided. To do this, the response provided by each person was analysed and the total number of persons in their household was calculated. In cases where an age was given it was counted as a single member towards the entire number of occupants in that household. These results were then sorted into ranges and combined with the results from the first survey.

Regarding pet ownership, the first survey provided an option. Respondents had to type in the response regarding the *type of pet* that was owned. While the second survey, provided respondents with options for selection. There was an open-ended response - “*Other*” and they were required to type only were the response. The data collected from the first survey was sorted into the categories used in the second survey. Both sets of responses were combined.

Data collected on who is affected by fireworks in the first survey gave a single option, for “*Age Ranges*” and an open-ended option: ‘*Other.*’ The latter option was used if, a participant’s choice was not present. Whereas, in the second survey, this question was presented in two parts: - one focused on humans and the other on pets. Many responses received in the first survey were related to pets and wildlife rather than humans, using the ‘*Other*’ option. These responses were combined with those received for the corresponding question in the second survey.

Similarly, some responses received in the second survey relative to the question on pets, were specific to humans. These responses were combined with the corresponding question related to humans.

The final question in both surveys invited respondents to provide additional comments, via a text box which allowed responses to be typed. Each response was examined and sorted into categories based on the general theme of the comment.

Where responses were deemed applicable to the previous questions asked with the surveys, they were included in that data set. Although this resulted in an increase to the number for certain results the total number of respondents had not changed and therefore the total number of participants for each question was not altered.

Once the data from both surveys were consistent, percentages were calculated and represented graphically.

2.4 Virtual Presentation of Results

The results of the survey were presented to the public virtually on August 25, 2020 via a Webinar hosted on the Zoom platform and simultaneously broadcasted live via the EMA's Facebook page. The public was able to submit questions through both avenues, as well as, through the EMA's Knowledge Series email address. Questions, comments and suggestions received through this medium were also incorporated into the report.

3. Results

3.1 Sample Size

A total of two thousand, nine hundred and seventy-eight (2978) responses were received during the survey period. The Raosoft® Sample Size Calculator was used to determine the minimum sample size for Trinidad and Tobago's population of approximately 1.4 million¹ people, and this was calculated as six hundred and sixty-four (664) persons. Therefore, the responses received were adequate and representative of the population.

3.2 Demographics

3.2.1. Location of Respondents

Respondents were asked to indicate their "*Municipality*," and to identify the locality – that is, the city, or town within which they were located. Figure 2 shows the distribution of responses throughout the country.

With respect to location a total of two thousand nine hundred and sixty-two (2962) responses were received. Respondents were distributed throughout all fifteen municipalities in Trinidad and Tobago, as seen in Figure 2. The highest number of responses – 18.64% were received in Tunapuna / Piarco, while the lowest number of responses – 0.61% were received in Mayaro / Rio Claro.

¹ The Central Statistical Office (CSO) Mid-Year Population Estimate as of June, 2019 is stated as 1 363 985 persons. Source: <https://cso.gov.tt/tt-at-a-glance/>

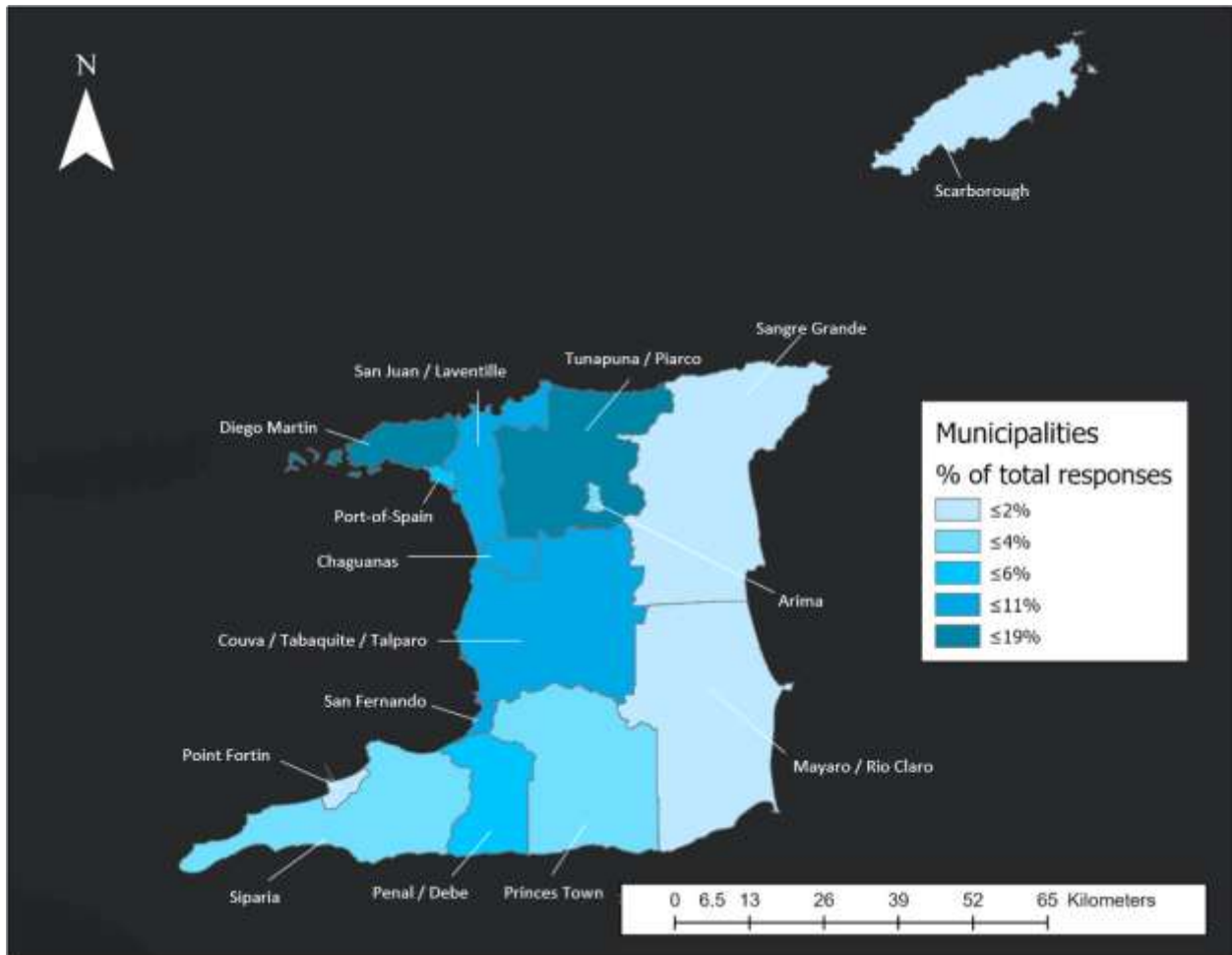


Figure 2: Geographic Location of Respondents

3.2.2. Age and Gender of Respondents

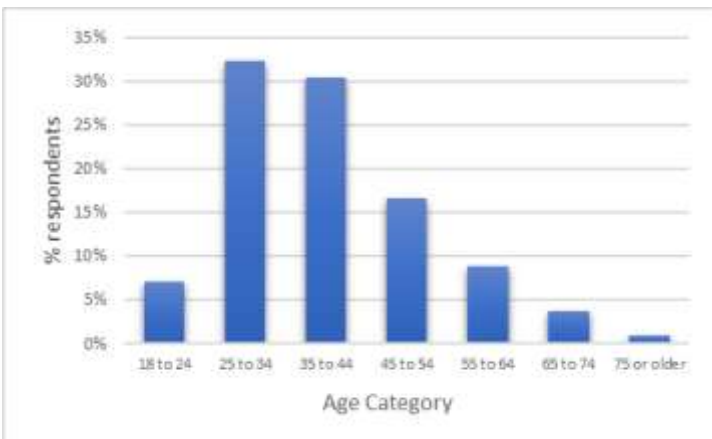


Figure 3: Respondent Age Categories

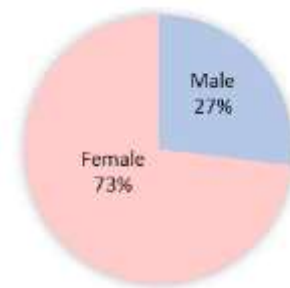


Figure 4: Respondents by Gender

A total of one thousand, five hundred and forty (1540) respondents answered the query on their age. As seen in Figure 3, the majority (62%) of respondents were between the ages of 25 and 44 years old. Seventeen percent (17%) were within the 45 to 54 age bracket, nine percent (9%) were within the 55 to 64 age bracket, seven (7%) percent were within the ages of 18 and 24, four percent (4%) were 65 to 74 years old, and one percent (1%) stated their age as 75 years or older.

With respect to gender a total of two thousand nine hundred and seventy-five (2975) responses were received, with almost three quarters of respondents (73%) indicating that they were female, as seen in Figure 4.

3.2.3. Household Information

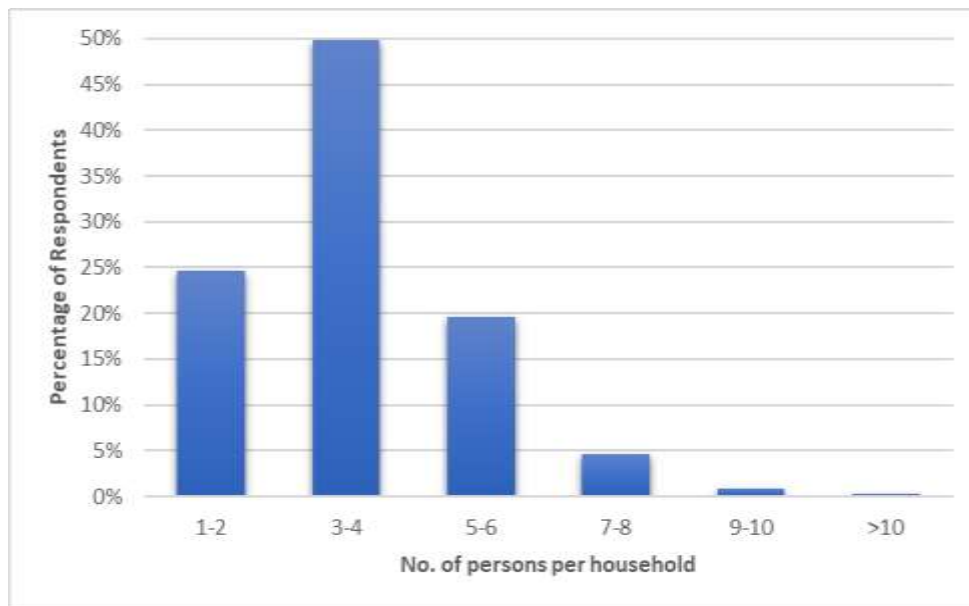


Figure 5: Household Size

A total of two thousand nine hundred and seventy-three (2973) responses were received with respect to household size, and the distribution of these responses are presented in Figure 5. Approximately fifty percent (50%) of households contained three to four persons, twenty-five percent (25%) were in a household comprising of one to two persons, twenty percent (20%) were in households with five to six persons, approximately four percent (4%) of respondents lived with seven to eight persons, while one percent (1%) of respondents lived with nine or more persons.

Respondents were also asked to indicate whether they owned pets. If they did, to indicate the type of pets that they owned. Eighty-five percent (85%) of respondents were pet owners, and

Figure 6 shows the types of pets owned and the distribution. Pet types were: dogs (62%), cats (18%), birds (13%), and other (7%). Other pet types included: fishes, rabbits, turtles, squirrels, and farm animals.

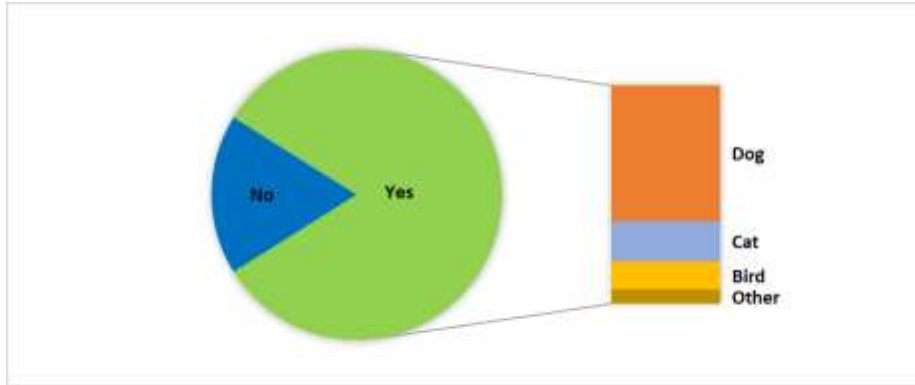


Figure 6: Pet Type

Respondents were asked to indicate the type of residence, in which they resided. As seen in Figure 7, the majority, eighty percent (80%) of respondents lived in a single home, just under nine percent (9%) lived in an apartment, approximately six percent (6%) lived in a townhouse, and five percent (5%) indicated that they lived on a farm or large property.

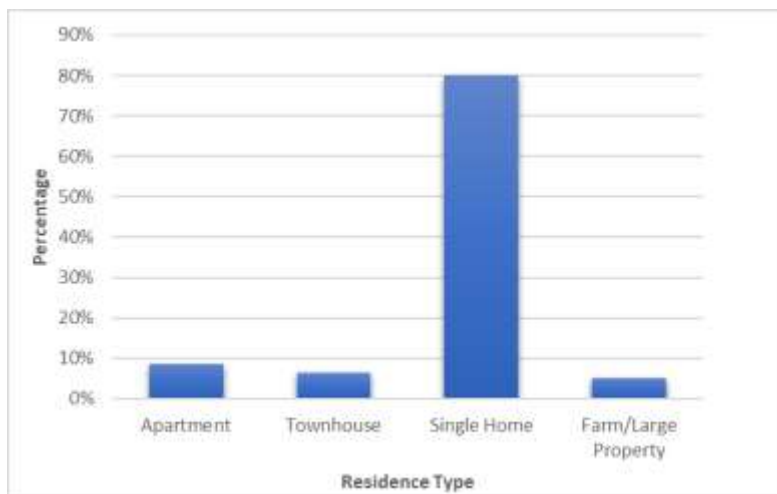


Figure 7: Residence Type

3.3 Fireworks Use

3.3.1. Purchase of Fireworks

Respondents were asked whether they, or anyone in their household purchased fireworks for use at home, within the last five years. A total of two thousand nine hundred and seventy (2970) responses were received, with eighty-seven percent (87%) of those respondents indicating that no fireworks were purchased.

Respondents who responded positively were asked to state where these fireworks were purchased. These responses are presented in Figure 8. Fifty-five percent (55%) of fireworks was purchased at roadside vendors, thirty-nine percent (39%) was purchased at stores or outlets, malls and markets accounted for one percent (1%) each of the purchase. While the remainder, four percent (4%) stated other localities, such as, the Divali Nagar, fireworks companies, and shops.

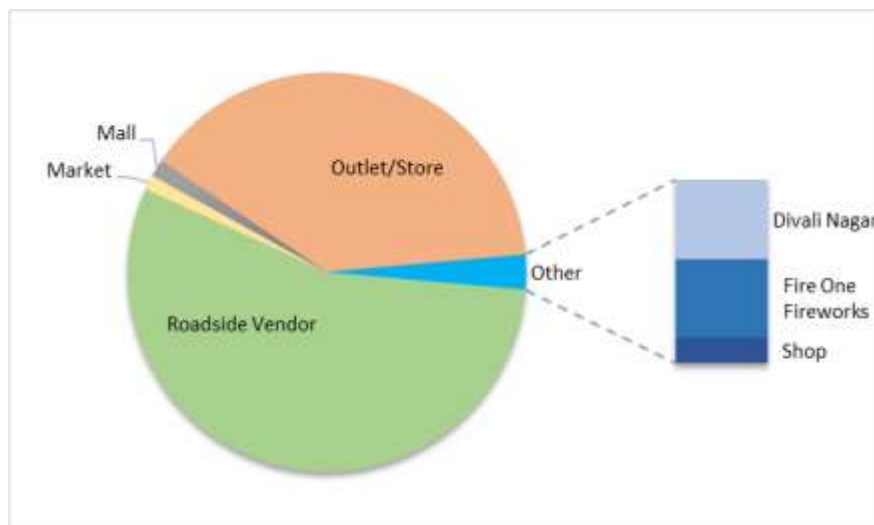


Figure 8: Fireworks Purchase Location

3.3.2. Discharge of Fireworks

Respondents were asked to indicate when the fireworks were used. A total of two hundred and thirty (230) responses were received. The distribution of these responses are shown in Figure 9. Fifty-seven percent (57%) indicated that fireworks were used on New Year's Eve (commonly referred to as Old Year's Day, in Trinidad and Tobago), thirty-eight percent (38%) indicated that they were used for national / cultural / religious occasions, four percent (4%) indicated that they were used at private events, such as, weddings, parties), and one percent (1%) of respondents indicated that they are used as a wildlife deterrent around aircrafts.

Respondents were then asked to indicate where the fireworks were discharged. A total of one thousand, four hundred and eight (1408) responses were received. The distribution of these responses are shown in Figure 10.

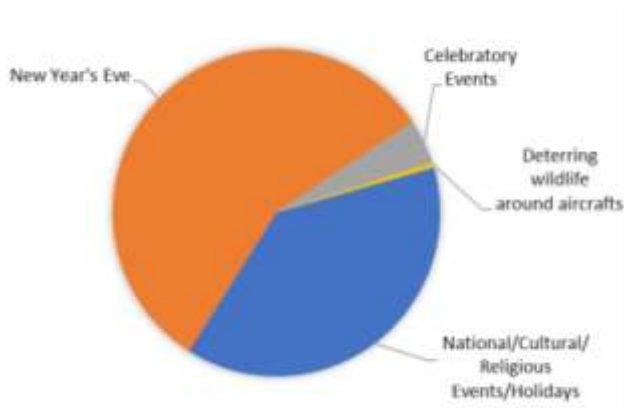


Figure 9: Events during which Fireworks were used

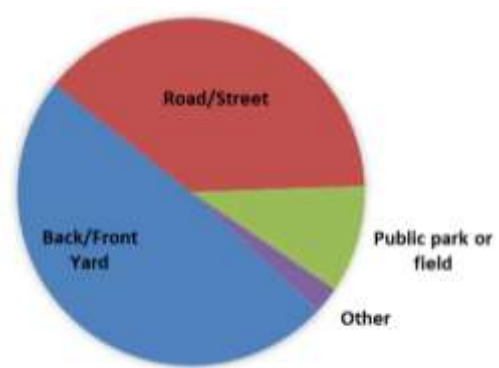


Figure 10: Fireworks Discharge Locations

Forty-nine percent (49%) percent of respondents stated that they were discharged from their private properties (front or back yards), thirty-nine percent (39%) indicated that they discharged fireworks in the road or street, approximately ten percent (10%) indicated that they were discharged in a public park or field. Two percent (2%) opted for the option of 'Other', and specified locations, such as: beaches and vacant land.

3.4 Fireworks Impacts

3.4.1. Affected Parties

Respondents were asked whether they, or anyone in their household were negatively affected by fireworks use. Two thousand nine hundred and fifty (2950) responses were received, with seventy-nine percent (79%) of respondents indicating that persons were negatively affected. These results are presented in Figure 11, as well as, the age distribution of those who were affected.

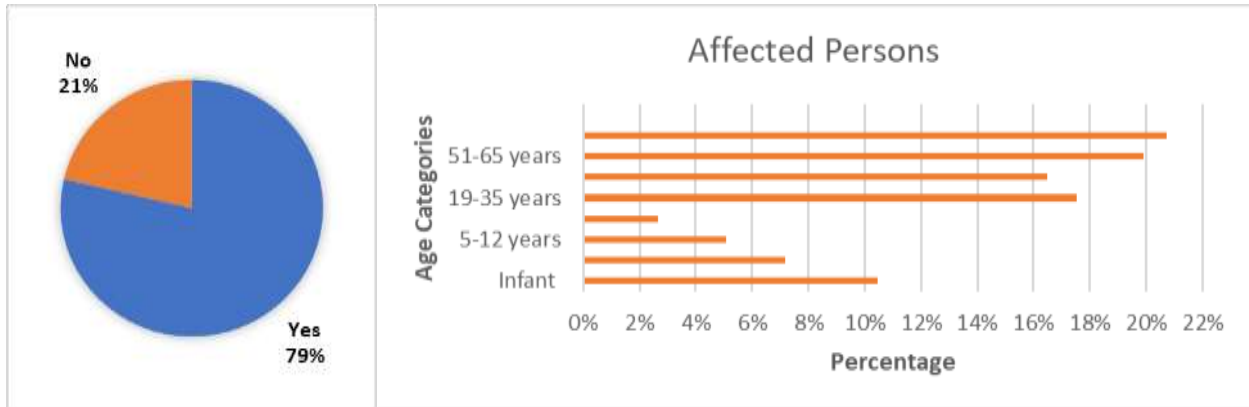


Figure 11: Affected Persons and Age Groups

Respondents were asked to indicate the ages of persons who were affected. The least affected fell within the ages of five (5) and eighteen (18) years, accounting for eight percent (8%). Approximately seven percent (7%) of affected persons were between one (1) and four (4) years, and ten percent (10%) were infants. The percentages for age categories for nineteen (19) years and older were generally consistent, ranging from eighteen percent (18%) to twenty-one (21%).

Respondents were also asked to indicate the types of pets that were affected, and this distribution is shown in Figure 12. Dogs were the major type of pet affected, by sixty percent (60%), followed by cats which accounted for seventeen percent (17%) of responses, and birds with thirteen percent (13%). Other types of pets, which accounted for ten percent (10%) included: squirrels, fishes, horses, and livestock.

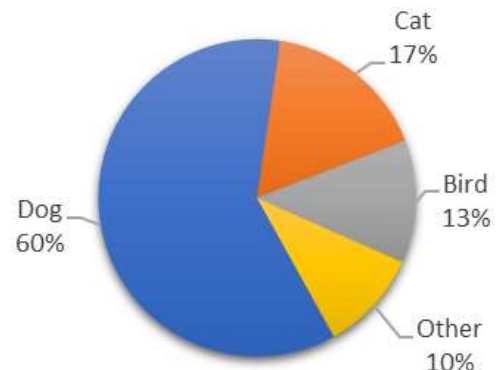


Figure 12: Affected Pet Types

The effects of noise experienced by respondents and persons in their households included:

- Irritability,
- Anxiety,
- Sleep deprivation,
- Headaches,
- Earaches and temporary/partial hearing loss,
- Hypertension,
- Chest pains,
- Stress,
- PTSD triggers,

- Burns/blast injuries,
- Panic attacks,
- Heart arrhythmia,
- Sinus problems and asthma attacks,
- Worsening of prior health conditions such as Alzheimer’s, Bipolar Disorder, and Autism.

The observed effects on pets included:

- Loss of life
- Erratic behaviour
- Traumatized wildlife seeking refuge
- Running off / running away
- Seizures
- Anxiety
- Distress
- Self-destruction
- Decreased egg production

3.3.2. Time and Frequency

The sources of the impacts were reported to have originated from neighbours (fifty-six (56%) percent), nearby events (twenty-two (22%) percent), and national / religious or cultural activities (twenty-two (22%) percent), as seen in Figure 13.

Respondents were also asked to indicate the frequency that fireworks were discharged. The distribution of these responses are shown in Figure 14. Approximately eighty-eight (88%) percent of respondents stated that fireworks were typically discharged during National / Cultural / Religious holidays, and New Year’s Eve. The remaining respondents indicated that fireworks were discharged quarterly (4%), monthly (2%), weekly (<1%), daily (2%), or infrequently (4%).

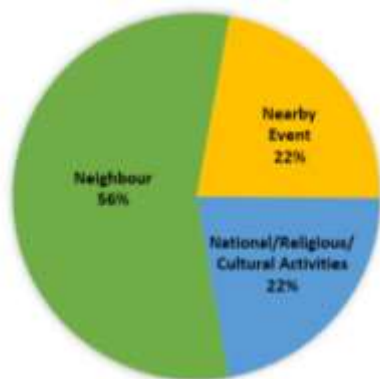


Figure 13: Source of the Impact

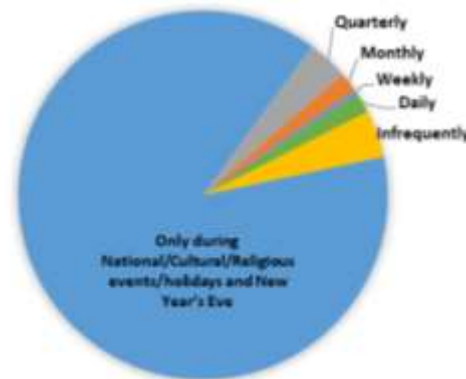


Figure 14: Frequency of Fireworks Discharge

Respondents were asked to indicate the time of impact experienced from fireworks. As seen in *Figure 15*, the time period 9:00 p.m. to 12:00 midnight garnered the majority of responses (63%), 23% of responses was received for the 12:00 midnight to 3:00 a.m. period, and 14% was received for the 6:00 p.m. to 9:00 p.m. period.

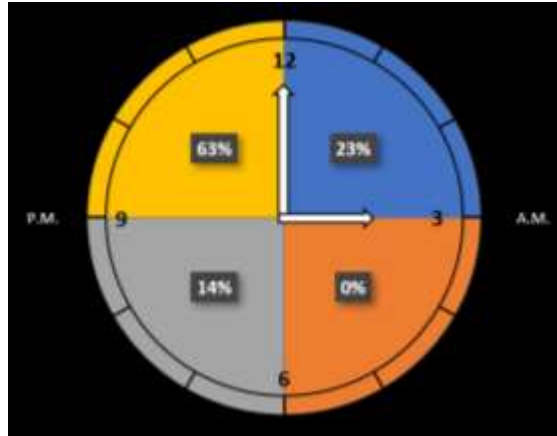


Figure 15: Time Period During Which Firework Impacts were Experienced

3.5 Proposed Actions

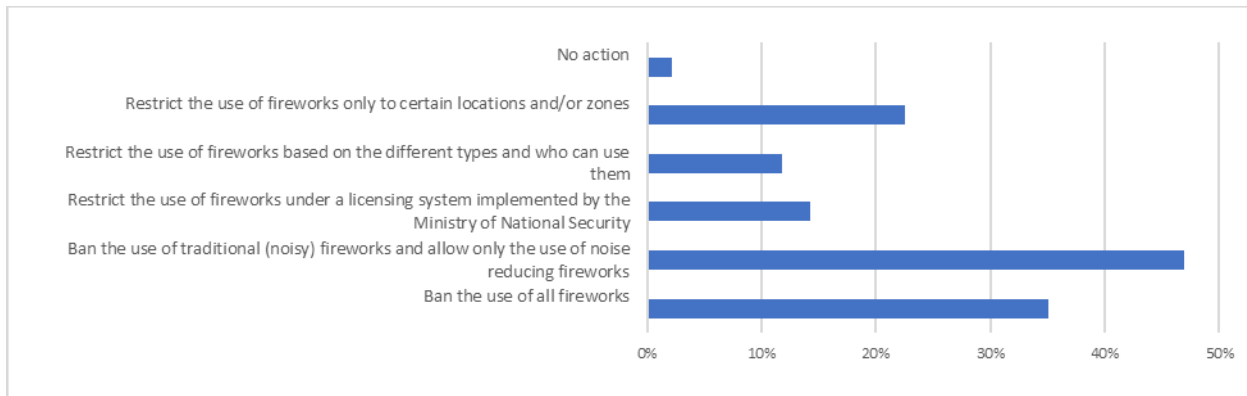


Figure 16: Preferred Actions to be Taken to Address the Issue of Fireworks

Respondents were asked to select the type of action(s) that they preferred to be taken to address the issue of fireworks. Two thousand eight hundred and eighty-one (2881) responses were received, and the distribution of responses are presented in Figure 16. Forty-seven percent (47%) of respondents were in favour of banning the use of traditional (noisy) fireworks and allowing the use of noise reducing fireworks. Thirty-five percent (35%) indicated that the use of all fireworks should be banned, twenty-three percent (23%) were in favour of restricting the use of fireworks to certain locations or zones, fourteen percent (14%) indicated that the use of fireworks should be restricted under a licencing system implemented by the Ministry of National Security, twelve

percent (12%) indicated that use of fireworks should be restricted based on the different types and who should be able to use them. Two percent (2%) indicated that they preferred that no action be taken. This group of respondents (two percent (2%)) had no problem with the way in which fireworks are currently managed.

3.6 General Comments

The final question of the survey invited respondents to provide additional comments, in the form of an open-ended question. The comments received fell into one of three broad categories: (i) additional comments on the use, (ii) effects and impacts of fireworks, (iii) recommendations on the use and management of fireworks, and (iv) comments on the survey.

As stated in Section 2.2, comments about the survey that were received in the first issue of the survey were used to rectify the issues experienced, and the survey was re-administered.

3.6.1. Additional Comments

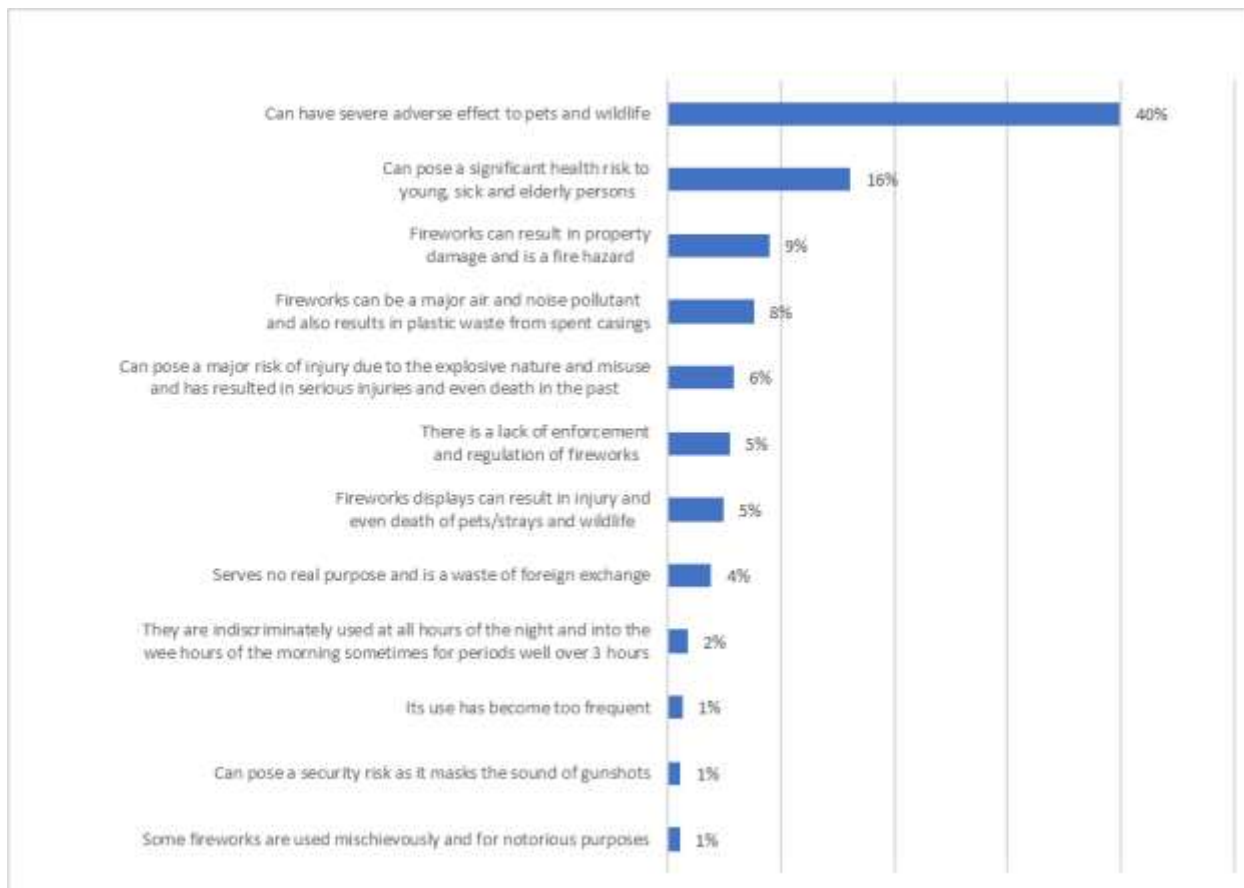


Figure 17: Additional Comments Received

A snapshot of some of the general comments received are presented in **Error! Reference source not found.** The most common response was that fireworks can have severe adverse effects on pets and wildlife, with approximately forty percent (40%) of respondents providing this comment. Other comments included: significant health risks to vulnerable groups, damage to property, as it is a fire hazard, source of noise, air and plastic pollution. Respondents also highlighted the lack of enforcement and regulation regarding fireworks, and the ease of accessibility of fireworks due to the increased number of retailers. The use of fireworks at night, and at early hours of the morning, and the frequency of these discharges, as well as, the potential security risks, specifically the discharge of fireworks masking the sound of gunshots were also mentioned by several respondents.

While the majority of comments focused on the negative impacts of fireworks, there were some comments that spoke favourably about the use of fireworks. Those comments noted that: there was cultural significance to the use of fireworks, hence it should not be banned. It makes special occasions memorable and therefore should not be banned. Fireworks are aesthetically pleasing, and due to the infrequent use. Therefore, it does not pose any issues. It serves an important role in the management of birds around landing aircrafts. These comments accounted for approximately one percent (1%) of the total comments received in this category.

3.6.2. Recommendations

Figure 18 provides a snapshot of the recommendations that were received by respondents. The comments included recommendations for changing the current legislation to close existing gaps; to include other activities, such as, bamboo bursting. To introduce stricter enforcement, and implementation of heavy fines. Both were seen as a deterrent and a source of revenue. The implementation of noise restrictions on the type of fireworks that are imported.

Respondents also suggested the use of designated areas for the discharge of fireworks. The places where its use should be permitted, were offshore, large open parks and savannahs. Conversely, some advocated for banned or restricted locations, for their use, such as, residential areas, in the vicinity of sensitive receptors, zoo and wildlife sanctuaries. There were also suggestions to limit the duration and periods during the year, whereby fireworks may be discharged. There were suggestions to not permit firework usage during specific periods, such as, during Carnival events.

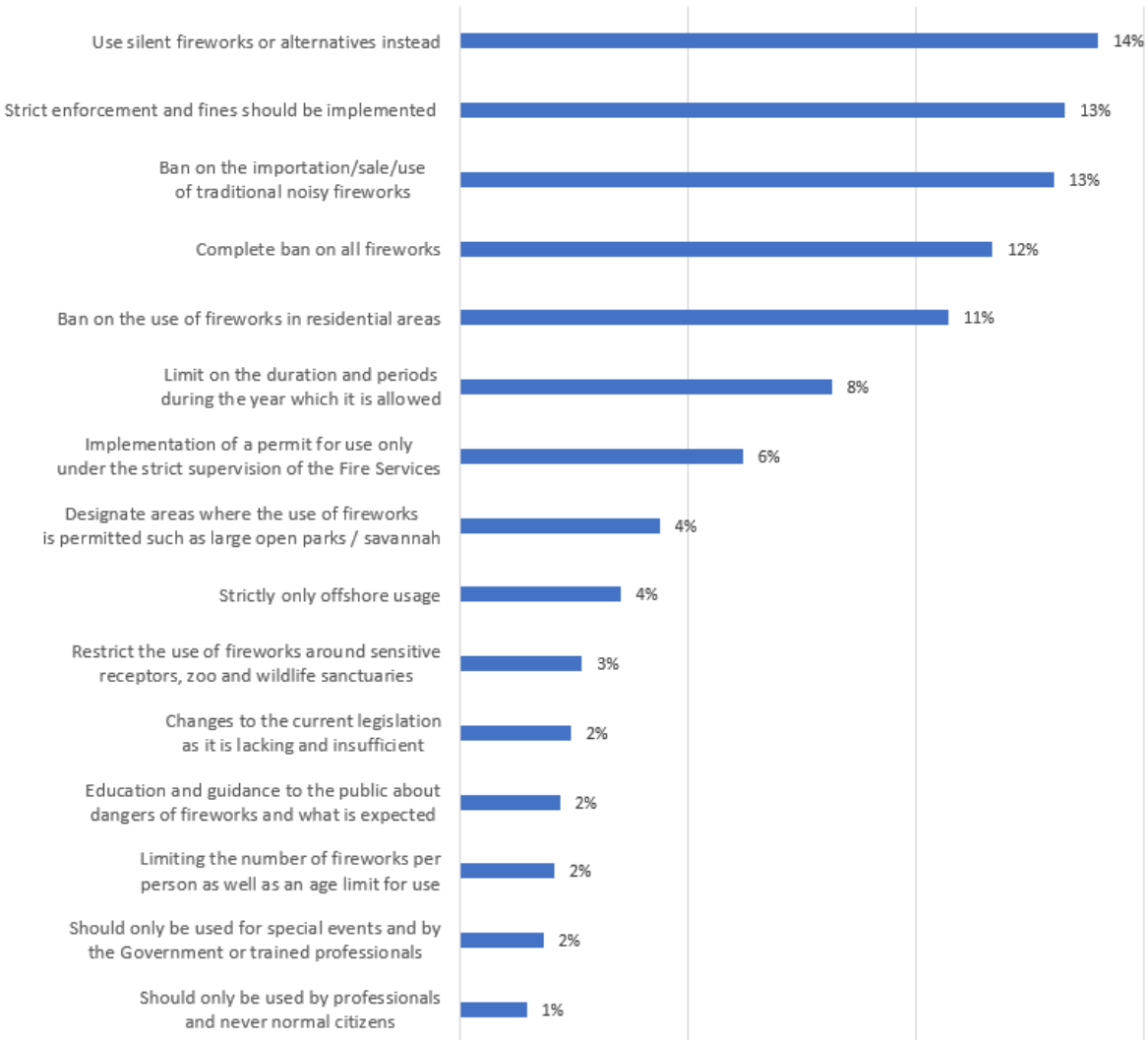


Figure 18: Recommendations Received

Several comments suggested that fireworks use be limited to specially trained professionals. Others suggested the implementation of a permitting system for use of fireworks. Additionally, there was a comment to limit the number of fireworks available to each person. Other comments stated the need to restrict usage through using an age limit.

Approximately thirty-six percent (36%) of the total comments spoke of the banning of fireworks. These recommendations ranged from: a complete ban on all fireworks, a ban on the importation/sale/use of traditional noisy fireworks and use of silent fireworks or alternatives instead.

Some respondents called for closer scrutiny of those companies that imported and sold fireworks. They noted that firework dealers / companies should be required to pay costs, for the medical and veterinary services that are incurred, by the public, as a result of fireworks use.

Some respondents also suggested the following: development of a software application to report fireworks nuisances, conduct a study on Best Practices used in other countries, to address fireworks. Other commenters stated that there is a need to educate and guide the public on the dangers of fireworks.

3.7 Virtual Presentation and Other Comments

3.7.1. Webinar Series

Comments from participants in the EMA's virtual presentation were received via two mediums: live during the session, and via the EMA's webinar email account, after the session.

Queries were made on: the current fines for fireworks related offences, and whether there were recommendations to increase existing fines. There were also queries regarding prosecutions for fireworks offences and the relationship between the EMA/EPU, the Trinidad and Tobago Police Service (TTPS), and the Trinidad and Tobago Fire Services (TTFS) with respect to fireworks use.

Some participants expressed that noiseless fireworks are not silent. They noted that there are still impacts from the use of such alternatives. It was suggested that there should be testing of the 'noiseless' fireworks to determine the noise levels produced, and whether there would in fact be a reduction in the impacts to receptors.

Recommendations, which were similar to those received in the public survey, included: increasing fines for illegal fireworks discharge, limiting the public's access to fireworks, limitations on the types of fireworks available to the general public, limitations on where these should be sold, and zoning restrictions for the discharge of fireworks.

3.7.2. Coalition of NGOs

In response to the public survey, the EMA received correspondence from a coalition of NGOs and private sector organizations, which comprised of the following entities: Animals 360 Foundation, El Socorro Centre for Wildlife Conservation, Animals Alive, Environmental Research Institute Charlotteville, Hikers Inc., Trinidad and Tobago Veterinary Association, Papa Bois Conservation,

Caribbean Discovery Tours, Animal Defence Society, and Wildlife and Environmental Protection of Trinidad and Tobago.

This correspondence outlined the negative effects of fireworks, as well as recommendations for the responsible use of fireworks. The Coalition's recommendations are as follows:

1. That the recommendations of the JSC be implemented.
2. That amendments be made to existing law to prescribe for the discharge of fireworks for national celebrations only (Independence and Old Year's) on designated times and dates.
3. That public spaces be identified by Regional Corporations where residents may gather to witness the discharge of fireworks under proper supervision during the designated times and dates. These being the only locations, times and dates permissible for the discharge of fireworks (whether in a town or not).
4. That end users of fireworks must be licensed to purchase or discharge fireworks.
5. That the remit of the EMA be increased to include noise control / limitations for fireworks.
6. That the fines associated with the unauthorised use of fireworks as prescribed under Section 99 and 100 of the Summary Offences Act Chap. 11.02 be increased.

4. Conclusion and Recommendations

The data collected in the public survey and subsequent webinar on the presentation of results indicate that there are numerous persons and animals who experience varying degrees of negative effects from fireworks use. The data also showed that fireworks usage in Trinidad and Tobago mostly occurs during national, cultural and religious events, and on New Year's Eve.

The general view of the public is that fireworks should not be banned outright, rather there should be greater management, through legislation and enforcement mechanisms regarding fireworks availability and use. The public also favoured the use of 'noiseless' fireworks over the traditional noisy varieties. It should be noted however, that 'noiseless' fireworks are not completely silent. They emit sound when discharged, albeit at a lower decibel level than the traditional fireworks, which produces sound that typically ranges from 125 - 155 dB, with a general average of 140 dB.

Based on the EMA's continued work on the issue of fireworks, we recommend the ban of the importation of traditional fireworks, and the promotion of, and use of noise reducing (<100 dB) fireworks, in Trinidad and Tobago.

Further we recommend the following:

1. Restrict the release of fireworks to certain specific occasions, for example, New Year's Eve, Independence Day, and National Religious Celebrations
2. Restrict the times fireworks are allowed to be discharged on these occasions, e.g.,
 - a. New Year's Eve - beginning 11:15 p.m. ending at 12:15 a.m. of the following day;
 - b. Independence Day - beginning 8:00 p.m. and ending at 9:00 p.m.; and
 - c. National Religious Celebrations - beginning 7:00 p.m. and ending at 8:00 p.m.
3. Designate areas for discharge of fireworks, such as, open public spaces with adequate setbacks from sensitive receptors.
4. Education and sensitisation of citizens as it relates to the benefits of moving towards noise reducing fireworks.
5. Increase fines and penalties for non-conformance of above recommendations.

References

Conway, Lorraine. 2020. *Regulation of fireworks*. Briefing Paper , UK House of Commons , House of Commons Library.

Ministry of Planning and Development. 2020. *T&T at a Glance*. <https://cso.gov.tt/tt-at-a-glance/>.

Vancouver City Council. 2020. "Fireworks Ban ." Council Report, Fire Rescue Services . <https://council.vancouver.ca/20200609/documents/r4.pdf>.

Yin, Steph. 2016. "Quiet Fireworks' Promise Relief for Children and Animals." *The New York Times*, 30 June. <https://www.nytimes.com/2016/07/01/science/july-4-fireworks-quiet.html>.

Environmental Management Authority

Position Paper on the Management of Fireworks in Trinidad and Tobago



In Trinidad and Tobago, celebrations including, Independence Day, Divali, the Christmas Season and New Year's Eve often involve the discharge of fireworks. In addition to its impact on sensitive human receptors, fireworks are also considered a worrying anthropogenic disturbance on companion animals, wildlife, pets and farm animals. The management of fireworks in Trinidad and Tobago, while governed by several pieces of legislation is generally unregulated. The increased and oftentimes indiscriminate usage particularly during festival periods, results in an annual outcry from citizens who are negatively impacted to varying degrees.

During the period 2015-2018, a Joint Select Committee (JSC) of the Parliament of the Republic of Trinidad and Tobago (GoRTT), was convened to conduct an inquiry into the adverse health effects of fireworks. The Environmental Management Authority ("EMA" or "Authority") was one of many agencies that appeared before the JSC to provide clarification and answer queries on its role in the issue of fireworks management in Trinidad and Tobago. The EMA's role in the management of the environment is governed by the Environmental Management Act Chap. 35:05 ("the EM Act") and regulated through its subsidiary legislation such as the Noise Pollution Control Rules, 2001 ("NPCR") and the Air Pollution Rules, 2014 ("APR"). The discharge of fireworks poses serious environmental concerns, particularly relating to noise and air pollution.

Section 51(2) of the EM Act makes it an offence for a person to emit or to cause to be emitted, noise greater in volume or intensity than prescribed in the NPCR.

Rule 9 (1) of the NPCR provides that where any person proposes to conduct an activity or event that will cause sound in excess of the prescribed standards, that person shall submit an application to the EMA for a Noise Variation from the prescribed standard ("Variation"). Rule 16 (2) of the NPCR further provides that the Authority shall establish conditions in each Variation. The conditions to be included in the Variation all speak to avoiding, minimizing or mitigating environmental impacts from the activity, including monitoring of the conditions of the Variation, and sound abatement.

Provided that the EMA is forewarned concerning the intention of an applicant for a Variation to discharge fireworks at a specific event, the EMA may stipulate as a condition of the Variation granted a particular time period in which the fireworks can be discharged. The Variation may also contain a condition that the surrounding community/receptors must be informed that fireworks will be discharged at the prescribed time.

However, it should be noted that based on the instantaneous nature of the noise generated from fireworks, it is generally difficult to predict the exact time of discharge to conduct noise measurement for the purpose of enforcement. Additionally, on occasions such as Divali and Old Year's night, when firework usage is prevalent, the noise generated from fireworks originate from multiple locations/sources making noise monitoring and the establishment of a breach of the NPCR difficult if not impossible. This is because a noise reading must be taken at the property boundary line of the source of sound, or at the boundary of a receptor affected by the sound pursuant to Rule 6 (1) and 4.3 of the Second Schedule of the NPCR in order to detect a breach.

In view of the foregoing, the EMA underscores that the technical advisory role of the EMA in the issue of fireworks management can produce the greatest impact provided that proper coordination mechanisms among the responsible agencies are established.

Environmental Management Authority

Position Paper on the Management of Fireworks in Trinidad and Tobago



1.0 BACKGROUND

1.1 Legislative Framework

The primary pieces of legislation which govern fireworks in Trinidad and Tobago are:

- **The Explosives Act Chap 16:02**
 - this governs the importation, manufacturing, transportation, storage, sale and use of fireworks and other related explosives¹;
- **The Summary Offences Act (“SOA”) Chapter 11:02 (as amended) – Sections 99 and 100**
 - this governs the use of fireworks² in relation to geographic space;
- **The Fireworks Permits Regulations**
 - made under Section 101 of the SOA and outlines the requirements to obtain permission to use fireworks.

The Ministry of National Security and its various arms and agencies – the Customs and Excise Division, and the Trinidad and Tobago Police Service (TTPS) are responsible for the implementation and enforcement of these pieces of legislation. While not explicitly stated in the Explosives Act or the SOA, the Trinidad and Tobago Fire Service (TTFS) also plays a key role. Under the Fire Service Act, Chap. 35:50, and Part V of the Occupational Safety and Health (OSH) Act Chapter 88:08, the TTFS is obligated to inspect facilities used for the storage of fireworks to determine suitability. At events, their responsibility includes the supervision of the storage and use of fireworks and related explosives.

The legislative requirements associated with the importation, storage, sale and distribution, and discharge of fireworks are summarized in Table 1.

Table 1: Requirements for Fireworks Usage in Trinidad and Tobago

	Requirement	Legislation	Agency
Importation	Import Licence	Explosives Act	Minister of National Security
Storage	Fire and Life Safety Certificate	Fire Service Act	TTFS
Sale and Distribution	<ul style="list-style-type: none"> • Wholesaler’s Licence • Retail Licence 	Explosives Act	TTPS District Magistrate
Discharge	Written Permission from the CoP	Fireworks Permits Regulations	TTPS

¹ As defined in the Act: *Explosive - means gunpowder, nitro-glycerine, dynamite, guncotton, blasting powders, fulminate of mercury or of other metals, coloured fires, and every other substance, whether similar to those above-mentioned or not, used or manufactured with a view to produce a practical effect by explosion or a pyrotechnic effect; and includes fog signals, fireworks, fuses, rockets, percussion caps, detonators, cartridges, ammunition of all descriptions, and every adaptation or preparation of an explosive as above defined.*

² As defined in the Act: *Fireworks - include bombs, torpedoes, squibs, rockets and serpents.*

Environmental Management Authority

Position Paper on the Management of Fireworks in Trinidad and Tobago



Import licences are issued by the Ministry of National Security, with roles for the TTPS and TTFS in the processing of these applications. There is no fee for this licence.

Wholesale and retail licences are issued by the District Magistrate's Court at fees of two hundred and fifty dollars (\$250) for a retailer's license and five hundred dollars (\$500) for a wholesaler's license.

Written permission is required from the Commissioner of Police (CoP) to discharge fireworks, and the fine for unapproved discharge stands at one thousand dollars (\$1000) within a town, and four hundred dollars (\$400) in an area that is not within a town.

The JSC on the inquiry into the adverse health effects of fireworks identified several gaps in the legislative framework:

- The Explosives Act does not accommodate the current diverse range of fireworks and other related explosives;
- TTFS' role is not designated in the legislative framework, thereby hampering their ability to take actions as may be necessary;
- Appropriate times and spaces where fireworks can be discharged are not specified.

1.2 Health, Safety and Environmental Impacts of Fireworks

Fireworks are explosive devices that produce beautiful visual effects when ignited. Unfortunately, they also release destructive blast waves of compressed air, toxic chemicals and loud sounds, which harm the health of humans, other animals and the environment.

Injuries from fireworks have been well documented in many countries [1,2,3,4,8,9]. Trinidad and Tobago has few studies relating to injuries specifically caused by fireworks, but this does not mean that they do not occur. There is evidence of these injuries, but they are not often documented in collective reports [7,10].

Firework injuries include burns, eye injuries, fractures including those of the skull, lacerations ear injuries and loss of limbs. Many of the injuries lead to permanent impairment and lifelong disability [3]. Rarely, death may occur from injuries sustained from fireworks [11]. Most disturbingly, a large proportion of those injured by fireworks are children and adolescents in most countries. Studies from the Netherlands [1], USA [5], and the Philippines [8] gave the proportion of children and adolescent patients as 40%, 37% and 47%. Many of the persons injured are bystanders with one study reporting 46% of persons who presented with injuries were bystanders [5]. These may include babies [1,7]. The American Academy of Paediatrics reported that one third of children with fireworks related eye injuries developed permanent blindness [11].

Impulse sounds are sounds of very brief duration and are more likely to cause noise-induced hearing loss (NIHL) than continuous noise of equal energy. Fireworks produce very loud levels of impulse noise with reports of 130dB and 175dB peak levels [12,13,14]. Sound levels of this magnitude are known to cause damage to hearing and to cause tinnitus. Most occupational health and safety regulations advise a maximum exposure limit of 140dB or lower peak sound level for adults [15,16,17]. The World Health Organisation recommended a maximum exposure limit of 140dB and 120dB peak sound level exposure for adults and children respectively [19]. Hearing loss and tinnitus from fireworks are not reported as

Environmental Management Authority

Position Paper on the Management of Fireworks in Trinidad and Tobago



often in the literature as for example, eye injuries and burns suggesting that those injuries may be less common. However, this may not be the case. Persons with a blast injury causing a perforated eardrum or lacerations to the ear will present to a medical facility for attention because of pain and/ or bleeding. Often persons with hearing loss and/or tinnitus due to exposure to a very loud sound would generally not seek immediate medical attention because there may be no significant pain. These persons are often seen days, weeks or months after the event. Damage from impulse noise can lead to early onset of age-related hearing loss [22].

The non-auditory effects of noise on health are well known and documented. They include annoyance, anxiety, cardiovascular disease, sleep disorders and cognitive performance. The effect of the noise from fireworks on wildlife and pets, especially dogs, is quite traumatic [21,29].

Fireworks are comprised of a variety of chemicals, and upon combustion, they release pollutants such as particulate matter (PM), carbon dioxide, sulphur dioxide, and nitrogen oxides into the air [23,24]. Strong links have been established between air pollution and respiratory disease and mortality [25,26,27]. There is also clear evidence of a significant increase in the air pollution during the discharge of fireworks as well as increased hospitalisations [23].

There are significant negative health effects of the discharge of fireworks. It is noteworthy that the majority of injuries from fireworks are to the young and many are life changing.

1.2.1 Environmental Assessment of Fireworks

In 2017, the EMA conducted an investigation into the negative impact of fireworks with regard to air and noise pollutants generated during fireworks discharge. Air quality was determined by observing particulate matter (PM) concentrations from data collected by the Ambient Air Quality Monitoring Stations (AAQMS) on the nights unweighted peak sound pressure levels were measured using sound pressure level meters.

The study areas of Port-of-Spain and Chaguanas were selected based on the locations of the EMA's AAQMS. Monitoring was conducted at the Port-of-Spain locations on December 25, 2017 (Christmas), and at the Chaguanas locations on December 31, 2017 (Old Year's). At each location, the meters were set to run simultaneously for a period of 1 hour, from 11:30 p.m. to 12:30 a.m., during each night of monitoring.

At the Port-of-Spain locations, there were no observable fireworks being discharged during the monitoring period, and all noise levels obtained were within the Prescribed Standard – night-time limit for General Areas. At the Chaguanas locations however, there was observable use of fireworks at all noise stations during the time of monitoring. There were instances where the Prescribed Standard was exceeded at all locations, while all Leq levels obtained exceeded the Prescribed Standard of 65 dBA (Leq). The levels obtained on Old Year's night were higher than those obtained on Christmas night and were primarily due to the use of fireworks during this time.

While this study was of a very limited scope and duration the data and information gathered was sufficient to reveal that the discharge of fireworks causes an elevation in noise levels beyond the stipulated levels in the NPCR.

Environmental Management Authority

Position Paper on the Management of Fireworks in Trinidad and Tobago



With regard to air quality, spikes in PM_{2.5} were observed at both stations, as well as a spike in PM₁₀ at the Chaguanas station on December 31, 2017. However, this was attributed to the presence of Saharan Dust in the region during the period of the study. As such no meaningful correlation can be made between discharge of fireworks and air quality based on this study.

1.3 Public Opinion on Fireworks in Trinidad and Tobago

In 2020, the EMA conducted an online public survey to gather information on the current practices regarding fireworks usage, obtain feedback on the impacts of fireworks, and proposed actions to address the issue of fireworks. This was an open survey which was publicised via the EMA's website and social media platforms.

From the responses provided, fireworks were found to have been discharged mainly on Old Year's Day (57%), as well as at national, cultural and religious events (38%), and private events such as weddings (4%). Discharge locations included private properties (49%), roads or streets (39%), public parks and fields (10%), and other locations such as beaches and vacant lands (2%).

The effects of noise experienced by respondents and persons in their households included: irritability, anxiety, sleep deprivation, headaches, earaches and temporary/partial hearing loss, hypertension, chest pains, stress, PTSD triggers, burns/blast injuries, panic attacks, heart arrhythmia, sinus problems and asthma attacks, worsening of prior health conditions such as Alzheimer's, Bipolar Disorder, Autism. The observed effects on pets included: loss of life, erratic behaviour, traumatized wildlife seeking refuge, running off / running away, seizures, anxiety, distress, self-destruction, decreased egg production.

The lack of enforcement and regulation regarding fireworks was highlighted by survey participants, as well as the ease of accessibility of fireworks due to the increased number of retailers. The use of fireworks at night and at early hours of the morning, and the frequency of these discharges, as well as the potential security risks, specifically the sound of fireworks masking those of gunshots were also mentioned by several respondents.

While the majority of comments focused on the negative impacts of fireworks, there were some comments that spoke favourably about the use of fireworks. Such comments included: that there was cultural significance to the use of fireworks and it makes special occasions memorable and therefore should not be banned; fireworks are aesthetically pleasing, and due to its infrequent use, it does not pose any issues.

The comments included recommendations for changing the current legislation to close existing gaps and include other activities such as bamboo bursting, stricter enforcement, implementation of heavy fines, both as a deterrent and a source of revenue, and the implementation of noise restrictions on the type of fireworks that are imported.

Respondents also suggested designated areas within which fireworks use should be permitted, such as offshore, large open parks and savannahs, as well as locations within which their use should be banned or restricted, such as residential areas, the vicinity of sensitive receptors, zoo and wildlife sanctuaries. There were also suggestions to limit the duration and periods during the year within which

Environmental Management Authority

Position Paper on the Management of Fireworks in Trinidad and Tobago



fireworks may be discharged, as well as suggestions of periods when firework usage should not be allowed, such as during Carnival events.

1.4 Economic Considerations

Fireworks are imported and exported into and out of the country. As reported in the findings of the JSC, as of 2016, there were five (5) import and export licence holders in Trinidad and Tobago. Table 2 shows information provided by the Customs and Excise Division regarding the value of fireworks imported during the period 2012 to June, 2017.

Table 2: The Total Customs Value of Fireworks Imported into Trinidad and Tobago in the period 2012 - 2017

Year	Actual TT Dollars	Average	Average US Dollars
2012	\$1,510,277.63	6.45	\$234,151.57
2013	\$2,791,953.10	6.45	\$432,860.94
2014	\$2,064,911.07	6.37	\$324,161.86
2015	\$1,614,651.67	6.43	\$250,605.56
2016	\$1,972,885.68	6.76	\$291,846.99
01/01 -22/06/17	\$ 174,104.50	6.76	\$ 25,755.10

Source: JSC Report on an Inquiry into the Adverse Health Effects of Fireworks (2018)

The above represents the use of foreign exchange to import fireworks into Trinidad and Tobago. No comparative export data was provided in the JSC Report to show foreign exchange earnings, if any, from the export of fireworks.

The fireworks business can be an employment generator, for which data is not available. Wholesalers operate year-round and may employ persons for tasks such as: supply and distribution, warehouse management, customer service, and administration. Employment generation may not be negatively impacted upon on a change to a safer category of fireworks.

Employment is also generated through the provisions of the retail licence system, although this is observed to be largely seasonal, coinciding with the Divali and Old Year's festivities when fireworks usage increases. In the weeks prior to these occasions, temporary retail outlets are observed at various locations through the country, and fireworks are readily available from stores, and vendors. However, although data is not available there is an adverse health impact on humans and animals, the economic and health related costs of which are unknown at this time.

1.4.1 Consumer Fireworks Costs

The price of fireworks ranges from a few dollars to thousands of dollars for a single item, based on the type and size of the product. Popular fireworks categories include: assortments, crackers, fountains, missiles, multicakes, mine and shell devices, spinners, rockets, roman candles, smoke items and sparklers. Table 3 shows the price range of the various firework types that are commonly available in Trinidad and Tobago. Prices vary greatly within a particular firework type based on the size, brand, and effect produced.

Environmental Management Authority

Position Paper on the Management of Fireworks in Trinidad and Tobago



Table 3: Firework Types and Average Costs³

Firework Type	Description	Price Range (TTD)*
Crackers	Contains flash powder wrapped in paper with a fuse attached. Creates loud bangs when ignited.	\$5 - \$400
Roman Candles	Long tubes containing several stars that are discharged in a series of short intervals.	\$60 - \$300
Fountains	These sit on the ground and emit showers of sparks. These do not typically discharge high into the air.	\$5 - \$400
Spinners	These spin, setting off sparks in all directions. These may be aerial or ground.	\$20 - \$80
Rockets and Missiles	Tube-like pyrotechnic that propels itself into the air.	\$30 - \$450
Smoke	These produce smoke effects. Noise may not be produced by their discharge.	\$12 - \$120
Sparklers	Commonly referred to locally as 'Star Lights'. These are simple handheld sticks that create sparks when lit. These do not typically emit noise.	\$10 - \$200
Cakes	Also known as 'repeaters' or 'multi-shot aerials'. These are comprised of a single fuse that sets off a variety of tubes in succession. These are typically loud.	\$30 - \$6000

* prices obtained from FireOne Fireworks Fx's online store

Consumers typically purchase a variety of firework types, at various price ranges. In the absence of formal accounts of monies being spent on fireworks by consumers being readily available, newspaper articles were scanned to obtain information. While this information is not truly representative, it offers an insight into the amount of money that consumers spend on fireworks. The newspaper articles published around Old Year's, typically report fireworks sellers as describing sales as positive. Persons have estimated to have spent in the amount of \$3500 [30], \$8000, \$28,000 [31] on fireworks, in some instances.

³ Information compiled from the following sources:

FireOne Fireworks Fx:

<https://www.fireonefx.com/shop/>

American Pyrotechnics Safety & Education Foundation:

<https://www.celebratesafely.org/kinds-of-fireworks>

Washington State Patrol:

<https://www.wsp.wa.gov/wp-content/uploads/2021/05/Fireworks-Stand-List-Legal-and-Illegal.pdf>

2.0 STRATEGIES TO SUPPORT OPTIONS

The following should be noted:

i. Traditional fireworks and noise reducing fireworks

The main complaint associated with fireworks is the loud, instantaneous noise generated from its discharge. Other complaints include: smoke / haze, air pollutants, and waste generated from its packaging. The traditional fireworks typically emit sounds that range from 125 - 155dB, with a general average of 140dB. Noise reducing fireworks, while not completely silent, emit sounds that are under 120dB.

The terms – ‘noiseless’, ‘silent’ and ‘noise reducing’ are used interchangeably in the literature, as they all refer to fireworks with a lower decibel level than the traditional fireworks. However, it should be noted that the use of the terms ‘silent’ and ‘noiseless’ to describe fireworks are misleading as fireworks are not completely noiseless or silent. In Scotland, the City of Edinburgh’s Corporate Policy and Strategy Committee’s report on Silent Fireworks noted that *“there is no legislative or numerical definition as to what is regarded a “silent” or “quiet” firework, and the fact remains these silent firework displays are neither silent or quiet”. The fireworks industry will generally describe them [quiet or silent fireworks] as being less than 120 decibel (dB) and to lack the characteristic “bang” of a firework”* [32]. As such, the term ‘noise reducing’ is preferred, as it provides a realistic description of those particular fireworks.

Globally, there is an increasing awareness of the loudness of fireworks, and its negative impacts on sensitive receptors, such as the elderly, babies, and animals. Jurisdictions in Italy and Canada have taken legislative steps to ban traditional noisy fireworks. While others, such as the United Kingdom have embarked on further investigations and inquiries to explore the possibility and determine the feasibility of banning fireworks.

Noise reducing fireworks are available on the local market, including locally from fireworks suppliers, though they are not as popular as the traditional fireworks.

ii. Amendment of the EM Act and NPCR to include fireworks

It is the technical opinion of the EMA that the inclusion of a noise standard for fireworks within the NPCR is impractical. The enforcement of the NPCR requires the establishment of a breach, and to do so, noise monitoring has to be conducted at a specific location over a specified time period to determine non-compliance of the prescribed standard. This becomes even more difficult on those days when fireworks discharge is prevalent with multiple sources being discharged at the same time. Constant surveillance by the EPU will also be required to locate persons undertaking the action. Additionally, the enforcement process takes the form of legal proceedings, wherein representations are required to be made which may be resolved by entering into a Consent Agreement which includes a financial penalty.

Environmental Management Authority

Position Paper on the Management of Fireworks in Trinidad and Tobago



This requires significant increases in the manpower and resources that are currently allocated to the EMA, as well as significant changes to the EM Act, the NPCR, and the processes within the EMA. It is onerous to pursue monitoring and enforcement of the discharge of fireworks, based on a standard.

Additionally, the required actions before enforcement action can be undertaken under the NPCR undermines the objective of the required surveillance which is to prevent or stop persons caught in the act of discharging restricted fireworks, therefore minimizing the impact on sensitive receptors.

Faster results can be accomplished through monitoring and enforcement of the Summary Offences Act Chapter 11:02 by the TTPS than under the NPCR. The ability to establish a breach and take action against the offending party would be impacted by the interference of noise being generated by other fireworks users in proximity.

iii. Fireworks Standards

In the United Kingdom (UK), legislation stipulates a maximum noise level of 120dB for fireworks, and manufacturers have adjusted their products to meet this requirement. Further, the UK utilizes the BS EN 15947 – *Pyrotechnic articles. Fireworks, Categories 1, 2, and 3* technical standard and requires that all fireworks offered for sale in the UK are marked with the applicable CE mark to signify compliance with the standard [33,34,35].

These standards (or the latest editions of the normative documents referred to) should be considered in the implementation of similar local standards, for fireworks being imported and used in the country. It is suggested that noise reducing fireworks be defined as fireworks that emit sounds up to a maximum of 120dB. This can be incorporated into the Explosives Act, Chap. 16:02.

It is more practical to apply restrictions on the import of fireworks that generate noise in excess of a determined decibel limit and allow the discharge of permitted fireworks during those days and for a limited duration as identified below.

iv. Categorization of Fireworks

In the UK fireworks are categorized in accordance with the Pyrotechnic Articles (Safety) Regulations 2015. These categories, as well as the corresponding safety distances and maximum noise level are summarized in Table 4 [34].

Table 4: Summary of different categories of fireworks in the UK

Category	Standard	Safety Distance	Maximum Noise Level
F1	Fireworks which present a very low hazard and negligible noise level and which are intended/or used in confined areas including fireworks which are intended for use inside domestic buildings.	1m	120dB (A, imp.)

Environmental Management Authority

Position Paper on the Management of Fireworks in Trinidad and Tobago



Category	Standard	Safety Distance	Maximum Noise Level
F2	Fireworks which present a low hazard and low noise level and which are intended for outdoor use in confined areas.	8m	120dB (A, imp.)
F3	Fireworks which present a medium hazard which are intended for outdoor use in large open areas and whose noise level is not harmful to human health.	15m	120dB (A, imp.)
F4	Fireworks which present a high hazard, which are intended for use only by persons with specialist knowledge and whose noise level is not harmful to human health.	no legal restrictions	no legal restrictions

This categorization specifies what types of fireworks can be used, where they can be used, and who can use them. Unlike the F3 category, the F1 category presents “a very low hazard and negligible noise level” and the F2 category presents “a low hazard and low noise level”. F4 fireworks are only accessible to persons with specialist knowledge and are not available to the general public. Consideration should be given to adopting a categorization similar to F1 and F2 within the local legislative framework.

v. Permitted Fireworks Discharge Periods

The discharge of fireworks should be limited to specific days and time periods. The following is presented for consideration:

- New Year's Eve - beginning 11:15 p.m. ending at 12:15 a.m. of the following day;
- Independence Day - beginning 8:00 p.m. and ending at 9:00 p.m.; and
- Public Holidays such as Divali, Eid, Christmas day, Boxing day - beginning 7:00 p.m. and ending at 9:00 p.m.

vi. Designated discharge areas

Specific discharge areas should be identified and designated such as open public spaces with adequate setbacks from sensitive receptors.

vii. Education and sensitization of citizens as it relates to the benefits of introducing noise reducing fireworks

The use of noise reducing fireworks as opposed to traditional noise producing fireworks operate to reduce the stressful effects on persons and animals in the vicinity of the fireworks release. Noise reducing fireworks allow for the pleasing of the optic receptors without the concurrent decimation of the auditory receptors, consequent elevation of stress levels and environmental pollution.

Environmental Management Authority

Position Paper on the Management of Fireworks in Trinidad and Tobago



3.0 EMA RECOMMENDATIONS

3.1 Complete ban on traditional noise producing fireworks and importation of ONLY noise reducing fireworks, in accordance with the Pyrotechnic Articles (Safety) Regulations 2015: category F1 and F2, with the limitation of the discharge of fireworks to the following specific days and time periods:

- a. New Year's Eve - beginning 11:15 p.m. ending at 12:15 a.m. of the following day;
- b. Independence Day - beginning 8:00 p.m. and ending at 9:00 p.m.; and
- c. Public Holidays such as Divali, Eid, Christmas day, Boxing day - beginning 7:00 p.m. and ending at 9:00 p.m.

3.2 The reconvening of the Ministry of National Security's (MoNS) Fireworks Committee to discuss these recommendations with the other relevant stakeholders. This Committee comprised of representatives from the following agencies:

- Ministry of National Security;
- Trinidad and Tobago Police Service;
- Trinidad and Tobago Fire Service;
- Ministry of Health; and
- Environmental Management Authority.

The following agencies should be included in the Committee:

- Customs and Excise Division;
- Trinidad and Tobago Bureau of Standards; and
- Tobago House of Assembly.

We firmly believe that the recommendation being put forward, represents an effective and efficient management strategy in controlling the impacts of fireworks usage on the environment.

The EMA remains committed to coordinating with all responsible agencies in fulfilling its role as a technical advisor in the management of the environmental impacts of fireworks in Trinidad and Tobago.

Environmental Management Authority

Position Paper on the Management of Fireworks in Trinidad and Tobago



REFERENCES

1. Van Yperen DT, Van der Vlies CH, De Faber JTHN, Smit X, Polinder S, et al. (2020) *Epidemiology, treatment, costs, and long-term outcomes of patients with fireworks-related injuries (ROCKET); a multicenter prospective observational case series*. PLOS ONE 15(3): e0230382. <https://doi.org/10.1371/journal.pone.0230382>
2. Rashid RA, Heidary F, Hussein A, Hitam WH, Rashid RA, Ghani ZA, Omar NA, Mustari Z, Shatriah I. *Ocular burns and related injuries due to fireworks during the Aidil Fitri celebration on the East Coast of the Peninsular Malaysia*. Burns. 2011 Feb;37(1):170-3. doi: 10.1016/j.burns.2010.05.019. Epub 2010 Jun 23. PMID: 20576358.
3. Chan WC, Knox FA, McGinnity FG, Sharkey JA. *Serious eye and adnexal injuries from fireworks in Northern Ireland before and after lifting of the firework ban--an ophthalmology unit's experience*. Int Ophthalmol. 2004 May;25(3):167-9. doi: 10.1007/s10792-004-1958-z. PMID: 15847316
4. Saadat S, Naseripour M, Smith GA. *The health and economic impact of fireworks-related injuries in Iran: a household survey following the New Year's Festival in Tehran*. Injury. 2010 Jul;41(7):e28-33. doi: 10.1016/j.injury.2009.02.002. Epub 2009 Jun 18. PMID: 19539923.
5. Moore JX, McGwin G Jr, Griffin RL. *The epidemiology of firework-related injuries in the United States: 2000-2010*. Injury. 2014 Nov;45(11):1704-9. doi: 10.1016/j.injury.2014.06.024. Epub 2014 Jul 8. PMID: 25047335
6. Sandvall BK, Jacobson L, Miller EA, Dodge RE 3rd, Alex Quistberg D, Rowhani-Rahbar A, Vavilala MS, Friedrich JB, Keys KA. *Fireworks type, injury pattern, and permanent impairment following severe fireworks-related injuries*. Am J Emerg Med. 2017 Oct;35(10):1469-1473. doi: 10.1016/j.ajem.2017.04.053. Epub 2017 Apr 25. PMID: 28495236.
7. Daily Express. November 16, 2020. *Injured Infant rushed to hospital as fireworks explodes*. Accessed on June 15, 2021. https://trinidadexpress.com/newsextra/injured-infant-rushed-to-hospital-as-fireworks-explodes/article_f8e667c6-2814-11eb-845f-1fe8d3a6b008.html
8. Roca JB, de los Reyes VC, Racelis S, Deveraturda I, Sucaldito MN, Tayag E, O'Reilly M. *Fireworks-related injury surveillance in the Philippines: trends in 2010-2014*. Western Pac Surveill Response J. 2015 Nov 11;6(4):1-6. doi: 10.5365/WPSAR.2015.6.1.014. PMID: 26798555; PMCID: PMC4712527.
9. Wang F, Lou B, Jiang Z, Yang Y, Ma X, Lin X. *Changing Trends in Firework-Related Eye Injuries in Southern China: A 5-Year Retrospective Study of 468 Cases*. J Ophthalmol. 2020 Aug 6;2020:6194519. doi: 10.1155/2020/6194519. PMID: 32832138; PMCID: PMC7428839.
10. Newsday (Paul Lindo) *Police: Zero tolerance on unauthorised fireworks*. December 2020 <https://newsday.co.tt/2020/12/29/police-zero-tolerance-on-unauthorised-fireworks/>
11. American Academy of Pediatrics Committee on Injury and Poison Prevention. *Fireworks-Related Injuries to Children*. Pediatrics July 2001, 108 (1) 190-191; DOI: <https://doi.org/10.1542/peds.108.1.190>

Environmental Management Authority

Position Paper on the Management of Fireworks in Trinidad and Tobago



12. Flamme GA, Liebe K, Wong A. *Estimates of the auditory risk from outdoor impulse noise. I: Firecrackers*. Noise Health Oct-Dec 2009;11(45):223-30. doi: 10.4103/1463-1741.56216.
13. Tanaka T, Inaba R, Aoyama A. *Noise and low-frequency sound levels due to aerial fireworks and prediction of the occupational exposure of pyrotechnicians to noise*. J Occup Health. 2016 Nov 29;58(6):593-601. doi: 10.1539/joh.16-0064-OA. Epub 2016 Sep 30. PMID: 27725489; PMCID: PMC5373909.
14. Kardous CA, Murphy WJ. *How Can we Measure Impulse Noise Properly?* NIOSH Science Blog. <https://blogs.cdc.gov/niosh-science-blog/2018/07/18/impulse-noise/>
15. Roberts B, Neitzel RL. *Noise exposure limit for children in recreational settings: Review of available evidence*. The Journal of the Acoustical Society of America 146, 3922 (2019); <https://doi.org/10.1121/1.5132540>
16. Occupational Safety and Health Service (2002). *Approved Code of Practice for the Management of Noise in the Workplace* (Occupational Safety and Health Service, New Zealand).
17. OSHA (2010). *Occupational Noise Exposure* (OSHA, Washington, DC), pp. 211–224.
18. NIOSH (1998). *Criteria for a Recommended Standard Occupational Noise Exposure Revised Criteria 1998* (National Institutes of Occupational Safety and Health, Cincinnati, OH)
19. Roberts B, Neitzel RL. *Noise exposure limit for children in recreational settings: Review of available evidence*. J Acoust Soc Am. 2019 Nov;146(5):3922. doi: 10.1121/1.5132540. PMID: 31795717.
20. Basner M, Babisch W, Davis A, Brink M, Clark C, Janssen S, Stansfeld S. *Auditory and non-auditory effects of noise on health*. Lancet. 2014 Apr 12;383(9925):1325-1332. doi: 10.1016/S0140-6736(13)61613-X. Epub 2013 Oct 30. PMID: 24183105; PMCID: PMC3988259.
21. Dale AR, Walker JK, Farnworth MJ, Morrissey SV, Waran NK. *A survey of owners' perceptions of fear of fireworks in a sample of dogs and cats in New Zealand*. N Z Vet J. 2010 Dec;58(6):286-91. doi: 10.1080/00480169.2010.69403. PMID: 21151214.
22. Xiong M, Yang C, Lai H, Wang J. *Impulse noise exposure in early adulthood accelerates age-related hearing loss*. Eur Arch Otorhinolaryngol. 2014 Jun;271(6):1351-4. doi: 10.1007/s00405-013-2622-x. Epub 2013 Jul 11. PMID: 23842602.
23. Garaga R, Kota SH. *Characterization of PM10 and Impact on Human Health During the Annual Festival of Lights (Divali)*. J Health Pollut. 2018 Dec 1;8(20):181206. doi: 10.5696/2156-9614-8.20.181206. PMID: 30560005; PMCID: PMC6285675.
24. Jing H, Li YF, Zhao J, Li B, Sun J, Chen R, Gao Y, Chen C. *Wide-range particle characterization and elemental concentration in Beijing aerosol during the 2013 Spring Festival*. Environ Pollut. 2014 Sep;192:204-11. doi: 10.1016/j.envpol.2014.06.003. Epub 2014 Jun 26. PMID: 24975025
25. Shah, A. S. V. et al. *Short term exposure to air pollution and stroke: systematic review and meta-analysis*. BMJ (Clinical research ed.) 350, h1295 (2015). 22.
26. Dominici, F. et al. *Fine particulate air pollution and hospital admission for cardiovascular and respiratory diseases*. Jama 295, 1127–1134 (2006)

Environmental Management Authority

Position Paper on the Management of Fireworks in Trinidad and Tobago



27. Kan H, Chen B, Zhao N, London SJ, Song G, Chen G, Zhang Y, Jiang L; *HEI Health Review Committee. Part 1. A time-series study of ambient air pollution and daily mortality in Shanghai, China.* Res Rep Health Eff Inst. 2010 Nov;(154):17-78. PMID:
28. Wong CM, et al; HEI Health Review Committee. Part 5. *Public health and air pollution in Asia (PAPA): a combined analysis of four studies of air pollution and mortality.* Res Rep Health Eff Inst. 2010 Nov;(154):377-418. PMID: 21446215.
29. Shamoun-Baranes J, Dokter AM, van Gasteren H, van Loon EE, Leijnse H, Bouten W. *Birds flee en mass from New Year's Eve fireworks.* Behav Ecol. 2011 Nov;22(6):1173-1177. doi: 10.1093/beheco/arr102. Epub 2011 Jul 11. PMID: 22476363; PMCID: PMC3199162.
30. Trinidad and Tobago Newsday. December 27, 2020. *Fireworks trump Boxing Day sales.* Accessed on July 19, 2021. <https://newsday.co.tt/2020/12/27/fireworks-trump-boxing-day-sales/>
31. Guardian Media Limited - CNC3. December 26, 2020. *Fireworks sales good.* Accessed on July 19, 2021. <https://www.cnc3.co.tt/fireworks-sales-good/>
32. City of Edinburgh Corporate Policy and Strategy Committee. March, 2017. *Silent Fireworks Report.* Accessed on October 01, 2021.
33. United Kingdom House of Commons Briefing Paper - *Regulation of Fireworks.* Number 05704. Nov 2020
34. The Pyrotechnic Articles (Safety) Regulations 2015. United Kingdom. Aug 2015
35. Office for Product Safety and Standards (United Kingdom). *Fireworks: noise levels and impacts on health and the environment.* 2020
36. Trinidad and Tobago Parliament. Joint Select Committee on Social Services and Public Administration. *Inquiry into the Adverse Health Effects of Fireworks.* May 2018.